

ECONOMIC SCIENCE FOR RURAL DEVELOPMENT

Proceedings of the
International Scientific Conference

No 44 Rural Development and Entrepreneurship
Bioeconomy
Production and Co-operation in Agriculture

No 44

Jelgava

2017

ISSN 1691-3078

ISSN 2255-9930 on line

ISBN 978-9984-48-260-6

Abstracted / Indexed: ISI Web of Science, AGRIS, CAB Abstracts, EBSCOHost Academic Search Complete databases and Google Scholar

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Time schedule of the conference

Preparation of the proceedings and organization: December 2016 – April 2017

Conference: 27-28 April 2017

Researchers from the following higher education institutions, research institutions, and professional organizations presented their scientific papers at the conference:

Agency for Restructuring and Modernisation of Agriculture in Leczna	Poland
AGH University of Science and Technology	Poland
Aleksandras Stulginskis university	Lithuania
BA School of Business and Finance	Latvia
College of Law	Latvia
Estonian University of Life Sciences	Estonia
Gdynia Maritime University	Poland
Groupe ESC Troyes	France
Institute of Agricultural Resources and Economics	Latvia
Institute of Soil Science and Plant Cultivation State Research Institute	Poland
Kaunas University of Technology	Lithuania
Kuban State University	Russia
Latvia University of Agriculture	Latvia
Lithuanian Institute of Agrarian Economics	Lithuania
Maxwell School of Syracuse University	USA
Pennsylvania State University	USA
Plekhanov Russian University of Economics	Russia
Pope John Paul II State School of Higher Education in Biala Podlaska	Poland
Poznan University of Economics and Business	Poland
Rezekne Higher Education Institution	Latvia
Riga Teacher Training and Educational Management Academy	Latvia
Riga Technical University	Latvia
"RISEBA" University of Business, Arts and Technology	Latvia
Russian State Agrarian University - Moscow Timiryazev Agricultural Academy	Russia
Samara State University of Economics	Russia
Slovak University of Agriculture in Nitra	Slovakia
St. Francis Xavier University	Canada
State Employment Agency of Latvia	Latvia
State Revenue Service of the Republic of Latvia	Latvia
State University of Applied Sciences in Konin	Poland
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University of Agriculture in Krakow	Poland
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The authors are responsible for the content and language of their papers.

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Every article included into the Proceedings was subjected to a scientific, including international review.

All reviewers were anonymous for the authors of the articles.

The following 105 reviewers from scientific and academic institutions of 8 countries (Estonia, Germany, Latvia, Lithuania, Poland, Russia, Slovakia and USA) have written 105 reviews.

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The Editorial Board is responsible for, among other, preventing publication malpractice. Unethical behaviour is unacceptable and the authors who submit articles to the Conference Proceedings affirm that the content of a manuscript is original. Furthermore, the authors' submission also implies that the material of the article was not published in any other publication; it is not and will not be presented for publication to any other publication; it does not contain statements which do not correspond to reality, or material which may infringe upon the intellectual property rights of another person or legal entity, and upon the conditions and requirements of sponsors or providers of financial support; all references used in the article are indicated and, to the extent the article incorporates text passages, figures, data or other material from the works of others, the undersigned has obtained any necessary permits as well as the authors undertake to indemnify and hold harmless the publisher of the proceedings and third parties from any damage or expense that may arise in the event of a breach of any of the guarantees.

Editors, authors, and reviewers, within the International Scientific Conference "**Economic Science for Rural Development**" are to be fully committed to good publication practice and accept the responsibility for fulfilling the following duties and responsibilities, as set by the *COPE Code of Conduct and Best Practice Guidelines for Journal Editors of the Committee on Publication Ethics (COPE)*.

It is necessary to agree upon standards of expected ethical behaviour for all parties involved in the act of publishing: the author, the editor, the peer reviewer, and the publisher.

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DUTIES OF REVIEWERS

Every submitted manuscript has been reviewed by one reviewer from the author's native country or university, while the other reviewer came from another country or university. The third reviewer was chosen in the case of conflicting reviews. All reviewers were anonymous for 9 the authors of the articles, and the reviewers presented blind reviews. Every author received the reviewers' objections or recommendations. After receiving the improved (final) version of the manuscript and the author's comments, the Editorial Board of the conference evaluated each article.

Contribution to editorial decisions

Peer review assists the editor in making editorial decisions and through the editorial communications with the author may also assist the author in improving the paper.

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Any selected referee who feels unqualified to review the research reported in a manuscript or knows that its prompt review will be impossible should notify the editor and excuse himself from the review process.

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The authors of reports of original research should present an accurate account of the work performed as well as an objective discussion of its significance. Underlying data should be represented accurately in the paper. A paper should contain sufficient detail and references to permit others to replicate the work. Fraudulent or knowingly inaccurate statements constitute unethical behaviour and are unacceptable.

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When an author discovers a significant error or inaccuracy in his/her own published work, it is the author's obligation to promptly notify the editor or publisher and cooperate with the editor to retract or correct the paper.

Editorial Board

Foreword

The international scientific conference "Economic Science for Rural Development" is organized annually by the Faculty of Economics and Social Development of Latvia University of Agriculture.

The proceedings of the conference are published since 2000.

The scientific papers presented in the conference held on 27-28 April 2017 are published in 3 thematic volumes:

No 44 Rural Development and Entrepreneurship

Bioeconomy

Production and Co-operation in Agriculture

No 45 Integrated and Sustainable Regional Development

Marketing and Sustainable Consumption

No 46 New Dimensions in the Development of Society

Home Economics

Finance and Taxes

The proceedings contain scientific papers representing not only the science of economics in the diversity of its sub-branches, but also other social sciences (sociology, political science), thus confirming interdisciplinary development of the contemporary social science.

This year for the first time the conference includes the section on a new emerging kind of economy-bioeconomy. The aim of bioeconomy is to use renewable biological resources in amore sustainable manner. Bioeconomy can also sustain a wide range of public goods, including biodiversity. It can increase competitiveness, enhance Europe's self-reliance and provide jobs and business opportunities.

The Conference Committee and Editorial Board are open to comments and recommendations concerning the preparation of future conference proceedings and organisation of the conference.

Acknowledgements

The Conference Committee and editorial Board are open to comments and recommendations for the development of future conference proceedings and organisation of international scientific conferences.

We would like to thank all the authors, reviewers, members of the Programme Committee and the Editorial Board as well as supporting staff for their contribution organising the conference.

On behalf of the conference organisers

Anita Auzina

Associate professor of Faculty of Economics and Social Development
Latvia University of Agriculture

Contents

RURAL DEVELOPMENT AND ENTREPRENEURSHIP.....	13
ADEQUATE COMPENSATION IN COMPULSORY ACQUISITION OF LAND IN THE ALBANIAN TRANS ADRIATIC PIPELINE PROJECT.....	14
Aris Adlers ¹ , Mg.oec.; Janis Viesturs ² , Mg.oec. and Ineta Geipele ³ , Dr.oec., Prof.	14
EVOLUTION FROM ECO-FRIENDLY SOLUTIONS IMPLEMENTATION IN AN ENTERPRISE.....	21
Dzintra Atstaja ¹ , Dr.oec./ professor; Rozita Susniene ² , Dr.oec./ researcher, Grazina Startiene ² , Dr.oec./professor; and Leonids Gabrevics ¹ , Mg.oec./ researcher	21
SOCIAL POLICY AND EMPOWERMENT OF WOMEN IN THE AGRICULTURAL SECTOR IN UZBEKISTAN	29
Nodira Azizova ¹ , MA in Journalism; Zulfiya Tursunova ² , PhD; Lobarkhon Azizova ³	29
OPEN INNOVATION STRATEGIES AND BUSINESS INCUBATION SERVICE IMPACT ON THE SUCCESS OF INCUBATION.....	36
Iveta Cirule ¹ , Mg.sc.pol.; Simona Adela Maria Grama ² , Dr.oec.; Iveta Ludviga, Dr.sc.administr., and Ilmars Kreituss ³ , Dr.chem.....	36
IMPACT OF REGIONAL HIGHER EDUCATION INSTITUTIONS ON THE CONVERGENCE OF REGIONS	44
Tamara Grizane ¹ , Dr.oec.; Aija Sannikova ² , Dr.oec.; Jonas Jasaitis ³ , Dr.....	44
RESOURCE CONDITIONS AND SUBSIDIES FOR PUBLIC GOODS IN THE EU	52
Marta Guth ¹ , PhD; Adam Majchrzak ² , PhD and Katarzyna Smedzik-Ambrozy ³ , PhD	52
LOCAL ACTION GROUPS AS NEW ORGANISATIONS IN RURAL DEVELOPMENT AN EXAPMLE OF THE LUBLIN REGION (POLAND).....	58
Danuta Guzál-Dec ¹ , PhD; Magdalena Zwolinska-Ligaj ² , PhD	58
ASSESSMENT OF LAND DEGRADATION FOR SUSTAINABLE DEVELOPMENT OF MUNICIPALITY TERRITORIES.....	69
Anda Jankava ¹ , Dr. oec. Velta Parsova ² , Dr.oec.; Maija Berzina ³ , Mg.sc.ing.; Dace Didrihsone ⁴ , Mg.sc.ing.; Dace Platonova ⁵ , Dr. oec.; Aina Palabinska ⁶ , Mg.oec.	69
INVESTIGATION INTO EMPLOYEE MOTIVATION	76
Inara Jurgena ¹ , Dr.oec.; Sintija Rimovica ² , Bc.oec.	76
CORPORATE SOCIAL RESPONSIBILITY AS AN OPPORTUNITY FOR THE SUSTAINABLE DEVELOPMENT OF SMALL TO MEDIUM-SIZED ENTERPRISES.....	83
Dagmara K. Zuzek ¹ , PhD	83
INFLUENCE OF A QUALITY MANAGEMENT SYSTEM ON EXTERNAL RELATIONS: EXAMPLE OF JOINT STOCK COMPANY "LATVIA'S STATE FORESTS"	90
Dace Kaufmane ¹ , Dr.oec.; Daina Smilgaine, B.Soc.Sc	90
BARRIERS TO THE DEVELOPMENT OF POLISH SME IN THE LIGHT OF THE RESEARCH RESULTS ON INNOVATIVENESS OF THE ECONOMY AND COMPANIES	99
Irena Lacka ¹ , Associate Professor	99
INFORMATION COMMUNICATION TECHNOLOGIES AS ENABLER FOR RURAL DEVELOPMENT	110
Sanita Meijere ¹ , PhD candidate; Tatjana Tambovceva ² , Dr. oec., Professor.....	110
PROCESS OF SHAPING OF INSTITUTIONAL SUPPORT FOR AGRICULTURAL SECTOR IN POLAND	116
Antoni Mickiewicz ¹ , PhD, Professor; Bartosz Mickiewicz ² , PhD, Professor; Robert Jurczak ³ , PhD; Sebastian Lisiak ⁴ , MSc	116
THE IMPORTANCE OF LAND CONSOLIDATION IN POLAND FOR THE PROCESSES OF SHAPING AGRARIAN STRUCTURE.....	126
Bartosz Mickiewicz ¹ , PhD, Professor; Antoni Mickiewicz ² , PhD, Professor.....	126
SOCIAL ECONOMY IN LATVIA: THE CASE OF CHARITY SHOPS	136
Liga Paula ¹ , Dr.sc.soc.; Anda Grinfelde ² , Dr.oec.	136
EU FUNDING FOR THE DEVELOPMENT OF WATER MANAGEMENT INFRASTRUCTURE IN LATVIA	142
Irina Pilvere ¹ , Dr.oec., professor; Sanita Bema ² , Mg.oec.....	142
SOCIO-ECONOMIC DEVELOPMENT IN POLAND'S WARSAW METROPOLITAN AREA AND THE REST OF MAZOVIECKIE VOIVODESHIP	153
Iwona Pomianek, PhD.....	153
REALIZATION OF AGRI-ENVIRONMENTAL PROGRAM IN WESTERN POMERANIA IN THE YEARS 2007-2013	161
Monika Pradziadowicz ¹ , PhD	161
IDENTIFICATION AND DEVELOPMENT OF BUILDING MANAGEMENT SYSTEM CHARACTERISTICS IN LATVIA	166
Iveta PUKITE ¹ , Ineta GEIPELE ² ,.....	166

GASTRONOMIC HERITAGE: DEMAND AND SUPPLY	174
Baiba Rivza ¹ , Dr.habil.oec., professor; Maiga Kruzmetra ² , Senior researcher; Diana Foris ³ , Dr., Assistant Professor; Laura Jeroscenkova ⁴ , Dr.oec.	174
DIVERSIFICATION OF RURAL AREAS IN POLAND IN TERMS OF LEVEL OF LIVING.....	182
Agnieszka Sompolska-Rzechula ¹ , PhD.....	182
THE CONVERSION OF THE AREA OF ECOLOGICAL CROPS IN THE SELECTED EU STATES	190
Joanna Stefanczyk ¹ , MSc; Dominik Sieradzki ² , MSc	190
RURAL DEVELOPMENT POLICY INCENTIVES ENCOURAGING ENTREPRENEURSHIP IN SELECTED EU COUNTRIES	197
Egle Stonkute ¹ , Dr.; Jolita Vveinhardt ² , Dr.....	197
ECO-INNOVATIONS AND SUSTAINABLE DEVELOPMENT OF BUSINESSES IN RURAL AREAS OF KUJAWSKO- POMORSKIE PROVINCE OF POLAND.....	205
Izabela Wielewska ¹ , PhD.....	205
MAIN CHARACTERISTICS OF ECONOMIC ZONES TYPES: LATVIA'S EXPERIENCE	212
Dace Ziedina ¹ , Mg.oec.; Modrite Pelse ² , Dr.oec./ professor.....	212
SPREAD AND CONTROL OF SOSNOWSKY'S HOGWEED IN REZEKNE MUNICIPALITY.....	219
Anda Zvaigzne ¹ , Dr.oec.; Inta Kotane ² , Mg.oec.	219
THE ACTIVITY OF LOCAL SELF-GOVERNMENTS IN THE AREA OF CREATING LOCAL INNOVATION (BASED ON THE EXAMPLE OF LUBLIN COUNTIES, POLAND)	226
Magdalena Anna Zwolinska-Ligaj ¹ , PhD; Mieczyslaw Adamowicz ² , Prof.	226
BIOECONOMY	236
BIO-ECONOMY AS AN ELEMENT OF DEVELOPMENT STRATEGIES IN THE EUROPEAN UNION.....	237
Mieczyslaw Adamowicz ¹ , Professor	237
DEVELOPMENT OF ENVIRONMENTAL REGULATIONS AND BENEFITS ON ENTERPRISES	248
Martins Jirgens ¹ , Mg.oec., PhD student; Dzintra Atstaja ² , Dr.oec, Prof.	248
GREEN GOVERNANCE PRINCIPLES IN THE DEVELOPMENT OF ENVIRONMENTAL EDUCATION INFRASTRUCTURE.....	256
¹ Janis Kuis, Dr.hist., assoc. prof.; ² Larisa Brokane, Dr.psych. assoc. prof.;, ³ Baiba Miltovica Mg.sc.pol., Mg.paed.....	256
SELECTION OF GREENHOUSE GAS EMISSION-REDUCING MEASURES WITH ANALYTICAL HIERARCHY PROCESS APPROACH: A CASE STUDY FROM LATVIAN CROP PRODUCTION SECTOR.....	267
Arnis Lenerts ¹ , PhD student, MBA; Dina Popluga ¹ , Dr.oec., and Peteris Rivza ² , Dr.habil.sc.ing.....	267
INNOVATION SYSTEMS APPROACH AND SUPPORT ELEMENTS FOR INNOVATION IN AGRICULTURE.....	274
Modrite Pelse ¹ , Dr.oec.; Lasma Aleksejeva ² , Mg.oec., Sandija Zeverte-Rivza ³ , Dr.oec.....	274
DEVELOPMENT OF RENEWABLE ENERGY POLICY IN LATVIA.....	281
Mareks Rubins ¹ , Mg.oec.; Irina Pilvere ¹ , Dr.oec.	281
THE ENVIRONMENTAL CONSEQUENCES OF CROP STRUCTURE CHANGES IN POLAND.....	292
Alina Syp ¹ , Dr hab.; Artur Zukiewicz ² , Msc.	292
FOOD AND BIOENERGY – EVIDENCE FROM POLAND	299
Ludwik Wicki ¹ , dr hab., assoc. prof.	299
PRODUCTION AND CO-OPERATION IN AGRICULTURE	306
PROBLEMS AND SOLUTIONS FOR ABANDONMENT OF UTILISED AGRICULTURAL AREAS IN LATVIA.....	307
Edite Arika ¹ ,Bc.oec, Gunita Mazure, Dr.oec., assoc. professor.....	307
COOPERATION IN LATVIAN FISHERIES SECTOR.....	315
Inese Biuksane, PhD, researcher	315
MULTIDIMENSIONAL COMPARATIVE ANALYSIS OF THE POLISH AGRI-FOOD SECTOR IN REGARD TO OTHER EU COUNTRIES IN THE YEARS 2004 – 2014	323
Mariola Chrzanowska ¹ , Dr.oec.,	323
AGRICULTURAL SOCIAL INSURANCE FUND BUDGET FINANCING IN POLAND IN 1996-2016	330
Andrzej Czyzewski ¹ , professor; Anna Matuszczak ² , PH.D,associated professor.....	330
FARMERS' ASSESSMENT OF TRAINING SERVICES AND THE IMPACT OF AGRICULTURAL ADVISORY ON SELECTED DEVELOPMENTAL FACTORS AFFECTING FARMING.....	338
Piotr Prus ¹ , PhD; Ksenia Drzadzynska ² ; MSc., PhD student	338
ACCESSIBILITY OF RURAL DEVELOPMENT PROGRAMME SUPPORT FOR SMALL RURAL FARMS IN LATVIA AND LITHUANIA	345
Armands Veveris ¹ , Dr.oec.; Vaida Sapolaite ² , Mg.oec.....	345

RURAL DEVELOPMENT AND ENTREPRENEURSHIP

ADEQUATE COMPENSATION IN COMPULSORY ACQUISITION OF LAND IN THE ALBANIAN TRANS ADRIATIC PIPELINE PROJECT

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Abstract. The aim of this paper is to research the process of compulsory acquisition of land and its fixtures in the Trans-Adriatic Pipeline project in Albania from the perspective of the affected persons. The legislation of Albania as well as international principles concerning compulsory acquisition of property was analysed. Examined also was the process of how legal and institutional framework is applied in determining adequate compensation to landowners who are mostly small rural farmers. Findings are based on analysed documents, scientific publications, and interviews with community leaders, ombudsmen of Albania and more than 80 family representatives from 32 villages in three regions of Albania whose land property rights were affected due to the Trans-Atlantic Pipeline project. The compensation mechanism and landowner point of view regarding the compensation process were also examined. The findings of this research reveal that the compensation paid to the landowners is inadequate and incompatible with the national and international principles, which prescribe compulsory acquisition of land and land use rights. The conclusions consist of considerations that need to be taken into account in order to achieve the highest maximum level of restoration of livelihood for affected persons.

Key words: compulsory acquisition, livelihood restoration, adequate compensation, Trans Adriatic Pipeline, Albania.

JEL code: R3, K11, Q15

Introduction

The Trans-Adriatic Pipeline (TAP) is a part of the Southern Gas Corridor, a 3500 km long pipeline project to transport gas from the Caspian and Middle Eastern regions to Europe. It is planned that 215 km of the total TAP are to be built in Albania. It is unavoidable that such a large project will affect privately owned land parcels located along the planned pathway of the gas pipeline. The realization or protection of public interests cannot be achieved without exercising the rights of ownership over privately owned movable or immovable properties (*Expropriations and Temporary Takings of Private Property for a Public Interest*, 1999). The involuntary or compulsory alienation or easement of these properties is necessary, which means that affected individuals do not have the right to refuse land acquisition, nor the restrictions placed on land use (EBRD Performance Requirement 5, 2014). Compulsory acquisition (involuntary resettlement) refers both to direct or physical displacement (relocation or loss of shelter) and indirect or economic displacement (loss of assets or resources, or loss of access to assets or resources that leads to loss of income sources or means of livelihood) as a result of project related land acquisition or restrictions placed on land use

(Environmental and Social policy, 2014). In the case of TAP, the types of compulsory acquisition applied are: 1) land purchase; 2) long-term land lease (approximately 50 years); 3) short-term land lease; 4) land easement in cases when TAP does not own the land, but has the right to enter it (for maintenance works, for example) and places certain restrictions on how the land is used for the life-cycle of the pipeline (Land easement and acquisition explained, 2016).

The commitment of this research is to examine the process of land alienation or easement determination, devoting the most attention to the verification of the adequacy of compensation and the attitude towards the project from the point of view of the affected persons consisting mostly of landowners in rural areas, whose livelihood is greatly affected. Research was conducted regarding the ongoing situation surrounding the TAP project from the perspective of affected persons. Interviews were conducted with more than 80 family representatives from 32 villages along the TAP in the regions of Korca, Berat and Fier. The purpose of the interviews was to find out the opinion of the affected people, how they found the process of compulsory acquisition to be and especially the land compensation process. The purpose of the

interviews was also to determine the main problems encountered during the course of the land alienation process. In the research process, the main compulsory acquisition principles were determined according to Albanian and international legislation and analysis was done as to how they are complied with in the acquisition of land process.

Usually, in compulsory acquisition, the main consequences are the displacement of large numbers of landowners and their families (Cernea, 2008), the loss of their assets and often a completely changed lifestyle, which can even be described as traumatic (Taka, et al., 2015). In the case of TAP, the displacement of landowners is not as prevalent as land use restrictions placed upon the land (certain restrictions on how the land can be used). Most affected persons are small landowners who cultivate orchard trees, olives, oranges, limes etc.

Those who cultivate crops primarily receive compensation in the form of a short-term lease and are able to continue their agricultural activities. Thus, they do not have major objections towards compulsory acquisition and the offered compensation.

Thirty-two villages in three regions of Albania (Figure 1) were visited and interviews with community leaders, ombudsmen of Albania and more than 80 landowners were conducted from July 3-8, 2016, within CEE Bankwatch network Fact Finding mission in Albania:

- 1) Korce (Korce) region: Turan, Kuc, Kapshticë, Bilisht, Cangonj, Manurisht, Ravonik, Trestenik, Vranisht, Zemblak;
- 2) Berat (Berat) region: Kutalli, Squepur, Poshnje, Pobrat, Konishbalte, Otlak, Fushe-Peshtan, Uznove, Vodice, Bregas, Ullinjas, Mbrakull, Vertop, Orizaj, Buzuq, Corovoda, Munushtir;
- 3) Fier (Fier) region: Strum, Kavaklli, Seman, Petove, Verri.



Source: The Pipeline Route. <https://www.tap-ag.com/the-pipeline/route-map>

Fig. 1. The Trans-Adriatic Pipeline Route in Albania

Legal considerations

A wide range of terms based on each country and its traditions is used to describe the power of government to acquire private rights to land or real property for the needs of the state or the public (or society) - compulsory acquisition (alienation, purchase, expropriation), involuntary resettlement, (compulsory) takings, forced land acquisition, eminent domain (dominium eminens) etc.

Governments (society) have always reserved the right to restrict individual subjective rights to property without the consent of the landowner; therefore, they are guaranteed but not untouchable. The land interests of the landowner are balanced with the rights of other individuals and the interests of the public as a whole. In order for compulsory acquisition to take place, the following three basic internationally recognised elements need to be respected: 1) transactions must be done for public purpose (the public good); 2) private property must be alienated according to law - expropriation can only be decided by the Council of Ministers based on an application by the requesting agency or requesting private entity (*Albanian Law on Expropriations and Temporary Takings of Private Property for a Public Interest*, 1999); 3) property must be alienated for prompt, adequate (effective, full) compensation.

The legal framework of compulsory acquisition in Albania consists of the international principles set out in the *European Convention for the Protection of Human Rights and Fundamental*

Freedoms, in the Constitution of Albania and in Albanian law on Expropriations and Temporary Takings of Private Property for a Public Interest. Laws which are associated with the compulsory acquisition process are the Albanian constitution, the *Albanian law On Registration of Immovable Properties*, and the *Civil Code of the Republic of Albania*.

The European Convention for the Protection of Human Rights and Fundamental Freedoms prescribes the fundamental imperative that compulsory acquisition of property may only be used for purposes which are in the public interest and subject to the conditions provided for by law and by the general principles of international law.

International principles in the case of compulsory acquisition of property, which are accepted by potential lenders (international financial institutions) to finance TAP - Asian Development Bank (ADB), the European Bank for Reconstruction and Development (EBRD), the European Investment Bank (EIB), the World Bank's International Finance Corporation (IFC) are incorporated in the "Environmental and Social Impact Assessment in Albania", document which prescribes that compensation for permanent and temporary land acquisition will be carried out according to Albanian regulations and "EBRD Performance Requirement 5.

The TAP project is promoted by the European Commission as a project of common interests and as a strategic asset for Europe's energy security by increasing the diversity of their gas suppliers. The project is created to help Central and South Eastern European countries diversify their sources of gas suppliers. The Southern Gas Corridor aims to expand the gas transportation infrastructure so that gas can be transported to the European Union (EU) members from the Caspian Basin, Central Asia, the Middle East and the Eastern Mediterranean Basin (EU Regulation No 347/2013). Geopolitical analysis leads to the conclusion that the best strategy for the EU is to have gas sources that include gas suppliers from

at least two countries from the Caspian and Middle Eastern regions (Bilgin, 2009).

Does this provide enough foundation for TAP to be acknowledged as a project of common interests? The question of public interest (public purpose or public good) is often discussed regarding projects requiring forced land acquisition. There exists a great variety of national laws, requiring the definition of public purpose. Some countries define public purpose with a list of land uses; however, others, for example Albania (Art. 8. *Albanian Law on Expropriations and Temporary Takings of Private Property for a Public Interest*, 1999), leave the definition of public interest open-ended (Lindsay, 2012), thus the notion of "public interest" is necessarily extensive (Case of Jahn and Others v. Germany, 2005). The public purpose of the TAP is under scrutiny for the following reasons: 1) it may not be in complete agreement with the EU climate change principles (Macalister, 2016); 2) question of human right abuse in Azerbaijan and Turkey need to be taken into consideration (Macalister, 2016); 3) project may not bring benefits for the Albanian economy in the long term perspective; 4) gas demand in the EU is falling due to structural shifts within the European economy, changing consumption patterns and significant progress on energy efficiency (Dufour and Gaventa, 2015); 5) the holder of TAP in Albania is a private joint venture company registered in Switzerland; however, a privately promoted project can also be recognised as being in the public interest (Epstein, 1985; Susette Kelo et al., petitioners v. City of New London, Connecticut et al., 2005). "Private compulsory purchase" (Kalbro and Lind, 2007) can be in the public interest; however, such cases require a higher compensation level (Epstein, 1985; Kalbro and Lind, 2007). Therefore, taking into consideration these many aspects, TAP is to be viewed as a project that is being realized for public interest. Many private landowners also recognise that the

TAP project is strategically significant to Albania and for all of Europe.

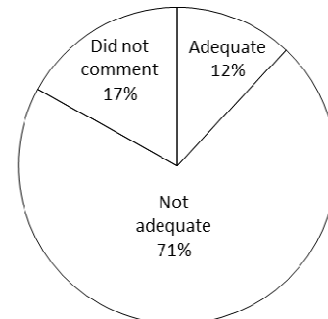
Limited practical application of the legal and institutional frameworks in Albania

Compulsory acquisition is used by governments in most countries around the world and almost always is controversial. With such transactions no one should be neither impoverished nor enriched, however this is not always the case. The golden mean is covenant, which satisfies both sides in such a way that the landowner feels as if his property had not been taken (Epstein, 1995) i.e. that there is a complete restoration of livelihood, as well as compensation for extra expenses, and public interests are achieved. A widely accepted form of compensation is "resettlement with development". This provides an opportunity for development and improvement of livelihood for those resettled due to compulsory displacement (Cernea, 2008; McDonald et al., 2008). However, in Albania, this development cannot be observed, because Albanian legislation does not embrace the internationally recognised requirements that the standard of welfare affected landowners at the end of the project should be higher than at the beginning of the project or, at least, remain at the same level as before (Taka et al., 2015; EBRD Performance Requirement 5., 2014).

Conducted interviews with landowner family representatives reveal that the compensation offered by TAP is mostly viewed as inadequate for the value of the asset (Figure 2). This high level of dissatisfaction with the compensation volume as well as other conditions give credence to the fact that the unfulfilled high expectations of landowners (Komu, 2014) are not the only reason for the dissatisfaction of compensation.

Interviews with affected landowners revealed that "failure to comply with the law" was present in the acquisition process, i.e. what is prescribed by law regarding the compulsory acquisition mechanism does not work in its practical application. The result is the high level of

dissatisfaction and confusion for people impacted by the construction of the TAP gas pipeline (Roggenbuck, 2016) and the violation of national and international compulsory acquisition principles.



Source: authors' calculations and construction based on interviews with affected landowners

Fig. 2. Landowner's opinion regarding compensation level

The following number of problems in the process of compulsory acquisition was identified after conducted interviews with community leaders, ombudsmen of Albania and landowners as well as after analysis of documents and scientific publications: 1) problems with property rights uncertainties; 2) problems with the compensation procedure and the grievance mechanism; 3) lack of clarity about the role of different actors and the process of valuation; 4) lack of compensation for consequential damages.

1. Problems with property rights uncertainties

According to Albanian Law on Registration of Immovable Properties and the Civil Code of the Republic of Albania, the Immovable Properties Register is administered by The Immovable Property Registration Office of Albania under the control of the Ministry of Justice. Since 1994, ownership titles and other real rights must be registered in the Immovable Properties Register. Beginning in 1990, the new transformation process required the creation of private ownership in Albania (Rama, 2013) and the reforms are still in progress (According to the Doing Business data, in the category "Registering property" Albania took 107th place in the world in 2016). A number of property right

uncertainties were observed: 1) lack of information for landowners related to unregistered or inaccurately documented property rights; 2) lack of a clear functioning administration system of immovable property rights (Rama, 2013); 3) poor administration of the Immoveable Registry and Cadastre; 4) lack of documentation held by affected families and the complicated land sharing system within families due to the traditional Albanian law (*kanun*), which dictates that property rights are registered by the head of family; 5) different legal definitions for agricultural, forest, pasture, urban housing, commercial, industrial and other lands or properties, creating so a highly complex system with many gaps and overlaps (Rama, 2013); 6) there is a huge number of illegal constructions without proper property rights. They have been subjects of numerous informal transactions without proper documentation and clear property rights.

2. Compensation procedure and the grievance mechanism

The TAP project coordinators organized a large scale informative campaign to provide written and verbal information as well as consultations to the communities and individuals potentially affected by the project.

The company announced that TAP Land Easement and Acquisition is being conducted in accordance with the international standards of the European Bank for Reconstruction and Development (EBRD Performance Requirement 5, 2014). In communities that might be affected by TAP, the project's subcontractors organise meetings for local people to explain the Land Easement and Acquisition process. However, in the course of interviewing affected landowners, it became clear that the EBRD standards were not being upheld. The following violations of the announced standards were discovered: 1) the majority of the landowners emphasised that the level of compensation is insufficient and cannot lead to the restoration of livelihood (Fig. 2); 2)

regardless of the fact that "EBRD Performance Requirement 5" prescribes that the standards for compensation will be transparent and consistent within the project, there was confusion and a lack of clarity regarding the appeals process and the compensation process (including when compensation was to be received for those who had already signed a contract); 3) information was lacking regarding the actual TAP construction timeline, which left crop farmers with great uncertainty regarding the planting and harvesting of crops in affected areas; 4) it was discovered that few landowners were properly and clearly informed about the appeals process and even of the right to appeal. Few formal complaints had been filed by those interviewed due to lack of awareness of the right to appeal or due to the fear of potential (real or imagined) consequences. The fears included that compensation would be lower or delayed or the state might intervene if the complaint was filed. Hence the principle that "at any point while the expropriation process is on-going the owner has the possibility to continue negotiation and reach agreement with the expropriating agency" set down in the "Livelihood Restoration Framework" is not enforceable; 5) a consequence of the totalitarian rulership throughout Albanian history (Grillot and Cruise, 2014) is a lack of trust by the Albanian people in their government and its institutions, which are namely the bodies to which affected landowners must appeal ("We have no other option", 2016). As a consequence, rural landowners have feeling of fatality and opinion that they disagree with the compensation, but they have no other option.

3. Lack of clarity about the role of different actors and process of valuation

Information of all contractors working on land easement and acquisition for TAP is publicly available. The consulting company ABkons is contracted to support TAP in Albania. Interviews with affected persons revealed the following findings: 1) difficulties distinguishing between the

institutional framework of the Trans-Adriatic Pipeline, the consulting company ABKons, the staff of the Land Registration Office and the local municipality, and their respective roles and responsibilities; 2) Albania cultural tradition does not require the collection and keeping of written documentation. In numerous cases, affected persons had complained about compensation orally, however were unable to identify to whom the complaint was made; 3) The municipality does not have any system for registering grievances or complaints, and they are not able to provide any written material that would describe the steps that affected people could take ("We have no other option", 2016).

4. Lack of compensation for consequential damages

Tree owners are the main group dissatisfied with the compensation amount because consequential damages associated with a reduced business volume are not taken into account in the final compensation. Consequential damages are unique to each individual landowner; therefore, the relationship between the landowner and his agricultural activities and the expropriated property is decisive (Voss, 2010). For example, if a landowner loses a significant amount of his olive trees, the loss includes not only the actual trees but also the reduction of business activities, which fact is disregarded when calculating compensation. In the interviews, many landowners emphasised, that the compensation was insufficient to buy land (to fulfil the principle "land for land" (Taka, 2015)) and to renew entrepreneurship at the previous level, which leads to substantial reduction of business activities.

Bibliography

1. Bilgin, M. (2009). Geopolitics of European Natural Gas Demand: Supplies from Russia, Caspian and the Middle East. *Energy Policy*, Issue 37 (2009), pp. 4482–4492. doi:10.1016/j.enpol.2009.05.070.
2. Case of Jahn and others v. Germany. (2005). European Court of Human Rights. Grand Chamber. Judgment. 30 June 2005. Retrieved: <https://wcd.coe.int/ViewDoc.jsp?p=&id=876505&Site=COE&direct=true>. Access: 20.12.2016.
3. Cernea, M.M. (2008). Compensation and Benefit Sharing: Why Resettlement Policies and Practices Must Be Reformed. *Water Science and Engineering*, Mar. 2008, Vol. 1, No. 1, pp. 89–120. ISSN 1674–2370. doi:10.1016/S1674-2370(15)30021-1.

Conclusions

From the conducted research, the following can be concluded.

- 1) In Albania, the "failure to comply with the law" is evident in the process of compulsory acquisition, i.e. what is prescribed by law regarding the compulsory acquisition mechanism does not work in its practical application. The result is the high level of dissatisfaction and confusion among the people impacted by the construction of the TAP gas pipeline.
- 2) Currently, the applied compensation methods are not protecting the socio-economic livelihoods of affected persons and the internationally recognised requirement that the standard of welfare of affected landowners at the end of the project should be higher than before the beginning of the project or, at least, at the level that has been before is not respected.
- 3) The lack of a clear functioning administration system for immovable property rights and the number of property right uncertainties can be an obstacle to implementing adequate and full compensation for the compulsory acquisition of land.
- 4) The TAP grievance mechanism is not recognised by affected people, because they consider it as unreliable as a mean of redress.
- 5) Significant lack of trust in the Albanian government and its institutions, namely the bodies to which affected landowners ought to appeal, affect why the landowners fail to file an appeal.

4. Constitution of the Republic of Albania. (1998). Legislation of the Republic of Albania. Retrieved: http://www.wipo.int/wipolex/en/text.jsp?file_id=224105. Access: 24.06.2016.
5. Dufour, M., Gaventa, J. (2015). Europe's Declining Gas Demand. Trends and Factors. Report. June 2015. Retrieved: https://www.e3g.org/docs/E3G_Trends_EU_Gas_Demand_June2015_Final_110615.pdf. Access: 2.12.2016.
6. EBRD Performance Requirement 5. Land Acquisition, Involuntary Resettlement and Economic Displacement. (2014). Retrieved: http://www.ebrd.com/downloads/about/sustainability/ESP_PR05_Eng.pdf. Access: 20.09.2016.
7. Environmental and Social policy. (2014). Approved by the Board of Directors at its Meeting on 7 May 2014. Document of the European Bank for Reconstruction and Development. Retrieved: <http://www.ebrd.com/downloads/research/policies/esp-final.pdf>. Access: 30.09.2016.
8. Environmental and Social Impact Assessment. (2012). Trans Adriatic Pipeline. Albania. Non-Technical Summary Retrieved: https://www.tap-ag.com/assets/07.reference_documents/english/nts/albania/esia_nts_albania_in_english.pdf. Access: 12.09.2016.
9. Epstein, R.A. (1985). Takings: Private Property and the Power of Eminent Domain. Cambridge, Massachusetts: Harvard University Press, p. 362.
10. Expropriations and Temporary Takings of Private Property for a Public Interest. Law No. 8561. (1999). Legislation of the Republic of Albania. Retrieved: [http://www.promise-project.net/wp/wp/project-library/doc/02-Albanian-Legislation/Law%208561%20on%20Expropriations%20for%20Public%20interest%20\(Eng\).pdf](http://www.promise-project.net/wp/wp/project-library/doc/02-Albanian-Legislation/Law%208561%20on%20Expropriations%20for%20Public%20interest%20(Eng).pdf). Access: 15.09.2015.
11. Grillot, S.R., Cruise, R.J. (2014). Building Trust and a Sense of Community in the Western Balkans: They Shall Overcome (their violent pasts)? Southeast European and Black Sea Studies, 2014, Vol. 14, No. 4, pp. 508-529. <http://dx.doi.org/10.1080/14683857.2014.967943>.
12. Kalbro, T., Lind, H. (2007). Compulsory Purchase – Reasonable and Fair Compensation. Nordic Journal of Surveying and Real Estate Research, Volume 4, Number 1, 2007, pp. 7-22.
13. Komu, F. (2014). Conceptualizing Fair, Full and Prompt Compensation – the Tanzanian Context of Sustaining Livelihood in Expropriation Projects. Journal of Land Administration in Eastern Africa, Vol. 2, Issue 2, January. 2016. ISSN 2453-5869.
14. Land Easement and Acquisition Explained. (2016). Trans Adriatic Pipeline. Retrieved: <https://www.tap-ag.com/land-access>. Access: 15.12.2016.
15. Lindsay, J.M. (2012). Compulsory Acquisition of Land and Compensation in Infrastructure Projects. PPP Insights, Vol 1, Issue 3, August 2012. Retrieved: <http://ppp.worldbank.org/public-private-partnership/sites/ppp.worldbank.org/files/documents/Compulsory%20Acquisition%20of%20Land%20and%20Compensation%20in%20Infrastructure%20Projects.pdf>. Access: 12.09.2016.
16. Livelihood Restoration Framework. Land and Easement Acquisition. Albania. (2014). Retrieved: https://www.tap-ag.com/assets/03.land_access/english/LRF_Albania_AR&B_Nov%202014.pdf. Access: 21.12.2016
17. Macalister, T. (2016). Gas Pipelines Run over EU Energy Policy. Climate News Network. CEE Bankwatch Network. September 14, 2016. Retrieved: <http://bankwatch.org/news-media/for-journalists/bankwatch-in-the-media/gas-pipelines-run-over-eu-energy-policy>. Access: 30.09.2016.
18. McDonald, B., Webber, M., Yuefang, D. (2008). Involuntary Resettlement as an Opportunity for Development: The Case of Urban Resettlers of the Three Gorges Project, China. Journal of Refugee Studies, 2013. Vol. 21, No.1. pp. 82-102. doi:10.1093/jrs/fem052.
19. Rama, A. (2013). Property Rights Issues in Albania: Challenges and perspectives. Retrieved: <http://library.fes.de/pdf-files/bueros/albanien/10052.pdf>. Access: 20.10.2016.
20. Registering Property. Albania. (2016). Retrieved: <http://www.doingbusiness.org/data/exploreeconomies/albania>. Access: 20.12.2016.
21. Regulation (EU) No 347/2013 of the European Parliament and of the Council of 17 April 2013 on Guidelines for Trans-European Energy Infrastructure and Repealing Decision No 1364/2006/EC and Amending Regulations (EC) No 713/2009, (EC) No 714/2009 and (EC) No 715/2009. Retrieved: <http://eur-lex.europa.eu/legal-content/EN/ALL/?uri=CELEX:32013R0347>. Access: 21.10.2016.
22. Roggenbuck, A. (2016). "We have no other option" - Albanian communities face unjust resettlement process for Trans-Adriatic Pipeline. Retrieved: <http://bankwatch.org/news-media/blog/we-have-no-other-option-albanian-communities-face-unjust-resettlement-process-trans>. Access: 15.12.2016.
23. *Susette Kelo, et al., petitioners v. City of New London, Connecticut, et al.* (2005). Supreme Court of the United States. Retrieved: <https://supreme.justia.com/cases/federal/us/545/469/>. Access: 12.09.2016.
24. Taka, A., Brahushi, F., Basha, R., Leskaj, B., Musabelliu, B., Sulce, S. (2015). Gaps Analysis of Albanian and International Legislation on Easement: Legal Prospect. Albanian Journal of Agricultural Sciences. 2015, Vol. 14 Issue 2, pp. 79-86.
25. TAP's Grievance Mechanism. (2016). Trans Adriatic Pipeline. Retrieved: <https://www.tap-ag.com/grievance>. Access: 15.12.2016
26. The European Convention for the Protection of Human Rights and Fundamental Freedoms. (1950). European Court of Human Rights. Retrieved: http://www.echr.coe.int/Documents/Convention_ENG.pdf. Access: 12.10.2016
27. Voss, W. (2010). Compulsory Purchase in Poland, Norway and Germany - Part Germany. XXIV FIG International Congress 2010 Facing the Challenges - Building the Capacity. Sydney, Australia, 11-16 April 2010.
28. "We have no other option". Preparation of the Trans-Adriatic Pipeline in Albania Fact Finding Mission Report. (2016). Retrieved: <http://bankwatch.org/sites/default/files/no-other-option-TAP-FFM-Albania.pdf>. Access: 12.09.2016

EVOLUTION FROM ECO-FRIENDLY SOLUTIONS IMPLEMENTATION IN AN ENTERPRISE

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Abstract. Lately, it has become rather popular to change a business so that it is environmentally-friendly and sustainable. There is a plethora of information available to the general public that describes the advantages of such an operating model, but somehow very few sources providing a clear description of how a business can estimate the financial benefit from the transition to a "green" model. This research has the goal of reviewing and summarizing fragmented information to create a comprehensive guide to estimate the benefits and planning for organizations considering turning "green". The research can be split into three virtual parts. The first part is a critical review of fundamental information sources. The second part is devoted to the public resources that currently exist, which monitor and provide statistics regarding business resource consumption. The third part evaluates which of the existing financial ratios and indications can be used to monitor implemented eco-solution performance and planning. The result of this research is a guideline on estimating the benefits from the implementation of eco-friendly solutions for SMEs that are considering investing their resources into this area. Publicly-available information from Lithuanian and Latvian sources were frequently used.

Key words: benefits, environmentally-friendly, evaluation, business, decision.

JEL code: Q12, Q51

Introduction

Until the second half of the 20 th century, a limited understanding of society's interaction with nature prevailed. Now, people are aware that natural resources are not perpetual and any human activity influences nature, both in the short and the long term. Environmental management has become a theme of vital importance among entrepreneurs in all Baltic Sea Region countries. Society and the business world have changed their attitude towards the environment – very often issues connected to the latter have become serious arguments in the decision-making process. The ability to improve the environment is a significant task for enterprises in order to maintain international competitiveness (Dimante D., Atstaja D., 2010).

Nowadays, it is everyday life for all of us – individuals, businesses, and governments. As it usually happens, such trends and changes start with governments, which then affect common private businesses, and only then widely enter people's personal lives. More and more businesses are now focusing their attention and resources on ways to become more environmentally-friendly in their operations.

Despite the fact that the topic is more than just popular, the authors of the research found

out that information related to benefits planning and estimations is surprisingly scarce. A large number of companies are trying to become more eco-friendly, but it would appear that not all of them actually understand how to measure what the enterprise is getting from this innovation.

By being eco-friendly, an enterprise can reach two targets at the same time. It can acquire competitive advantage by reducing costs and enhancing operations, and support ecology at the same time. However, when an enterprise decides to "go green", meaning to implement eco-friendly solutions into their operations, several important questions could arise. These questions are as follow.

- Where the enterprise should start and what are the preferred areas for implementation?
- What advantages are available for the enterprise from being "green"?
- How the enterprise could finance the transition to an eco-friendly operations mode?
- How the enterprise could evaluate the financial effect from the transition to an eco-friendly operations mode? (Gabrevics L., 2016)

In order to achieve this target, the following tasks were defined:

- 1) to study the fundamental researches and publications devoted to the processes of implementing green technologies into existing businesses;
- 2) to study the fundamental researches and publications related to green technologies available for business, its requirements, and selection criteria;
- 3) to study the possible sources of business financial benefit from implementing green technology.

As the hypothesis being put forward - it is possible to implement voluntary environment-friendly solutions in a SMEs project that would provide positive net present value. The aim of this article is to demonstrate the logical sequence of implementing the evolution in eco-friendly solutions in an enterprise. The originality of the article lies in the model developed by the authors.

Methodology of this research includes collecting the most relevant data from fundamental researches and reputable publications in order to collect sufficient understanding of possible ways to introduce green technologies into the operations of an existing business unit, as well as the possible benefits, losses, advantages and disadvantages. In order to maintain quality of information and to create a broader picture of this question, information from different sources will be compared against each other. The following methods were used in it: analysis of theoretical literature and publications; document analysis; individual interviews with representatives of SMEs.

Key results of the research:

- 1) information has been gathered from articles and scientific literature, which would be useful for practical applications;
- 2) areas and risks have been clarified to which more attention should be paid in order that businesses can become environment-friendly and sustainable;

- 3) conclusions may serve as the basis for further research and activities.

This article deals only with the ideas of some problems and results of "greening a business" in Latvia and Lithuania, and the authors would be grateful for any wider discussion, criticism and contributions to the topic under discussion.

Theoretical insights

Greening the economy is a way of solving the dilemma between development and environmental impact. While changes in the functioning of an economic system are very slow, self-governments can promote a green economy at a local level, thereby contributing towards overcoming the crises the world is experiencing. (Atstaja D. et al., 2012)

The topic has been widely studied and included in research articles by scientists from many different countries; however, this article focuses on the work of authors from Lithuania and Latvia, in particular.

The analysis of publications of the ISI Web of Science – Lithuanian authors in "Green business" have embraced their studies in a broad spectrum of problems: Cekanavičius L, Bazyte R., Dicmonaitė A., (2014); Barysienė J., Batarlienė N., Bazaras D. et al. (2015); Rakauskienė O. G., Okuneviciute-Neverauskienė L. (2015); Zieminska-Stolarska, A., Zbicinski I., Imbierowicz M. et al. (2013); Ramanauskas J., Stasys R., Zilinskas V. J. (2013); Banyte J., Brazioniene L., Gadeikiene A. (2010); Ruzevicius J. (2009); Grundey D., Zaharia R. M. (2008); Brock G., Urbonavicius S. (2008); Ruzevicius J., Wagering E. (2007). These authors have focused their studies on Challenges in The Context of the Changing; Sustainable incentives in marketing and strategic greening; Green Business: Challenges and Practices, Expression of Green Marketing, Developing the Conception of Corporate Social Responsibility, Eco-labelling, Environmental Management Systems and Tools Analysis etc. As for the Latvian authors,

important studies have been completed by Cirjevskis A., Novikova J. (2012); Melece L. (2008, 2016); Atstaja D., Dimante, D., Livina, A. (2012). Research into eco-friendly solutions and measures have been taken on by Lithuanian colleagues: Baltusnikiene, R.; Susinskas, S. (2012), Banyte J., Brazioniene L., Gadeikiene A. (2010); Grundey D. (2008, 2009); Zaharia R. (2008). The publications include the experience, in cooperation with researchers from other countries, as well as the progress achieved in Lithuania. Accordingly, researchers from Latvia should also be mentioned - Kasalis E., Kasalis J. (2011); Dimante D. (2010). Although the studies do include the main topicalities and studies, they lack the economic assessment. Therefore, the case study concluded by the authors is necessary to select the best practice for implementing evolution from eco-friendly solutions into an enterprise.

The key measures in greening an economy are: investment in natural capital, decarbonising the economy, and the creation of green jobs. The main areas for implementing these changes are: renewable energy, manufacturing, waste management, building, transport, tourism, and urban development (Atstaja D. et al, 2012).

Research results and discussion

1. Green solutions selection criteria

Mostly when people hear about "eco-friendly solutions and innovations", they immediately think about technologies. In a way, this is also correct, but simple procedural and organizational changes can make a difference.

By being eco-friendly, an enterprise can reach two targets at the same time. It can acquire a competitive advantage by reducing costs and enhancing operations, and support ecology at the same time. Watson (2013, p. 36) summarizes several available directions of implementing green technologies:

1) Generating heat, electricity and fuel from renewable sources.

- 2) Improving the efficient use of energy within buildings. This direction is closely related to the LEED (Leadership in Energy and Environmental Design), BREEAM (environmental assessment method and rating system for buildings) and other building certifications.
- 3) Reducing greenhouse gas emissions by means other than those specified in direction 1. This could include promoting alternative transportation methods or distance working.
- 4) Reduction or complete elimination of waste materials produced during operations. One example of this direction is wastewater and wastepaper management.
- 5) Use of technologies that help to conserve natural resources, excluding the technologies mentioned in point 4. It could be rain and storm water management programmes or forestry practices.

One method is suggested by Bonini and Swartz (2014, p. 8). They state that prior to the implementation of a green solution project an enterprise should determine the main goals, and advise having three to five priority goals.

Table 1

Possible groups of priority goals for the business when implementing eco-friendly solutions

Priority goals		
Growth	Returns on capital	Risk management
Composition of business portfolios	Green sales and marketing	Operational risk management
Innovation and new products	Sustainable value chains	Reputation management
New markets	Sustainable operations	Regulatory management

Source: authors' created by Bonini and Swartz, 2014

It could fall under one of three major categories, as shown in Table 1.

Table 1 also shows activity areas which correspond to each major category.

2. The choice and justification of the financing package.

Companies could benefit from being "green" in several different ways. One of the most obvious is an increase in revenue due to an improvement in the brand image, meaning – green marketing. Several authors state that by turning green an enterprise can attract more customers because consumers see additional value in this type of product (Cekanavicius et al, 2014, p. 81). This idea is also supported by Kabiraj (2010, p. 26) who notices that consumers are now experiencing a shift of interest toward greener products. Another way for an enterprise to benefit is from the reduction of costs. Generally, this is caused by managing waste and using energy efficiently – for example, smart use of paper, the efficient use of electronic devices etc. (Cekanavicius et al, 2014, p. 82).

When it comes to the more "serious" and significant changes and investments in "green" solutions, one of the most important questions for any business would be, "where can we get resources for that?"

Apart from using one's own resources, there are several other ways, for example, using public and private capital funding sources.

Public sector financing can come in different formats. The OECD defines the following main types of financing.

- 1) Appropriate grants – which is nearly the most popular and at the same time the most attractive financial instrument. Advantages of grants include transparency, the fact that grant funds are easy to combine with private funding. An additional advantage of grants for recipients is that they are often not required to repay them.
- 2) Interest rate subsidies – this is an instrument which is similar to the direct grant. The purpose of this instrument is to reduce the effective interest rate on a project's loan. It could be fixed or flexible, or even pegged to

some particular target rate, depending on each particular case.

- 3) "Soft loans" – this is second most popular funding instrument and the most preferred in countries with under-developed financial markets. "Softening" could take the form of a lower interest rate, a reduced payback period, or more attractive terms.
- 4) Equity investments – this is an instrument which is used for private enterprises, for example, to modernise or expand operations. Due to the fact that this "environmental equity" is designated for particular environmental purposes, in most cases it is available on more attractive terms than common equity. One serious disadvantage of this instrument is that most agencies do not have a procedure to sell the rights if they want to sell equity shares with profit.

The general principle of evaluating the financial aspect of green innovations lays in a simple comparison of costs and benefits. Both should usually be evaluated for the period of the useful lifetime of the project (asset) and be based on market prices. In addition, it is recommended to analyse the cash flow, even though it does not consider opportunity costs. In order to establish a clear planning of funding sources it is recommended to use resource budgeting (HM Treasury, 2011).

We can now finally move to the very essence of the research – estimations and planning. We would particularly like to stress that one of underlying "preferences" was to create an estimation model based on common tools and methods – to make it comprehensive and universally acceptable for most companies. Also, it's easier to use well-known tools and methods that are readily adaptable.

Clearly, the most obvious core idea is the costs comparison. This idea is also supported by guidelines set out by Her Majesty's Treasury, which recommend using clear cash flow planning and resource budgeting.

The exact model and main tool recommended by the European Commission is the Discounted Cash Flow method. Several prerequisites and limitations for this tool are:

- 1) Use of cash inflows/outflows only. No other items considered.
- 2) Use of correct Discount Rate. In 2014, the EU recommended using 4 %. 3 years prior to that HR Treasury's Green Book advised 3.5 %, so considering that increase was caused by time difference, it's good idea to keep to that rate.
- 3) Forecasted cash flows=the project's useful lifecycle.
- 4) Planning done with prices fixed at base year.
- 5) Input/output net of value added tax (VAT).
- 6) Direct taxes only considered for financial sustainability.

A similar idea is expressed by Owens (2002) who states that, in addition to the Discounted Cash Flow (DCF) model, use of Cost-Benefits Analysis (CBA) and Cost-Benefit Ratio is required.

Regarding Return Ratios, almost all the basic ones are Gross Profit Margin and Net Profit Margin. As stated by Gasiorowski-Denis and UNEP, implementation of eco-friendly solutions could increase an enterprise's revenues and reduce its costs. This, in turn, causes changes in these ratios.

Based on suggestion from the same research by Gasiorowski-Denis (2014), it also can be said that Return Ratio – Especially RoA and RoE will be affected. Best Practices Guide by Owen presents Financial Internal Rate of Return (FIRR), which is another ratio used for green projects appraisal. Same author also indicates that in most cases FIRR is checked against enterprise's actual cost of capital, in order to find out whether project should be undertaken or not.

Additionally, Owens (2002) emphasizes that Payback Period is easiest and most basic measure of project's profitability. The Nest ratios group are composition ratios and relate more to

the evaluation of a project's funding methods, i.e. whether the implementation based on this funding approach is acceptable or not. The D/E Ratio will grow if an enterprise decides to increase existing debt in order to finance the implementation of eco-friendly solutions, or it will decrease if an enterprise decides to finance a project by increasing its equity value.

Liquidity ratios are an entire group of ratios which include current ratio, quick ratio and absolute ratio. All these ratios could be affected by the implementation of eco-friendly solutions.

Weighted average cost of capital (WACC) is a slightly more complicated way to take a deeper insight into the profitability of a project and its funding link. The WACC equation is structured in a way that reflects changes in an enterprise's funding, therefore making it possible to predict whether the chosen funding model is acceptable for the enterprise or not.

The harmonisation of the interests of an enterprise and the undertaking of the measures

Interviews and surveys with employers and employees of the enterprise are highly recommended in order to achieve the results of the measures undertaken, as well as to gather information on the situation. This practice is crucial for gauging the attitude and the collective support for the initiatives.

As for the interviews with the employers, it is recommended to include general questions of the field of an enterprise and of the influence of "green solutions" in the future work of an enterprise. Surveying the employees could be crucial for evaluating the priorities and the optimal sequence of the measures.

It unlikely that the solutions would be implemented one by one, and an entire set will be needed, at least initially. As such, it should be remembered that there is more than one scenario. The measures displayed in Table 2 can be taken as an example.

Available methods of eco-efficiency improvements for an enterprise

Energy Efficiency	Water Efficiency	Waste Management	Commuting Alternatives	Other actions
Use of energy efficient bulbs	Use of low-flow sanitary appliances	Boost material recycling	Bicycle infrastructure	Green purchases policy
Programmable temperature controllers	Smart use of water	Purchase used office furniture	Encourage alternative transport (AT)	Use green cleaning products
Use of lightning sensors	Possible re-use of grey water	Boost plastic bag recycling	Arrange mass transit buses	Use hybrid or electro -cars
Efficient use of electronic devices	Collection and use of rain and storm water	Implement smart use of paper	Payroll benefits for alternative transportation	Regularly review potential improvements
Use of Energy Star rated appliances	Regular water system maintenance	Introduce limited printing policy	Preferential parking spots for AT	n.a.
Use of heat-saving doors and windows	Use of car washes that recycle water	Recycle printer cartridges	Facilitate remote work	n.a.
Improved insulation within buildings	n.a.	Implement newer filtering systems to reduce pollution	n.a.	n.a.
Use of alternative energy sources (solar, wind)	n.a.	n.a.	n.a.	n.a.
HVAC systems use	n.a.	n.a.	n.a.	n.a.

Source: authors' created by Smith and Perks (2010)

Minimum portfolio is a solutions portfolio which causes a minimum number of changes to the existing situation. The objective of this option is to implement as much cost reduction at the lowest possible price, with environmental benefit used only as a secondary priority. Despite this, it is recommended to start with this option for initial changes and later continue with changes in Full portfolio, or choose another line of development.

Radical portfolio is based on a suggestion that an enterprise invests in all of the eco-friendly measures step by step.

Full portfolio provides another approach. This portfolio is based on the idea that the entrepreneur invests heavily into environmental solutions, implementing as many as possible. By doing this, an enterprise could avoid the risk of "minimum portfolio", but at the same time it is incurring costly expenses initially, which will take a long time to pay back.

Flowchart (Fig. 1) displays the progress of adopting the decision.

Conclusions, proposals, and recommendations

- 1) Decision making is the process of making choices by identifying a decision, gathering information, and assessing alternative resolutions. This document contains notes, which are not compulsory, but which you
- 2) may find helpful when considering what you need to do (Fig. 1).
- 3) Green economics is not just about the environment. The implementation of its main principles requires outstanding human creativity, knowledge and the participation of everyone. A green economy is a way of solving the dilemma between development and environmental impact.

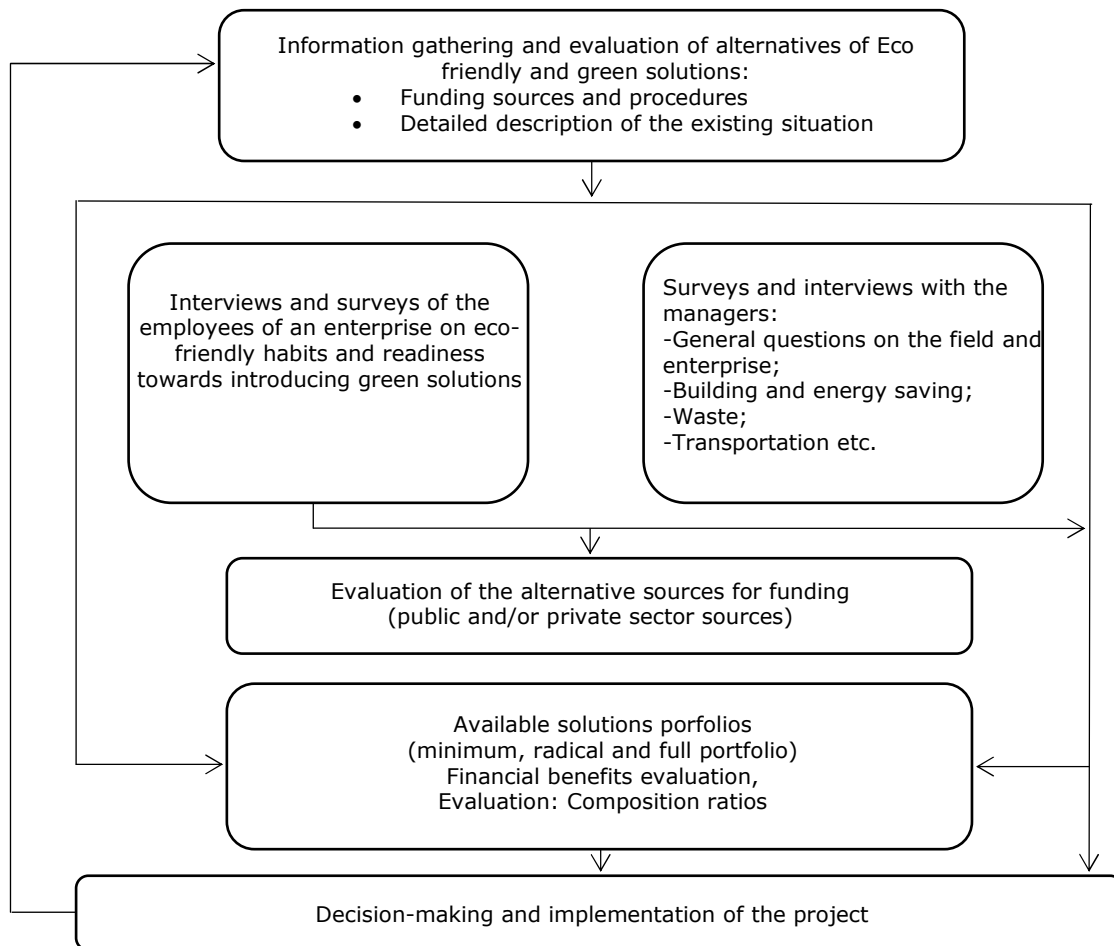


Fig. 1. **Decision making process**

4) The investments needed for such improvements are rather a popular topic for discussion nowadays, so depending on a particular case organization should (and sometimes could) decide whether it would go with a public or private funding source, bearing in mind that some funding options are not available for particular funding models. However, it isn't likely that funding could be acquired before clear planning is carried out.

5) In order to make the results of this research as broadly applicable as possible, this article

uses equations in their general state; however, the authors recommended analysing each ratio prior to implementation and adjust it more individually toward company specific. If the organization is already using these ratios and metrics, it could be adapted to evaluate an eco-friendly solution.

Acknowledgements

Many thanks to the **Lithuanian State Scholarship Programme** and the Government of the Republic of Lithuania for the opportunity to conduct a joint research.

Bibliography

1. Atstaja, D., Livina, A., Dimante, D. (2012). Public Activities in Developing Green Economy: Case Studies in Latvia Conference: 13th International Scientific Conference on Economic Science for Rural Development Location: Latvia Univ Agr, Fac Econ, Jelgava, LATVIA Date: APR 26-27, 2012 *Economic science for rural development: rural business and finance: 1. rural business economics and administration, 2. Finance and taxes Book Series: Economic Science for Rural Development* Issue: 28, pp. 14-19
2. Baltusnikiene, R.; Susinskas, S. (2012). Building the Future (Edited by: Bazaras, Z; Kleiza, V) Conference: 7th International Conference on Intelligent Technologies in Logistics and Mechatronics Systems (ITELMS 2012) Location: Kaunas Univ Technol Panevezys Inst, Panevezys, Lithuania Date: May 03-04, 2012 *Intelligent Technologies In Logistics and Mechatronics Systems (ITELMS '2012) Book Series: Intelligent Technologies in Logistics and Mechatronics Systems*, pp. 22-28
3. Banyte, J., Brazioniene, L., Gadeikiene, A. (2010). Expression of Green Marketing Developing the Conception of Corporate Social Responsibility, *Inzinerine Ekonomika-Engineering Economics* Volume: 21 Issue: 5, pp. 550-560

4. Barysiene, J., Batarliene, N., Bazaras, D. et al. (2015). Analysis of the Current Logistics and Transport Challenges in The Context of the Changing Environment *Transport* Volume: 30 Issue: 2, pp. 233-241
5. Bonini, S., Swartz, S., (2014), "Profits with purpose; How Organizing for Sustainability can Benefit the Bottom Line", *McKinsey on Sustainability & Resource productivity*, July, pp. 5-15
6. Brock, G., Urbonavicius, S. (2008) Regional FDI growth in Lithuania, 1996-2003 *TRANSFORMATIONS IN BUSINESS & ECONOMICS* Volume: 7 Issue: 1 Pages: 80-88
7. Cekanavicius, L, Bazyte, R., Dicmonaite, A. (2014). "Green Business: Challenges and Practices", *Ekonomika*, Vol. 93, Issue 1, pp. 74-88
8. Cirjevskis, Andrejs; Novikova, Jekaterina (2012). Commercial Viability of Strategic Choice on Green Energy Business: Hydro Power versus Wind Power (Latvian case) (Edited by: Deng, W) Conference: *AASRI Conference on Power and Energy Systems (PES)* Location: Hong Kong, PEOPLES R CHINA Date: SEP 04-05
9. Dimante, D., Atstaja, D. (2010). "The Economies of the Baltic Sea Region in Relation to Green Economics, with Particular Focus on Latvia: Environmental Sustainability and Well-being" *Int. J. Green Economics*, Vol. 4, No. 3, pp.292-305.
10. Gabrevics, L. (2016). Evaluation of Financial Benefits from Eco-friendly Solutions Implementation in Latvian Branch of Siemens OY. Master thesis. BA School of Business and Finance, Riga, p133
11. Gasiorowski-Denis, E., (2014). "Why Green is Good", *ISO Focus*, Vol. 105, pp. 2 – 3.
12. Grundey, D. (2009) Eco-marketing and Eco-labelling: Does it Ensure Customer Loyalty for Eco-products in Lithuania? *Transformations in business & economics* Volume: 8 Issue: 1 pp. 152-179
13. Grundey, D., Zaharia, R. (2008). Sustainable Incentives in Marketing and Strategic Greening: The Cases of Lithuania and Romania. *Technological And Economic Development of Economy*, Volume: 14 Issue: 2 pp. 130-143
14. HM Treasury, (2011). "The Green Book. Appraisal and Evaluation in Central Government", London: TSO, London
15. Kasalis, E., Kasalis, J. (2011). Sustainable Development: Theory and Implementation (a case of Latvia) Edited by: Rakitovac, KA; Sugar, V; Bevanda, V. Conference: 5th International Scientific Conference on Entrepreneurship and Macroeconomic Management: Reflections on the World in Turmoil Location: Pula, CROATIA Date: MAR 24-26, 2011, 5th International Scientific Conference Entrepreneurship and Macroeconomic Management: Reflections on the World in Turmoil, vol. 2, pp. 1432-1450
16. Melece, L. (2008). Environmentally Friendly Agriculture: Development Issues in Latvia. *Socialiniai tyrimai/ Social Research*. 2010.Nr.2 (19), pp. 37-46
17. Melece, L. (2016). Challenges and Opportunities of Circular Economy and Green Economy. Edited by: Malinovska, L; Osadcuks, V. Conference: 15th International Scientific Conference on Engineering for Rural Development Location: Jelgava, LATVIADate: MAY 25-27, 2016 15TH INTERNATIONAL SCIENTIFIC CONFERENCE: ENGINEERING FOR RURAL DEVELOPMENT Book Series: *Engineering for Rural Development* Volume: 15 Pages: 1162-1169
18. Organization for Economic Co-Operation and Development [OECD], (2007). "Handbook for Appraisal of Environmental Projects Financed from Public Funds", OECD Publishing, France
19. Owens, G., (2002). "Best Practices Guide: Economic & Financial Evaluation of Renewable Energy Projects"
20. Rakauskienė, O. G., Okuneviciute-Neveauskiene, L. (2015). Strategic Guidelines of Increasing Employment and Reducing Unemployment in the Context of EU (Lithuanian Case) *Transformations in business & economics* Volume: 14 Issue: 2 Pages: 224-253
21. Ramanauskas, J., Stasys, R., Zilinskas, V.J. (2013). Coordination of the Objectives and Optimal Selection of Innovative Biofuel Market Participants (Edited by: Eglite, A) Conference: International Scientific Conference on Economic Science for Rural Development Location: Latvia Univ Agr, Fac Econ, Jelgava, LATVIA Date: APR 25-26, 2013 ECONOMIC SCIENCE FOR RURAL DEVELOPMENT: RURAL DEVELOPMENT AND ENTREPRENEURSHIP MARKETING AND SUSTAINABLE CONSUMPTION Book Series: *Economic Science for Rural Development* Issue: 32 Pages: 92-97
22. Ruzevicius, J. (2009). Environmental Management Systems and Tools *Analysis INZINERINE EKONOMIKA-ENGINEERING ECONOMICS* Issue: 4 Pages: 49-59 Published: 2009
23. Ruzevicius, J., Waginger, E. (2007). Eco-labelling in Austria and Lithuania: a Comparative Study. *Inzinerine Ekonomika-Engineering Economics*, Issue: 4 Pages: 96-102
24. Watson, A., (2013). "Green Technologies and Practices: a Visual Essay", *Monthly Labor Review*, January, pp. 36-48
25. Zieminska-Stolarska, A., Zbicinski, I., Imbierowicz, M. et al. (2013) Waterpraxis as a Tool Supporting Protection of Water in the Sulejow Reservoir *Desalination and water treatment* Volume: 51 Issue: 19-21 Pages: 4194-4206

SOCIAL POLICY AND EMPOWERMENT OF WOMEN IN THE AGRICULTURAL SECTOR IN UZBEKISTAN

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Abstract In 2016, Uzbekistan celebrated twenty-five years of independence. Although government prioritized investment in agriculture sector, the social policy emphasized strongly institutional and organizational changes. As a result, women are mostly excluded from reforms' benefits. This paper provides a critical literature review that addresses how international gender measurement indicators and methodologies help in understanding women's empowerment and opportunities in the agriculture sector of post-Soviet Uzbekistan. Women play an important role in agricultural growth in Uzbekistan, but face persistent obstacles and societal and economic constraints that limit their further inclusion in agriculture. Mostly women are unrepresented and "invisible" in the agricultural sector in Uzbekistan because of cultural norms and gender stereotypes that undervalue female labour. Majority of women often also have no equal access to natural, financial resources and technology, and typically earn less.

Key words: social policy, women empowerment, gender stereotypes, women farmers, Uzbekistan

JEL code: P32

Introduction

This paper provides a critical literature review that addresses how international gender measurement indicators and methodologies help in understanding of women's empowerment and opportunities in the agriculture sector of post-Soviet Uzbekistan. The literature review is based on critical analyses of articles about women's farming and leadership activities in agriculture sector in Uzbekistan (Alimdjanova, 2008; 2009; Tursunova, 2008) the 2014 Asian Development Bank (ADB) Country Gender Assessment report, and two Technical Assistance (TA) reports conducted by "TAHLIL" Research Center and by "Nazar Business Technology" company.

In this paper, the authors analyse the empowerment of women in the agricultural sector through international measurement of "The Women's Empowerment in Agriculture Index" (WEAI) in the case of Uzbekistan. This is followed by the description of the theoretical framework using WEAI approach and the analysis of: 1) the role of women in decision-making in agricultural production at household and farm levels; 2) women's access to the financial resources and ownership of assets that influence their opportunities to set up and manage new businesses; 3) women's control of incomes and the decision-making opportunities at family level; 4) women's practicing of leadership skills in the

non-formal and formal networks; and 5) women's time allocation for the productive and domestic tasks. Finally, authors developed recommendations for the Women's Committee and ministry of Agriculture and Water Resources of the Republic of Uzbekistan, as responsible implementing agencies of the state programs and international projects, which focus on decreasing of gender empowerment gap in Uzbekistan.

Theoretical framework

"The Women's Empowerment in Agriculture Index" (WEAI) is a theoretical approach used to examine gender empowerment indicators in agriculture for any country. The Women's Empowerment in Agriculture Index is a new survey-based index designed to measure empowerment, agency, and inclusion of women in the agricultural sector in an effort to identify ways to overcome the obstacles and constraints women will face (Alkire et al., 2012). In order to monitor and measure gender empowerment, Zoe Alkire and colleagues introduce significant indicators which are called "5 Domains of Empowerment" (5DE): "(1) decisions about agricultural production; (2) access to and decision-making power about productive resources; (3) control of use of income; (4) leadership in the community; and (5) time allocation" (Alkire et al., 2012).

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Domain 1: Decisions about agricultural production

Even though female participation in farming activities remains high, more often women are excluded from decision-making regarding agricultural production, at dehkan plots (peasants' land) as well as at individual farm's management level. Gender analysis of production domain focuses on the decision-making of the agricultural production of dehkans' plots and farms.

Agriculture is a primary source of livelihood for rural population. Although women play a major role in agricultural production, they are underrepresented in groups responsible for decision-making in agriculture. The Gender Assessment Report of Asian Development Bank in 2014 pointed out that women constituted majority of water users for the agricultural production but they underrepresented at sectoral organizations such as Water Users Associations (WUA) (ADB, 2014:13).

Majority of female-farmers felt some positive changes related to the reforms in the agriculture sector. Most of female farmers were proud to say that they could pay tuition fees for their sons' higher education. On the one hand, this indicator demonstrated a positive attitude regarding the importance of education for the young generation. On the other hand, however it revealed the existence of gender stereotypes about the traditional women's role in patriarchal society. The patriarchal relationships influenced not only family relationship, but also women's access to education and natural resources such as land.

In Uzbekistan, the majority of rural population (49 %) depend on land production. That is why the land has become not only the crucial natural resource but also significant commodity. Whereas men and women legally have equal rights, cultural norms; and gender stereotypes deny women prevailing patriarchal land rights particularly in rural areas (ADB, 2014:29).

Furthermore, in rural areas the land transaction is one of the important operations.

Due to widespread gender stereotypes and lack of formal woman recognition, land ownership remains a male-dominated domain (FAO, 2013). The social survey conducted in Tashkent region also shows that Uzbek women are not benefiting equally from the recent shift towards private farms, and they are disadvantaged in access to key productive resources, such as land, water, and credit. They are underrepresented in the bodies concerned with the management and distribution of these key resources. As a result, even though majority of Uzbek women supplied their household with food from dehkan plots and were busier with unpaid domestic work, they had no legal rights on the land (Kandiyoti 2003; Tursunova 2012). As a result, the lack of opportunities in formal sector, low contribution to the family budget, and overwhelming domestic duties decreased the chances of women in decision-making at the household level.

How can women participate in decision making at macro level, if women often have no sufficient education and are busy with domestic duties? Women's low decision-making at a micro level correlates with the macro level data. The indicator of autonomy production during the last ten years was significantly low in Uzbekistan at a macro level. For example, women farmers felt that their decision-making was absent due to authorities under the local administrations, who could order how much wheat and cotton farmers need to grow or order to grow rice, even though horticulture products would be better for their land. As a result, they received very low yield and income (ADB 2014, Tursunova 2014).

The female farmers emphasized that they could not receive credits for the processing of agriculture production because loans are mostly given for growing activities and new initiatives and plans of female farmers were not correlated with plans of local authorities and hence were rejected (Alimdjanova 2009:9). For example,

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when women initiated the seed selection process, since the quality of seeds were poor, local authorities did not allow women to purchase raw material from other organizations, and the initiative of active farmers was rejected by local administration (Alimdjanova 2008:9).

Domain 2: Ownership of assets and credits

The next section demonstrates the access of women to natural resources and loans. Although the Article 18 of the Constitution of the Republic of Uzbekistan guarantees equal rights for women, gender stereotypes and patriarchal attitudes have a strong negative influence on their performance and situate them at a disadvantaged position. As it was emphasized in the Gender Assessment Report of ADB in 2014, women have benefited substantially less than men from privatization of agricultural production and land allocation schemes. The privatization is a process that is facilitating the resurgence of patriarchal land rights, because state inaction on ensuring women's rights to property has meant that it is largely men who are in a position to acquire rights to land during privatization. In addition, cultural norms and traditions contributed to men's control of family assets. Even in the case of divorce, men tried to retain the land and dehkan plots. In the case of a husband's death, the land rights pass to the son because it is expected that he will take care of elders (ADB, 2014).

In comparison with dehkan plots, the tender system of farm registration gave more chances to men rather than women (Tursunova, 2013). Consequently, because of the special attention given to the persons who had initial capital and special knowledge in agricultural production, men occupied an advantaged position. Traditionally, majority of women are excluded from the ownership assets system. In addition, they have no equal access to natural resources and could not equally participate in the management and decision-making process (ADB, 2014). For example, in 2012, the Bukhara irrigation system

included 124 Water Users Associations (WUA), which serviced 3950 farmers (ADB 2014:5). However, as emphasized in the report, women's average participation in each WUAs was 10 %. Usually they work as accountants, administrative staff or cleaners. Still, women's representation and participation in WUAs and in agricultural production require significant steps to be involved in the formal decision-making process about water use (ADB 2014).

Women's needs are connected to social policies on water regulation. There are no specific guidelines that regulate the water distribution on an equal basis among farmers and population. Women do not participate at the decision making level in WUA; however, irrigation water conflicts are mostly linked with watering of dehkan farms where women's involvement is dominating. Furthermore, the government policy and programs on natural resources, specifically on water resources management, are generally silent on gender and make no reference to gender equality in access to land or water resources (Alimdjanova, 2008:9). State programs focused more on institutional changes rather than decreasing the gender gaps in participation and benefits from natural resource policies.

Although women play a dominant role in agricultural production, they have no equal access to the financial resources such as collateral and ownership assets. Women working in agriculture, including female entrepreneurs, represent an important economic human resource. In many ways, the issues faced by women in agricultural business are similar to those encountered by entrepreneurs operating small-scale enterprises in rural areas (ADB, 2014). For instance, female farmers generally do not hold legal titles to land and lack access to other productive resources, such as credit and microfinance. In total, the financial problems could be grouped according to the following characteristics: absence of collateral to receive a loan and of opportunities to receive cash from

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bank cards, lack of knowledge in business plan development, and registration and design of financial documents (ADB 2014). Except these difficulties, there are many bureaucratic obstacles in the banks in registration and designing documents. Usually, the majority of women are faced with lack of time to walk to get inquiries during the hot season of harvest or during the period of active field and garden work. Finally, the high rates of available credits entice women to resist banks proposals.

Female farmers and dehkans have limited access to finance, which is a major constraint for small businesses. The legal framework governing secured transactions does not effectively promote the use of movable property, which makes up two-thirds of all assets held by small businesses as loan collateral. In 2002, according to information from the State Statistical Department, 85 % of micro credits were allowed to men and only 15 % to women. The absence of cash flow-based lending processes is the major obstacle to providing credit to medium and small enterprises. Small businesses' limited business skills, experience, and knowledge also pose significant credit risks and prevent their growth. The survey revealed that only 10 % of female farmers could receive bank loans, while the majority of female farmers from Zomin region emphasized that their attempts to apply for bank credits were unsuccessful (Alimdjanova 2008 :12).

Other female farmers were faced with bureaucratic obstacles in the banks and lost their hope to receive the credit. In comparison with male farmers, women usually felt the time shortage, because they also had domestic duties to attend to. The lack of financing is one of the main constraints to develop their own farm or small entrepreneurial activities in rural areas.

Besides, studies on female entrepreneurs highlight their lack of business skills and difficulties accessing business education – both formal education and training on business start-

ups. In conclusion, all the reports proposed the business development trainings that included different basic modules such as accounting and business management to be organized on a regular basis, especially for females from remote areas in Uzbekistan (Kandiyoti 2003; ADB 2014:63).

Domain 3: Control over use of income

Although women play a dominant role in agricultural production, their participation in control of incomes at micro and macro levels are still low in Uzbekistan. Income is one of the significant indicators, which mostly identified the power subordination at the household level between husband and wife. That is why the control of an income indicator and the decision making opportunities at the household level correlated with the same indicators at macro level as well. ADB Poverty and Social Assessment report (2008) examined and presented calculations of the distribution of men's and women's incomes at the household level in a detailed manner. For example, in 2008, the TA report revealed that the role of women in the household economy is not very significant in the Narpay district of Samarkand region. On average, income from women's employment (without taking into account income from agricultural activity on family plots and incomes from non-agricultural entrepreneurship) makes up only 13 % of the total family income. Taking into account work on garden plots and social benefits (which are, in most cases, given to women), women's contribution to family income may go up to 27 % (ADB, 2008). It is worth noting that in the Narpay district, women's contribution to family income to a considerable extent consists of social transfers: old-age pensions; disability pensions; and children's benefits. At the same time, in comparison to men, almost every type of women's income is lower in both absolute and relative terms.

The difference becomes particularly vivid when comparing income from hired employment

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in non-agricultural sector, where women's income is almost three times lower than men's income. Old-age and disability pensions for women are also 1.4 times lower, which reflects lower earnings during their working years (ADB, 2008). Additionally, the necessity to take care of children does not allow women to be active on the labour market and forces them to give up looking for a job. In such conditions, women could work on a garden plot and market their own agricultural products, but even such employment is not available in the Narpay district due to irrigation water famine. Therefore, the unused labour potential of women has the most negative effect on living standards of households.

In 2013, as presented in a household survey, conducted in the framework of the "Rehabilitation of Amu-Bukhara Irrigation System", the role of women in the household paid economy is not significant. On average, income from women's employment makes up only 19 % of the total family income in Bukhara district and 14 % in Romitan district. Women contribute to family income 2.1 times less than men in Bukhara district and 2.3 times less in Romitan district. That factor is explained by low employment opportunities for women in rural areas. According to survey results, the majority (22 %) of female family members are housekeepers, while 18 % are pensioners and 18 % are students. This indicates gender misbalance in economic activity and male dominance being a main income earner. Men mostly have their own business (12 %) and work in hired positions (10 %). In contrast, majority of women are employed on farms (8 %) compared to men (3 %). Consequently, in a male-headed household, they make the final decision in 89 % of the cases. In the rest, 11 % of male headed households, there are other family members (i.e. spouse, parents, children) who make the decision (ADB, 2013).

Domain 4: Participation in the community's economic or social groups

Women in Uzbekistan are active in practicing leadership skills in formal and non-formal community networks. What is the social system in rural areas where women can exercise and practice their leadership skills? First, it is the Women's Committee of Uzbekistan, a Non-profit Government Organization (NGO). The Women's Committee of Uzbekistan was established in 1991 to provide the Government with recommendations on women's policies. This NGO is one of the key institutions urged to assist in every way to strengthen the status of rural women and provide legal support to the women, organize and conduct trainings, protect low-income families, enhanced economic opportunities. It is financed by the government and has the main authority to promote women's issues.

This organization has representatives in all administrative structures, beginning from makhalla (local community) to regional and republican levels. One of the main roles of the Committee is to promote gender equality at all levels (ADB, 2014). There are many other associations at community level such as Farmers Council, National Association of Non-governmental Organization of Uzbekistan (NANOUz) and local district authorities. However, due to different reasons women have passively participated in activities of these organizations.

Women are very active in creating, establishing, and participating in the non-formal network in rural areas (Tursunova 2013). These social networks operated also as indigenous economic networks where all participants contributed fixed funds that were given in turn to the host of the event, which they received as a lump sum payment at a future event. Tursunova observed informal socio-economic network structures of indigenous women in Uzbekistan during 1991-2012 (2013). She examined the creation of indigenous saving networks, such as gaps.

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Gap and saving networks are local and emerged during Soviet times known as "chernaya kassa" (black cash register). Women's social and economic networks often enhance leadership skills, power sharing, equity, equality, justice, and environmental sustainability in improving lives of rural people. Socio-economic networks act as a livelihood resilience mechanism in the process of changes in rural areas from gender, age, education, ethnicity, class, location, and household status dimensions. In addition, diametrically different approaches for active participation in the economic and social life were presented (Tursunova 2013). In the case study of Uzbek women, it was found that due to lack of assets, the majority could not borrow credit in the state and private banks up to the present time. In response, Uzbek women in rural areas of Tashkent created informal social networks with relatives, classmates, and neighbours (Tursunova 2014). Furthermore, the case study shows that the informal form of sharing money in Uzbekistan, the "Gap" process, is an example of mutual help through monetary sharing. The gift economy allows the redistribution of resources from richer relatives to others among kinship groups.

Gap was a space where women addressed social problems, created knowledge, and formulated actions to solve livelihood dilemmas. Women utilised gap to make meaning of events, which often involved sharing of knowledge about seeds, prices in the market, planting, and harvesting. Also, women raised concerns about social issues, such as unemployment, domestic abuse, and migration (Tursunova 2014). In the leadership domain, Uzbek women from rural areas could be considered as active participants of non-formal community networks that often respond to social and economic issues women experience.

Domain 5: Allocation of time to productive and domestic tasks

While women demonstrated their will to be active in participation at social and entrepreneurial life in Uzbek community, the time constraint could be considered as an important indicator which hampered their professional development. It was summarized that patriarchal norms of Uzbek society and existing gender stereotypes negatively influence socio-economic development of the entire society. In 2010, the Institute for Social Research and United Nation Population Fund in the social survey revealed that most of the respondents (48 %) preferred to follow patriarchal family model where the husband is the main breadwinner and the wife is considered as housekeeper and mother. However, on average 66 % of women surveyed were responsible for domestic duties: cleaning, cooking, and taking care of children. The same results regarding the time-use were received in other social survey reports in scope of ADB projects in rural areas. Due to time constraints, women were usually excluded from active participation in the labour market and consequently in the formal sector of the economy. In conclusion, although women may be interested in pursuing entrepreneurial activities and other income-generated schemes, it may be impossible for them to reconcile household activities and other income generating schemes (ADB, 2014:10).

Conclusions and recommendations

Through the lenses of WEAI theoretical framework, women's participation in socio-economic life shows that women are often disempowered in the agricultural sector in Uzbekistan. While women play a significant role in agricultural production at household and farm levels; however, women's role as active actors in livelihood and formal sector activities is unrecognized. Uzbek women still face lack of autonomy in decision-making, income control, and time allocation issues, which has negatively

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influenced their professional development. It is recommended to the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan in cooperation with Women's Committee consider to develop and implement gender mainstreaming programs and projects in the country and among stakeholders. During the planning phase to involve national and international gender experts with aim to organize gender awareness trainings for men and women in rural areas and among stakeholders.

The existing gender stereotypes prevent women's ownership of assets and the majority of women farmers are faced with financial issues in accessing credits. It is recommended to the Ministry of Agriculture and Water Resources of the Republic of Uzbekistan in cooperation with Women's Committee to organize business trainings for farmers and young people.

Due to existing gender stereotypes and lack of professional skills, women are employed in low-income positions within the labour market. There is also horizontal and vertical gender asymmetry at the distribution of employment amongst sectors, remuneration, and education. Even though women play a dominant role in the agricultural sector, they are still unrepresented and "invisible" because of cultural norms and gender stereotypes. It is recommended to Ministry of Agriculture and Water Resources of the Republic of Uzbekistan in cooperation with Women's Committee to set up Women's Leadership School with aim for advancing skills and knowledge on economic and social development of the community. In addition, to set up the Association of female entrepreneurs and farmers of Uzbekistan to empower women and foster gender sensitive and responsive policies.

Bibliography:

1. Alkire, S., R. Meinzen-Dick, A. Petrman, A.R. Quisumbing, G. Seymour, and Vaz, A (2012). The Women's Empowerment in Agriculture Index. IFPRI Discussion Paper 1240. Washington, DC: International Food Policy Research Institute. Downloadable at: <http://www.ifpri.org/publication/women-s-empowerment-agriculture-index>, p. 82.
2. Alimdjanova, D. (2008). "Women Farmers in Uzbekistan: Experience During The Period of Institutional Reforms, Economics and Rural Development", Volume 4, p. 16.
3. Alimdjanova, D. (2009). "Gender Aspects of Agricultural and Rural Employment: Application for Uzbekistan", Gender Pathways out of Poverty Rural Employment, p. 17.
4. ADB. (2014). Uzbekistan Country Gender Assessment, www.adb.org, p. 95
5. ADB. (2008). "Poverty and Social Assessment on the Territory of Narpay Sub-project, Samarkand Province". TA 7061: Water Resource Management Sector Project. ADB/Government of Uzbekistan/IKS, p. 92.
6. ADB.(2012). Poverty and Socio-economic Assessment on the Territory of Bukhara and Romitan Districts, Bukhara Province TA 7917: Amu Bukhara Irrigation System Rehabilitation ADB/Government of Uzbekistan/NBT, p.56.
7. Kandiyoti, D. (2003). The Cry for Land: Agrarian Reform, Gender and Land Rights in Uzbekistan. *Journal of Agrarian Change*, 3(1 & 2), pp. 225-256.
8. Tursunova, Z. (2013). Post-Soviet Uzbekistan: The Implications of Land Reforms on Women's Farming and Income-Generating Activities. *Journal of Human Security* 8(2),pp. 125-145.
9. Tursunova, Z. (2014). Women's Narratives: Resistance to Oppression and the Empowerment of Women in Uzbekistan. *Journal on Indigenous Social Development*, 3 (2), pp.16.
10. FAO Uzbekistan Country Report. (2013). Gender and Land Rights Database. <http://www.fao.org/gender/landrights/home/en/> (accessed August 2013) pp. 21

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OPEN INNOVATION STRATEGIES AND BUSINESS INCUBATION SERVICE IMPACT ON THE SUCCESS OF INCUBATION

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Abstract. New ventures that generate innovation are associated with economic growth and business incubators play unique role in stimulating this growth by facilitating creation of new companies. Many researchers associate start-ups with open organisations engaged in innovation processes and call for research in the intersection between the themes of open innovation and start-ups. This study relates to the call to investigate which competencies are crucial for open innovation success by looking at open innovation competences, strategies and motivation as contributing factors. The purpose of this study is to link innovation capacity of nascent entrepreneurs with services provided by University Business Incubators and find out which factors contribute most to the success of incubation. The quantitative study of tenants of Latvian University business incubators revealed that open innovation strategies and motivation to engage in open innovation activities are positively associated with the use of incubation services. Among factors contributing to the success of incubation incubator service networking appeared to be the most important, followed by open innovation inside-out strategy and incubates age. Practical implications for the management of business incubators are related to widening the networking services.

Key words: open innovation strategy; open innovation competencies; university business incubation; start-ups

JEL code: M19, L26, M13

Introduction

Innovation and entrepreneurship are often regarded as a basis for economic growth and the wealth of nations (Maritz & Donovan, 2015). Business incubators are among initiatives that stimulate economic growth by facilitating creation of new companies (Ratinho, et al., 2011). Incubation is a support process that nurtures the development of beginning and emerging companies through a range of resources and services. Entrepreneurial process refers to the recognition or creation and exploitation of business opportunities and that requires various types of skills and competencies (Fukugawa, 2013). New business creation is frequently related to innovation and business incubators have unique position of knowledge transfers in this innovation and entrepreneurship ecosystem. Moreover, start-ups that foster innovations are the hallmark of economic renewal and progress and are also associated with greater potential returns (BarNir, 2014). Similarly Spender describes start-up companies as „powerful engine of open innovation processes“ (Spender, et al., 2017, p. 4). Open innovation (OI) is the new model of doing innovation (Chesbrough, 2003). Innovative entrepreneurship process is related to

use of open innovation strategies as, for example, inflow and outflow activities (Grassmann & Enkel, 2004) and to develop specific competencies, named open innovation competencies, which are essential for the success of open innovation (DuChatenier, et al., 2010). As the competencies in general are important for performance (Mulder, 2007; Mitchelmore & Rowley, 2010), those related to open innovation could help nascent entrepreneurs to exploit better the incubator's services and open innovation strategies, and thus influence their success inside the incubator as well as the results of incubation. In the growing context of open innovation, business incubators adapt by developing more the networking services, which are essential in the context of open innovation (Hansen, et al., 2000) still there is lack of data how efficient these services are.

The *aim of this study* is to link innovation capacity of nascent entrepreneurs with services provided by University Business Incubators and find out which factors contribute most to the success of incubation. Moreover, this study relates to the call to investigate which competencies are crucial for open innovation success (DuChatenier, et al., 2010) by looking at

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open innovation competences, strategies and motivation as contributing factors.

The paper is structured as follows. The first part presents the theoretical foundations and definitions of open innovation, open innovation competencies, motivation and strategies, and briefly describes incubation and Latvian University Business Incubators. Further the variables of the research and research questions are presented. The second part describes the methodology, design of the research instrument (questionnaire) and finally presents the results and discussion leading to managerial implications.

Open innovation strategies, competencies and motivation

Open innovation is defined as "the use of purposive inflows and outflows of knowledge to accelerate internal innovation, and expand the markets for external use of innovation, respectively" (Chesbrough, et al., 2006). Open innovation involves increasing internal innovation by involving different parties and more value creation for the business by the commercialisation of the unused technology and patents (Chesbrough, et al., 2006). Open innovation asks for specific *strategies*, such as inside-out and outside-in activities, but also some coupled activities, which suppose a combination of those two (Grassmann & Enkel, 2004). Outside-in activities are supposed to involve external and internal parties of the business to accelerate internal innovation. For example, IBM's incubator encourages incubates to work with external partners of the incubator's network to increase their performance in terms of product development. Inside-out activities include new ways of commercialising the unused technology and patents. For example, incubated start-ups from Technical University of Zurich commercialised some of their mechatronic knowledge to ABB Group (Grassmann & Enkel, 2004).

In the open innovation context, entrepreneurs need specific competencies, named open innovation competencies. Elise du Chantenier defines *open innovation competencies* as "the behavioral characteristics supporting the following activities or tasks and challenges: managing the processes of inter-organizational collaboration, managing the process of innovation, creating new knowledge in collaboration" (du Chantenier, et al., 2010). Authors categorize these competences per the objective they serve. The profile of open innovation competencies proposed by du Chantenier includes 33 competencies, grouped in four clusters: self-management, interpersonal management, project management and content management. Except for the first category (self-management), which is a useful basic skill for other categories, each skill category is associated with a main object or activity of open innovation. As the authors pointed out, these competencies, which are all useful for open innovation, are not necessarily specific and may be necessary for other tasks as well. These competencies are important for the open innovation success since they could influence incubates' success inside and outside the incubator by affecting value creation.

Open innovation competencies can contribute to value creation and thus to new business development. For example, trust, which belongs to interpersonal management category of open innovation competencies, is a moderator of several relationships, such as the perception of the network benefits and the decision to actively collaborate inside a network (Brunetto & Farr-Whatson, 2007). Moreover, interpersonal trust is a moderator between knowledge management processes and knowledge management effectiveness (Poon, 2006). Absorptive capacity, which belongs to content management category of open innovation, helps entrepreneurs to explore and exploit internal and external sources of new knowledge by moderating the relationships between technology sourcing and

firm performance (Grama & Royer, 2013). Project management competence which belongs to project management category of open innovation competencies is considered a moderator between the motivational empowerment, which is the feeling to work competently, and the job performance (Chan, et al., 2013).

Since these competencies influence performance and are related to open innovation, it can be expected that open innovation competencies help students from University business incubators to use better incubator's services and open innovation strategies, thus have positive impact on the result of incubation process and value creation. However, competencies alone do not work without motivation to engage in innovation processes. Saraswathi defines motivation as willingness to exert high level of effort towards certain goal (Saraswathi, 2011). Consequently, open innovation motivation is willingness to exert high level of effort related to open innovation activities, such as generating new ideas, acquiring new technologies and markets, and involving partners.

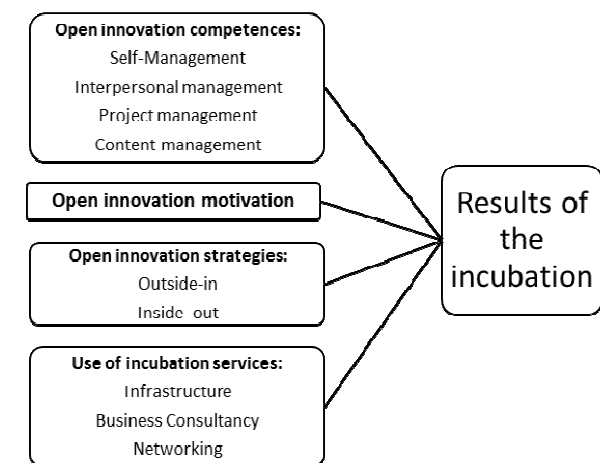
Open innovation of tenants of University Business Incubators

Many research papers demonstrate the benefits of open innovation for big companies, however, open innovation is even more important for small companies and nascent entrepreneurs since they have fewer resources. Nowadays open innovation becomes more an obligation for new firms than a choice (Lichtenthaler, 2011), and business incubators favour open innovation in their tenant firms (Grama & Royer, 2013).

Business incubators are organisations designed to accelerate the economic development, helping start-up firms in their growth and development phase (Somsuk & Laosirihongthong, 2014). The primary goal of a business incubator is to support tenants during the start-up period when they are most vulnerable, and to produce firms that will leave

the incubation program as a self-supporting enterprise (Hacket & Dilts, 2004).

There are multiple types of business incubators - private business incubators, enterprises' business incubators, business incubators for local economic development and University business incubators (Albert, et al., 2003). In Latvia since 2013 five Universities have business incubators where young entrepreneurs and start-ups can seek assistance in pre-incubation phase as well as during incubation phase. The services delivered by the University business incubators are classified in three categories: infrastructure, business support and networking services (Bergek & Norrman, 2008; Bruneel, et al., 2012). Due to the novelty of this phenomenon, there is no research done so far in Latvia about University business incubation. Still for the management of these incubators it is important to understand which services are more valuable and which factors contribute most to the success of incubation and new business creation. Moreover, for tenants it is important to know which competences and strategies in relation to which incubation services work better.



Source: authors

Fig. 1. Variables influencing the results of the incubation

The model presented in Fig. 1 shows the associations between the variables which, according to the literature, impact the success of the incubation. The following research questions are formulated:

RQ1: Which open innovation dimensions are better associated with the use of Business incubator services?

RQ2: Which services provided by the University business incubators contribute most to the results of the incubation?

RQ3: Which factors of open innovation contribute most to the results of the incubation?

Methods

To answer the research questions, the quantitative study was performed. To collect the data the questionnaire was developed with five scales related to each of the variables and 96 statements in total. All statements were measured in 7 point Likert scale where coding 1 is allocated to "completely do not agree" and coding 7 is assigned to "completely agree".

Depended variable of this study is related to the results of the incubation process. The tenants were asked to evaluate their performance as value created at the end of incubation period. Value creation is measured based on the scales proposed by Hughes and colleagues who proposed to measure it in terms of innovation and competitiveness (Hughes, et al., 2007). They adopted from the literature three innovation scales measuring: radical innovation (6 items); technical innovation (2 items); process innovation (3 items). They also adopted a competitiveness's scale named competitive ability (4 items) (Hansen, et al., 2000; Kambil, et al., 2000) and proposed to add competitive performance (2 items) (Hughes et al., 2007). Students were asked: "In order evaluate the performance of your business in terms of innovation and competitiveness, please indicate your level of agreement with the following statements". The scale included in total seventeen statements.

Independent variables of this research are open innovation competencies, open innovation motivation, open innovation strategies and use of services provided by University business incubators.

The *open innovation strategies* are related to inside-out, outside-in and coupled activities (Grassmann & Enkel, 2004). These open innovation strategies are related to: problem solving with experts; design of a new product thanks to crowdsourcing; internal idea challenges; enterprise social network or continuous suggestion box; product test/service test in a client community; open data and data sharing; start-ups scouting and partnerships; intrapreneurship programs; investments in innovative companies; patents. The two additional strategies added are related to commercialization of the scientific work and new product development using crowdfunding. Students were asked: "How often do you use these open innovation approaches?" The scale included in total twelve items, eight for outside-in and four for inside-out strategies.

Open innovation competencies include 33 items proposed by du Chatenier et al. (2010) and are grouped in 4 clusters corresponding to interpersonal management (9 items), project management (10 items), content management (9 items), and self-management (5 items). Students were asked: "What level do you consider to have for the following capabilities of open innovation?"

Open innovation motivation is measured with 8 statements and respondents were asked: "Please evaluate your motivation to do the following". Statements are related to idea generation, customer research, searching for access to new technologies and markets, development of intellectual property like patents and trademarks.

The list of *incubator services* delivered by Latvian University business incubators is built upon the literature (Bergek & Norrman, 2008; Bruneel, et al., 2012). They are classified in 3 categories: infrastructure (4 items), business consultancy (8 items) and networking services (14 items). The students were asked: "In what extent are you using the following services of the incubator?"

Table 1

Cronbach`s Alpha, mean values and standard deviations of dimensions

	Cronbach`s Alpha	Mean	SD
Result of the incubation	0.82	3.97	1.21
OI Competences (Self-Management)	0.73	5.69	0.77
OI Competences (Interpersonal Management)	0.85	5.89	0.69
OI Competences (Project Management)	0.85	5.66	0.73
OI Competences (Content Management)	0.80	5.61	0.72
Incubator service use (Business consultancy)	0.81	3.73	1.64
Incubator service use (Networking)	0.91	3.30	1.64
Incubator service use (Infrastructure)	0.68	3.62	1.69
OI strategy (outside-in)	0.84	3.44	1.31
OI strategy (inside-out)	0.62	4.44	1.37
OI motivation	0.80	5.64	1.19
Stage of the business idea	-	2.42	1.73
Gender	-	1.46	0.5
Age	-	21.58	0.66

Source: author's calculations based on research data

Control variables were included to understand whether they have any effect on dependent variable. Five control variables were included: the incubator; stage of business idea at the start, where "just an idea" was coded as 1 whereas "already have sales or provide service" was coded as 7. Demographic variables included was respondent`s age, gender, and educational status (student or not).

The survey of University business incubators' tenants was launched to reach the tenants of three incubation sessions during 2013-2016. The incubation session corresponds with the academic year cycle. Thus, the population for this research is those tenants who had finished the incubation and may reflect on the overall incubation cycle and the total number is 121 persons or tenants during incubation sessions in 2013-2016. Five Business Incubators – RISEBA University, TURIBA University, Latvia University, Riga Technical University, BA Scholl of Business and Finance were involved. The data collection was launched in June 2016 until October 2016 via online survey platform Webropool. In total 69 replies were collected. Majority of the respondents (57 %) were students.

Research results and discussion

The data was analysed using SPSS 21 statistical package. First, the internal consistency reliability of all scales was checked by means of Cronbach's alpha coefficients. All scales show satisfactory to good internal consistency reliability, except Incubator service use (Infrastructure) and OI strategy (outside-in) show weak reliability (see Table 1). This can be explained with small number of items (four) in those scales. K-S test showed normally distributed data (all p values are in between .29 to .99), so the sample can be considered as representative.

One way ANOVA was used to determine whether there are significant differences between the results of tenants in the five business incubators. ANOVA indicated that statistically significant differences does not exist ($F=1.89$; $p=.12>.05$), so the results can be equally attributed to all University business incubators. Independent sample t-test for equality of means for gender groups does not indicate significant differences related to results of incubation ($t=-1.65$; $p=.11>.05$). Moreover, the stage of the business idea at the starting point appeared to have no significant relationship with any of the constructs.

To answer RQ1 and to find out which open innovation dimensions are better associated with the use of business incubator services, Pearson correlation analysis is used and results are presented in the Table 2.

Table 2

Pearson correlation coefficients

Open innovation competences, strategies and motivation	Incubator service use (Business consultancy)	Incubator service use (Networking)	Incubator service use (Infrastructure)	Result of the incubation
OI Competences (Self-Management)	0.10	0.15	0.11	0.16
OI Competences (Interpersonal Management)	0.08	0.12	0.01	0.19
OI Competences (Project Management)	0.12	0.05	0.10	0.16
OI Competences (Content Management)	0.19	0.12	0.22*	0.17
OI strategy (outside-in)	0.38*	0.40**	0.38**	0.40**
OI strategy (inside-out)	0.24*	0.32**	0.32**	0.45**
OI motivation	0.35**	0.28*	0.09	0.40**

Note: The level of significance: ** $p < .01$; * $p < .05$.

Source: author's calculations based on the research data

The correlation results show that open innovation competencies are not related to the use of incubation services, except content management competencies indicate statistically significant, however, weak correlation with incubator service infrastructure. Moreover, open innovation competencies are not associated with the results of the incubation. However, open innovation strategies are significantly related to use of all services provided by business incubators as well as to the results of the incubation. This finding is in line with (Grassmann & Enkel, 2004) research. Open innovation motivation is significantly related to the use of networking and consultancy services as well as the results of the incubation.

To answer RQ2 and RQ3 and to find out to what extent open innovation strategies, competencies, motivation and business incubators' services are associated with results of the incubation, multiple regression analysis was performed. It indicates how much of the variation in the dependent variable can be explained with the aid of the independent variables and how much variation remains unexplained (Stock & Watson, 2012). Multiple linear regression analysis with forward method of variable selection was performed to determine the dimensions that have the most significant

impact on the dependent variable (result of the incubation). Summary of the analysis is presented in the Table 3.

Table 3

Multiple linear regression results

Model	Variables	Adjusted R²	B	SE	t
1	Incubator service use (Networking)	0.32	0.42	0.07	5.70**
2	Incubator service use (Networking)	0.39	0.35	0.07	4.76**
	OI strategy (inside-out)		0.26	0.09	2.94*
3	Incubator service use (Networking)	0.42	0.30	0.08	3.96**
	OI strategy (inside-out)		0.31	0.09	3.45**
	Age		0.39	0.18	2.18*

Note: The level of significance: ** $p < .01$; * $p < .05$.

Source: author's calculations based on the research data

The regression results show that only three variables have significant impact on the results of the incubation, they are incubators' service networking, use of open innovation strategy inside-out and incubates' age. Based on the regression model summary it can be concluded that 32 % (adjusted $R^2 = .32$) of dependent variable – result of incubation is determined by

the incubation service use networking. When two additional predictors open innovation strategy (inside-out) and age are included in the model the model determines 42 % of the result ($R^2=.42$).

Conclusions and recommendations

The results provide the answers on the research questions.

- 1) Open innovation dimensions that are better associated with the use of business incubator services are the use of open innovation strategies. The research did not show relationship between open innovation competencies and the results of incubation, however, use of open innovation strategies could be improved by the open innovation competencies.
- 2) Among services provided by the University business incubators, networking contributes most to the results of the incubation. This finding suggests that the management teams of business incubators should propose more networking events and training programs to help new entrepreneurs to adapt open innovation strategies and increase motivation.
- 3) Factors of open innovation that contribute most to the results of the incubation appeared to be incubator service networking, open

innovation strategy outside-in and tenants' age. Thus, when selecting tenants, their age could be taken into consideration.

- 4) The results of this study can motivate tenants to use open innovation strategies, especially inside-out strategy, as these strategies may help them to better use services provide by business incubators and achieve better results.
- 5) This research has certain limitations and implications for future research. The most important limitation is the size of the sample. Future research should be carried out and answers from more respondents collected. Other limitation is related to the generalizability of the findings, since, respondents represent only University business incubators, and data from other types of incubators would enrich the findings. Moreover, certain limitation is related to the relationships between open innovation competencies, motivation, use of strategies and services, which certainly are more complex. More research should be done to explore these relationships with more sophisticated methodologies as structural equation modelling, for example. Still the present findings could be used as the basis for future investigations.

Bibliography

1. Albert, P., Bernasconi, M., Gaynor, L. (2003). Incubators: The Emergence of a New Industry. *The Proceedings of EFMD FORUM*, pp. 56-58.
2. BarNir, A. (2014). Pre-venture Managerial Experience and New Venture Innovation. *Management Decision*, Volume 52, Issue 10, pp. 1981-2001.
3. Bergek, A., Norrman, C. (2008). Incubator best practice: A framework. *Technovation*, Volume 28, pp. 20-28.
4. Bruneel, J., Ratinho, T., Clarysse, B., Groen, A. (2012). Teh Evolutuion of Business Incubators: Comparing Demand and Supply of Busienss Incubation Services across Different Incubator Generations. *Tehnovation*, Volume 32, Issue 2, pp. 110-121.
5. Brunetto, Y., Farr-Whatson, R. (2007). The Moderating Role of Trust in SME Owner/Managers' Decision-Making about Collaboration. *Journal of Small Business Management*, Volume 45, Issue 13, pp. 362-387.
6. Chan, I. Y., Liu, A. M., Cao, S., Fellows, R. (2013). Competency and Empowerment of Project managers in China. *Proceedings of teh 29th Annual ARCOM Conference* (pp. 389-392). The Association of Researchers in Construction Management (ARCOM).
7. Chesbrough, H. (2003). The Logic of Open Innovation: Managing Intellectual Property. *California Management Review*, Volume 45, Issue 3, pp. 33-58.
8. Chesbrough, H., Vanhaverbeke, W., West, J. (2006). *Open Innovation: Researching a New Paradigm*. Oxford: Oxford University Press. p. 373.
9. Du Chatenier, E., Verstegen, J. A., Biemans, H. J., Mulder, M., Omta, O. S. (2010). Identification of competencies for professionals in open innovation teams. *R&D Management*, Volume 40, Issue 3, pp. 271-280.
10. Fukugawa, N. (2013). Which Factors Do Affect Success of Business Incubators. *Journal of Advanced Management Science*, Volume 1, Issue 1, pp. 71-74.

11. Grama, S., Royer, I. (2013). Competencies for open innovation for entrepreneurs in technological incubators: an empirical test in Romania. *Revue de l'Entrepreneuriat*, Volume 12, pp. 33-58.
12. Grassmann, O., Enkel, E. (2004). Towards a Theory of Open Innovation: Theree Core Process Archetypes. P. Maskell, K. Laursen, & S. Ozkan (ed.), *Proceedings of R&D management Conference* (pp. 1-18). Lisabon: Copenhagen Business School.
13. Hacket, S. M., Diltz, D. M. (2004). A Systemic Review of Business Incubation Research. *The Journal of Technology Transfer*, Volume 29, Issue 1, pp. 55-82.
14. Hansen, M. T., Chesbrough, H. W., Nohria, N., Sull, D. N. (2000). Networked Incubators. *Harvard Business review*, Volume 78, Issue 5, pp. 74-84.
15. Hughes, M., Ireland, R. D., Morgan, R. E. (2007). Stimulating Dynamic Value: Social Capital and Business Incubation as a Pathway to Competitive Success. *Long Range Planning*, Volume 40, Issue 2, pp. 154-177.
16. Kambil, A., Esellius, E. D., Monteiro, R. E. (2000). Fast Venturing: Quick View to Start Web Business. *Sloan Management Review*, Volume 41, Issue 4, pp. 55-68.
17. Lichtenthaler, U. (2011). Open Innovation: Past Research, Current Debates, and Future Directions. *Academy of Management Perspectives*, Volume 25, Issue 1, pp. 75-93.
18. Maritz, A., Donovan, J. (2015). Entrepreneurship and Innovation: Setting an Agenda for Grater Discipline Contextualisation. *Education & Training*, Volume 57, Issue 1, pp. 74-87.
19. Mitchelmore, S., Rowley, G. (2010). Entrepreneurial competencies: a literature review and development agenda. *Interantional Journal of Entrepreneurial Behaviour & Research*, Volume 16, No 2, pp. 92-111.
20. Mulder, M. (2007). Competence - the essence and use of the concept in ICVT. *European journal of vocational training*, Volume 40, p. 5-21.
21. Poon, J. M. (2006). Trust-in-Supervisor and Helping Coworkers: Moderating Effect of Perceived Politics. *Journal of Management Behaviour*, Volume 21, pp. 518-532.
22. Ratinho, T., Harms, R., Groen, A. (2011). Are Business Incubators Helping? The Role of BIs in Facilitating Tenants` Development. T. Ratinho, *An Examination of Business Incubators` Impact on Tenant Firms* (pp. 134-174). CPI Wohrmann.
23. Saraswathi, S. (2011). A Study on factors thet Motivate IT and Non-IT Sector Employees: A Comparison. *Inetrnational Journal of Research in Computer Application and Management*, Volume 1, Issue 2, pp. 72-77.
24. Somsuk, N., Laosirihongthong, T. (2014). A Fuzzy AHP to Prioritize Enabling Factors for Strtategic Management of University Business Incubators: Resource-based view. *Technological forecasting and social change*, Volume 85, pp. 198-210.
25. Spender, J. C., Rippa, P., Corvello, V., Grimaldi, M. (2017). Startups and open innovaton: a review of the literature. *European Journal of Innovation Management*, Volume 20, Issue 1, pp. 4-30.
26. Stock, J. H., Watson, M. M. (2012). *Introduction to Econometrics*. Edinburg: Pearson Education. p. 827.

IMPACT OF REGIONAL HIGHER EDUCATION INSTITUTIONS ON THE CONVERGENCE OF REGIONS

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Abstract. The global tendencies of economic and social differences between the regions are becoming more significant. While pursuing the reform of the higher education system in Latvia, there has been a lack of focus on the role and impact of the regional higher education institutions. Until now in Latvia only qualitative methods have been used for research in this area. The authors based their study on indicators as the GDP per person and the annual costs of the higher education institutions (HEIs) per student, to reach the research aim: determining the impact of the regional higher education institutions (RHEIs) on the regional convergence in comparison with the Lithuania's experience. Qualitative and quantitative methods were used: content analysis of scientific and applied literature, statistical data; quantitative – correlation and dispersion analysis method. Results: the GDP per capita dispersion of the Latvian NUTS 3 regions in comparison with the Lithuania, indicates of a homogenous subgroups, which average values do not deviate significantly, corresponding to the convergence principle. Meanwhile when comparing the regions with Riga and Vilnius district – divergence can be observed indicating of the limited impact of RHEIs in both countries due to the limiting impact of various social, economic and other factors.

Key words: higher education, impact, regional convergence.

JEL code: D02, H52, I25.

Introduction

Education is one of the top five industries with an average worldwide turnover of around 4.9 billion USD (2015), while the increase in comparison to 2014 to accounted to 0.6 trillion (USD) (Robertson S., 2016; OECD, 2016). The aim of the regional development is to promote and ensure balanced-sustainable development of the state, while taking into account the countrywide territorial differences and limited opportunities (NAP, 2012). Global tendencies can be observed in Latvia – overall economic and social differences between the regions and cities are increasing (Špoģis L., et al., 2005; Beeson M., 2010) Countries are interested in understanding the impact of education on the national economy in a regional perspective.

The impact of the education has been investigated by multiple researchers and even institutes (Thaman K. H., 2008; Smas L., 2009; Vilerts K., Krasnopjorovs O., Brekis E., 2015).

The scientific viewpoints on this convergence are different: from socio-economical to econometrical (IHEP, 1998; Gorzelak G., 2000; Regional Convergence in the European..., 2002; Carrington, A., 2003).

Aim of the research: to define the impact of regional higher education institutions on the region convergence.

Tasks: 1) to investigate the convergence problematic, processes and to select indicators;

2) to investigate the regions and the RHEI; 3) to compare the RHEI experience of Latvia and Lithuania.

Research methods: analysis of scientific research sources, comparison, systematization, generalization, descriptive statistic, correlation, and co-variation analysis.

Research sources and materials: information from the Central Statistical Bureau, the Ministry of Economics, the Ministry of Environmental Protection and Regional Development of the Republic of Latvia, documents, statistics and researches from Latvia, Lithuania and international organizations were used.

Research limitations: The comparable GDP NUTS3 regional data of Latvia and Lithuania are available only for the period 2010-2013; therefore, further comparison and analysis was based on the data from this period, while only the RHEIs of the particular country and their impact on the regional convergence of the

particular regions were analysed. The choice of the study destination on a regional and capital city perspective were not analysed due to the lack of data.

Theoretical background

1. Convergence, issues, research field and indicators in a RHEIs perspective

In order to determine the impact of the RHEIs in Latvia on the regional convergence and the corresponding economic development, it is necessary to understand the impact and the basics of the regional convergence.

The convergence (lat. *convergere*) is a gradual joining of indications (Baldunciks J., Pokrotniece K., 2007). The economists are still unable to precisely define the term of the convergence due to the complicity of its nature. The term of convergence is often used for comparison of countries as a tendency which indicates their convergence, e.g. the increase of wealth and the development, level of inflation, social policy etc. which can be attributed also to the regional convergence (Black J., 2009).

Since the 60s the interaction of the human-capital and the economic development was researched from a microeconomic (Odit M., 2010) and microeconomic perspective (Bouaissa M., 2009). The human-capital is based on competencies, knowledge etc., while most importantly on the work applied for creation of economic value. The education helps to create these values, thus it is believed to be one of the basic components of the human-capital (Bashir M., Iqbal M., Zaman K., 2011).

Two approaches can be observed in macroeconomics: R. Solow supplementary neo-classicism approach and endogenous growth theories (Solow, R., 1956; Mankiw G., Romer D., Weil D., 1992).

The new theoretical approach defined the aspects of centralisation and decentralization and explained the convergence in the regional economics (Krugman, P., 1991; Krugman, P., Venables, A., 1995). Researches affirmed the impact of the human capital on the GDP and thus

allowed to attribute the level of education as an indicator describing the level of human-capital. (Mankiw G. N., Romer D., Weil D. N., 1992).

The human capital is believed to be the main driver of economic development: a better educated workforce increases the return in the research and development, and ensures more flexible inclusion in the economic structure, thus increasing the economic growth. Answering the question on whether the expenditure for education increases the economic growth would simultaneously show the role of the RHEIs in the regional development and convergence.

The authors base their assumptions on foreign researches: the World Bank research on the connection between the expenditure for education and the GDP, which showed that for each dollar spent on the education the GDP increases on average by 20\$; on the data from the USA which showed that the indirect effect of the acquired education ensures increased salaries and reduced level of poverty; as well as on a meta-analysis covering 29 researches on the connection between the GDP and the education (Benos N., Zotou S., 2014; Churchill S.A., Yew S.L., Ugur M., 2015; The World bank, 2017).

In Latvia, research has been conducted on the interrelation of the economic and educational indicators (Baumanis A., 2004; Ekmanis J., 2005; Steinbuka I. et al., 2006).

Based on the national and the international researches, authors conclude that the convergence in the economic analysis is a very broad concept and that the most precise indicator for its assessment is the GDP (Ingianni, A., 2007). Thereby for the further examination of the convergence problematique the authors chose as indicator the GDP and the costs for acquiring of the tertiary education which is also a an economical factor for producing changes to the human-capital. The expenses for the higher education are defined as the overall expenses which include both private and public expenditure. The private expenditure includes the

household expenses - corresponding to students and their families, as well as other private expenditure which includes the expenses for education services by the private companies and non-governmental organisations. One of the impacting factors are the public expenditure for education.

2. Impact of HEIs on the regional convergence

It can be assumed that the following conditions apply in the area of the higher education.

The commitment of the regions and the HEIs is aimed at the practical use of the higher education as the tool for regional economic integration and convergence (Knight J., 2012).

Simultaneously the efforts of the regions are aimed at reaching development and increasing the welfare of the citizens and the reduction of the inequality (Sinkiene J., Grumadaite K., 2014).

Thereby the HEIs which are located in these territories are closely connected with the convergence efforts and the higher education is serving as a tool to achieve that. The researchers state that first, this process is continuous and evolutionary, second, that there is an environment for the relationship between the HEIs and the diverse players of the region, third – the convergence as the resultative outcome of the described actions (Knight J., 2012).

The impact of the RHEIs is closely related to the interests of the national economy and human resources. The aim of the research is to bring the attention to the facts that the higher education in regions is represented by the RHEIs. Meanwhile, although the definition of the RHEI is not defined in any of the legal regulations of the Republic of Latvia, the term is understood as the HEIs which are located in a certain region. The region (lat. regio) is a land which is demarcated based on geographic, economic or political indicators (Baldunčiks, J., Pokrotniece, K., 2007).

Materials and methods

According the regulation of 2003, May 26 of the European Parliament and EC on the Nomenclature of territorial units for statistics about the creation of the (NUTS) the regulation (EC) No. 1059/2003 defines the regions of Member States based on the NUTS criteria. The NUTS hierarchy of classification defines the further composition of a country according to the NUTS 1, NUTS 2, and NUTS 3 scope. Each territorial division is coded with a single identifier and a specific name (EUROSTAT, 2011).

The authors noted that in Latvia the RHEI status is attributed to those institutions which are located outside Riga/Pieriga in any of the territorial entities: Kurzeme (LV003), Latgale (LV005), Vidzeme (LV008), Zemgale (LV009) and Latgale (LV009) (CSB, 2015). The six RHEIs of Latvia: University of Agriculture (LLU); Daugavpils University (DU); Liepaja University (LiePU); Rezekne Academy of Technologies (RTA), Vidzeme University of Applied Sciences (ViA), Ventspils University College (VeA). RHEIs constitute approximately 22 % of the HEIs in Latvia (out of 33 HEIs - 17 are state established, 16 by legal persons) and there are approx. 11,590 students or 26 % of the overall number of students (IZM, 2016).

The aim of the research includes defining of the impact of the RHEIs on the regional convergence and investigating the Lithuanian experience. As a result the universities of the following districts of Lithuania were observed: Kaunas district (LT002) – 4 universities: Aleksandras Stulginskis University (ASU), Kaunas University of Technology (KTU), Lithuanian University of Health Sciences (LSMU); Klaipėdas district (LT003) – Klaipėda University (KU); Šiauliai district (LT006) – Šiauliai University (ŠU); Vilnius district (LT00A) – 8 universities: Mykolas Romeris University (MRU), Lithuanian Academy of Music and Theatre (LMTA), Vytautas Magnus University (VDU), Vilnius University (VU), Vilnius Gediminas Technical University (VGTU),

Vilnius Academy of Fine Arts (VDA), The General Jonas Zemaitis Military Academy of Lithuania (LKA) un Lithuanian University of Educational Sciences (LEU). It can be concluded that there are six state funded RHEIs, which are located in three NUTS regional districts and thus influence their regional convergence. Meanwhile in Vilnius there are eight state run HEIs (MOSTA, 2015a).

Taking into account that only the territorial units with RHEIs were analysed, i.e. Kaunas country (LT002), Klaipėda county (LT003), Šiauliai county (LT003) and the capital city – Vilnius county (LT00A), thereby other counties were excluded from the research scope.

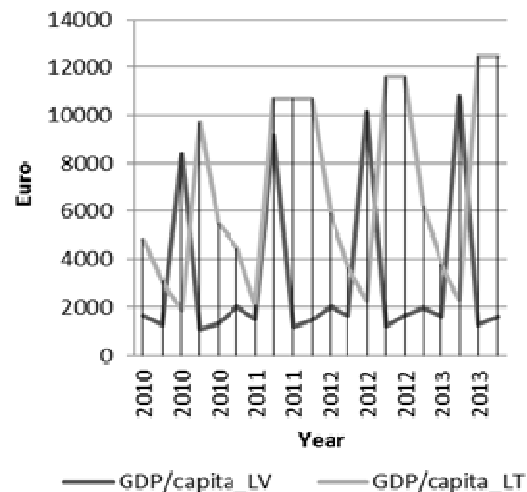
To assess the impact of the RHEIs on the regional convergence the authors carried out an analysis of the number of students in the regions and the capital in both Latvia and Lithuania.

According to the EUROSTAT, the annual costs (based on the price parity index) of the state owned and private HEIs per one student (ISCED 6-8) in 2013 were on average in Latvia - €4249 and in Lithuania - €3320 (LR SMM 2016). The costs per student of RHEIs and the HEIs in the capital city in Lithuania and Latvia were determined. In the case of Latvia the territories of Pierīga and Rīga were observed as a single unit due to the insignificant number of students in the former.

The acquired data on the students (in the regions of Latvia and Lithuania, the capital cities) was correlated with the corresponding GDP per person indicator in the regions as well as the capitals of both countries. The results were used for assessment of the RHEI impact on the regional convergence.

Research results and discussion

The annual fluctuation of GDP per person in the regions of Latvia and Lithuania (NUTS 3) from 2010 to 2013 show similarities (Fig. 1), nonetheless in Lithuania this indicator shows a more profound pattern.



Source: author's calculations based on CSB

Fig. 1. GDP in capita in the regions of Latvia and Lithuania (2010-2013), €

The dispersion analysis was carried out to research this tendency. The dispersion analysis of the GDP per person in the regions of Latvia, showed that the p-value=0.553, thus with the 95 % probability the hypothesis, that the GDP per capita of the four NUTS3 groups are similar, may not be rejected.

Table 1

The homogenous sub-groups of Latvia NUTS 3 GDP/capita_4 Scheffe

NUTS_4	N	Subset for alpha=0.05	
		1	2
Vidzeme	4	1171.2850	
Latgale	4	1490.4475	
Zemgale	4	1498.0750	
Kurzeme	4		1913.5400
Sig.		.062	1.000

Means for groups in homogeneous subsets are displayed.

Since the p-value=0.01<0.05, then with 95 % probability the hypothesis, that GDP of all of the NUTS groups are similar, can be rejected. Meanwhile it can be seen (Table 1) that there are homogenous sub-groups in which the average values do not differ.

Different situation can be observed in the dispersion results of the GDP per capita in the regions of Lithuania. As a result, the p-

value=0.532, then with a 95 % probability the hypothesis, that the groups of GDP per capita of the three NUTS3 are similar, cannot be rejected. Since the $p\text{-value}=0.01<0.05$, then with 95 % probability we can reject the hypothesis that the GDP per capita of all NUTS groups are similar, can be rejected. In addition the average values of the subgroups are significantly mutually different. In order to explain such situation, as well as to determine whether the RHEIs have a significant impact on the regional convergence, the RHEI annual expenses were determined as well as a correlation (Table 2) on the RHEI student expenditure for the higher education (since it is one of the human capital impact indicators) was carried out.

From the analysis of the theory the authors concluded that the determination of the economic differences of Latvia and Lithuania with the aim of creating a link between the costs of education in relation to the GDP increase, which would benefit the convergence, should be a relatively easy task. However the authors concluded that resources which are invested in the education as a factor, which influences development, are dependent from the development cycle of the corresponding state's economic. It is clear that the investment in the specific areas of education are also different for instance, the agrarian economics based education may have less significant impact on the GDP than the financial or industrial education, since education in such field would cost more and its impact is significantly greater. Unfortunately the authors had to acknowledge that there is a lack of precise data without significant variations depending on the source. For example it was not possible to carry out correlation for the following counties of Lithuania: Alytus County, Marijampolė County, Tauragė County etc. – where there are no RHEIs. The specific of Latvia – in each region there is a HEI. The possible impact of this situation is observable in the (Table 2) correlation. The research shows that the student cost correlation

with the GDP per capita within regions of Latvia (EXP_LVr un GDP_LVr) is statistically significant – 0.914. It is possible that this is due to specific regional coverage of HEIs.

In the meantime the data on student expenditure and the GDP in Lithuania showed that the data correlation coefficient is negative (-0.627) indicating of a fairly significant relationship. The reasons for this situation should be analysed because the given data is imprecise which was noted by N. Benos (2014). The research indicated multiple tendencies. Due to economic, demographic, migration and competition based reasons, the number of students has dwindled both in Latvia and Lithuania which thus affects the impact of RHEIs on the regions. For instance in Latvia in 2014./15. academic year the number of students has declined by 5-12 %, while the number of enrolled students has declined by 20 % (IZM, 2016 b). Taking into account that the new regional paradigm supports the idea of economic convergence, as it was pointed out by J.Black (2009), these tendencies indicate of possible threats for the regional development of Latvia – an opposite tendency – divergence. This can also be seen in the fact that part of the graduates of the RHEIs are employed in the capital cities (Rīga, Vilnius), while other part is affected by emigration – they pursue their career overseas. If in the Vilnius case the correlation between the GDP per person and student expenditure there is a limited but positive correlation (Table 2), then in Riga region (LV006) there is a limited-negative correlation (-0.581), and possibly it is affected by both the dwindling of the number of students, as well as the concentration of HEIs in the Riga region.

Table 2

Student cost correlation with the GDP per capital within regions of Latvia (2010-2013)

Correlations			
		EXP_R	GDP_LV
EXP_Riga	Pearson Correlation	1	-0.581
	Sig. (2-tailed)		0.419
	N	4	4
GDP_LV	Pearson Correlation	-0.581	1
	Sig. (2-tailed)	0.419	
	N	4	4
EXP_Vilnius	Pearson Correlation	1	0.15
	Sig. (2-tailed)		0.483
	N	24	24
GDP_Vilnius	Pearson Correlation	0.15	1
	Sig. (2-tailed)	0.483	
	N	24	24
EXP_LVr	Pearson Correlation	1	.914**
	Sig. (2-tailed)		0.00
	N	24	24
GDP_LVr	Pearson Correlation	.914**	1
	Sig. (2-tailed)	0.00	
	N	24	24
EXP_LTr	Pearson Correlation	1	-.627**
	Sig. (2-tailed)		0.009
	N	16	16
GDP_LTr	Pearson Correlation	-.627**	1
	Sig. (2-tailed)	0.009	
	N	16	16

****.** Correlation is significant at the 0.01 level (2-tailed).
EXP – expenditure; **LV** –Latvia; **LT** –Lithuania; **r-region**.
Source: author's calculations based on **MOSTA, 2015; LR SMM, IZM. 2014,2015;2016**

In the same time the calculations show (Table 1), that in Latvia the NUTS3 regions are homogenous even when taking into consideration the differences of Kurzeme region. This means that the regional convergence is happening. The results of the Kurzeme region may be affected by both the RHEI (the functioning of VeA) as well as other factors, for instance, the existence of a

significant infrastructure, which in this case is two national importance sea ports, which is a difference from other regions (except for Riga region). The Zemgale RHEI (LLU), as the largest of the RHEIs according to the number of students which is located near the capital city Rīga, in 2010.-2011. may have had a more significant impact on the development of the region in comparison with other RHEIs, as a significant GDP increase in the region is observable. The data analysis indicate that in 2013 the regional development convergence was not observable, while only in Vidzeme region there is a limited increase of GDP, while between the Riga and the regions divergence can be observable.

Similar situation is observable in Lithuania, where Vilnius County, in comparison with other regions demonstrates divergence – each year the GDP increases with a proportion 1:10 in favour of the Vilnius county. The authors conclude that increased amount of human and finance resources in the capital are a reason why the impact of RHEIs on the regional convergence is decreasing.

Conclusions

- 1) The convergence problem: the economic and social differences between the regions and the cities are increasing, and for the research of the regional convergence the scientifically approbated indicators – GDP and the annual expenditure in the public HEIs per student may be used.
- 2) The GDP per capita dispersion of the NUT 3 regions of Latvia and Lithuania is different, in Latvia it is homogenous with a slight difference in the case of Kurzeme region, while the regional groups in Lithuania on the contrary – are non-homogenous. The results of the research in both countries show a divergence for both capitals – Riga and Vilnius. This was indirectly indicated by the dispersion of the GDP per capita, as well as the student annual cost correlation with the

GDP per capita of the region (in Latvia: - 0.581).

- 3) The acquired results on the slightly limited and negative correlation of the Riga region with the study costs in the higher education, indicate that the impact of the RHEIs on the development of the region is not a determining factor and should be further

investigated. In the meantime the Vilnius county data indicate of an existent convergence process in spite of the positive while weak student cost correlation with the regional GDP per capita. Therefore it should be further investigated why the RHEIs have a very limited impact on the regional convergence.

Bibliography

1. Baldunčiks, J., Pokrotniece, K. (2007). Svešvārdu vārdnīca. Rīga: Jumava, 931 lpp.
2. Baumanis, A. (2004). Izdevumi izglītībai un to nozīme sociāli ekonomiskajā attīstībā. *5.starptautiskā konference. Uzņēmējdarbības iespējas, problēmas un to risinājumi globalizācijas apstākļos. Rakstu krājums*. Biznesa augstskola Turība, Rīga. 21.-30.lpp.
3. Beeson, M. (2010). Asymmetrical Regionalism: China, Southeast Asia and Univen Development. *East Asia*, Vol.27 (4), pp.329-343.
4. Benos, N., Zotou, S. (2014). Education and Economic Growth: A Meta-Regression Analysis. *World Development* Vol. 64, December 2014, pp. 669-689. Retrieved: <http://dx.doi.org/10.1016/j.worlddev.2014.06.034>. Access: 05.03.2017.
5. Black, J., Hashimzade, N., Myles, N., Gareth, D. (2009). *A Dictionary of Economics*. (3.ed.) Oxford University Press, p.505.
6. Carrington, A. (2003). A Divided Europe? Regional Convergence and Neighborhood Spillover Effects, *Kyklos* 56(3), pp.381-394.
8. CSB (2015). Par statistiskajiem reģioniem. Retrieved: <http://www.csb.gov.lv/dokumenti/par-statistikajiem-regioniem-28607.html>. Access: 10.12.2015.
9. CSB (2016a). Darba samaksa. DSG13. Darba ņēmēju skaita sadalījums pēc darba ienākumiem pa vecuma grupām. Retrieved: http://data.csb.gov.lv/pxweb/lv/Sociala/Sociala__ikgad__dsamaksa/DS0130_euro.px/table/tableViewLayout2/?rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0. Access: 10.01.2017.
10. CSB (2016b). Employees by Regions, Educational Attainment and Sex on October 31, 2014. Retrieved: http://www.csb.gov.lv/sites/default/files/nr_18_darba_samaksas_strukturas_apsekojuma_rezultati_2014_gada_16_00_lv_en.pdf. Access: 10.01.2017.
11. Churchill, S.A. Yew S.L., Ugur, M. (2015). Effects of Government Education and Health Expenditures on Economic Growth: A Meta-analysis. *Monash London: Business School*, p.26. Retrieved: https://business.monash.edu/__data/assets/pdf_file/0009/339399/effect_of_government_education_and_health_expenditures_on_economic_growth_a_meta-analysis.pdf. Access: 05.03.2017.
12. Ekmanis, J. (2005). Zinātnes attīstības tendences mūsdienā Latvijā. *Stratēģiskās analīzes komisija. Zinātniski pētnieciskie raksti. Zināšanu sabiedrību veidojot*. 2005. 2(3). Zinātne, Rīga. 30- 39.lpp.
13. European Union (2011). *Regions in the European Union. Methodologies & Working papers*.
14. Gorzelak, G. (2000). The dilemmas of regional policy in the transition countries and the territorial organization of the state. In: Petrakos G, Maier G, Gorzelak G (eds) *Integration and Transition in Europe: The Economic Geography of Interaction*. London: Routledge, pp.131-149.
15. IHEP (1998). *Reaping the Benefits: Defining the Public and Private Value of Going to College, The New Millennium on Higher Education Costs, Pricing and Productivity*. Washington, DC.: Institute for Higher Education Policy. ERIC Number: ED420256
16. Ingianni, A., Ždarek, V. (2007). Real Convergence in the New Member States: Myth or Reality? 6th EEFS Annual Meeting, p.26. Retrieved: https://editorialexpress.com/cgi-bin/conference/download.cgi?db_name=res_phd_2008&paper_id=128. Access: 20.12.2016
17. IZM (2014). Pētījums par studiju izmaksu koeficientu augstākajā izglītībā aktualizēšanu un priekšlikumu sagatavošana to konsolidēšanai. RTU. Retrieved: http://www.izm.gov.lv/images/izglitiba_augst/5_pielik_koefic.893.pdf. Access: 10.12.2016.
18. IZM (2016a). Pārskats par Latvijas augstāko izglītību 2015. gadā. Galvenie statistikas dati. Retrieved: http://www.izm.gov.lv/images/izglitiba_augst/Parskats_2015.pdf Access: 10.12.2016.
19. IZM (2016b). Publicēta studējošo skaita statistika 2015./2016. akadēmiskajā gadā. Retrieved: <http://www.izm.gov.lv/lv/aktualitates/1496-publiceta-studejoso-statistika-2015-2016-akademiskaja-gada>. Access: 20.12.2016.
20. Knight, J. (2012). A Conceptual Framework for the Regionalization of Higher Education: Application to Asia, in *Higher Education Regionalization in Asia Pacific. Implications for Governance, Citizenship and University Transformation*, (ed.) John N. Hawkins, Ka Ho Mok, Deane E. Neubauer. London: Palgrave Macmillan, p.215.
21. Krugman, P. (1991). *Geography and Trade*. Cambridge, MA: MIT Press., pp.85.
22. Krugman, P., Venables, A. (1995). Globalization and Inequality of Nations. *Quarterly Journal of Economics*, 110, pp. 857 – 880.

23. LR SMM (Lietuvos Respublikos švietimo ir mokslo ministerija) (2016). Lietuvos švietimas skaičiais. (Lithuania Education Number) Retrieved: https://www.smm.lt/uploads/lawacts/docs/609_7f0c44639ea84f9fcdfb645c1d80978.pdf. Access: 12.01.2017.
24. Mankiw, G.N., Romer, D., Weil, D.N., (1992). Contribution to the Empirics of Economic Growth. The Quarterly Journal of Economics, vol. 107i2, pp. 407–437.
25. MOSTA (Mokslo ir studijų stebėsenos ir analizės centras) (2015a). (Lithuania Education Number) 2015 studijos . Lietuvos Respublikos švietimo ir mokslo ministerija, Vilnius. Retrieved: http://mosta.lt/images/leidiniai/Lietuvos_svietimas_skaiciais_2015_Studijos.pdf. Access: 21.12.2016.
27. MOSTA (2015b). Effectiveness of higher education – overview and recommendations. Policy brief. Retrieved: http://mosta.lt/images/leidiniai/Effectiveness_of_higher_education_Policy_brief.pdf. Access: 12.01.2017.
28. NAP. (2012). Latvijas Nacionālais attīstības plāns 2014.-2020.gadam (NAP). http://www.varam.gov.lv/lat/darbibas_veidi/tap/lv/?doc=13524. Retrieved: 16.01.2017.
29. OECD (2016). Education at a Glance 2016: OECD Indicators, Paris: OECD Publishing, p. 508.
30. Regional Convergence in the European Union. Facts, Prospects and Policies. (2002). Cuadro-Roura, J.R., Parellada, M. (ed.) Berlin: Springer-Verlag, p.368.
31. Robertson, S., (2015). *Piketty, Capital and Education: A Solution to, or Problem in, Rising Social Inequalities? Special Issue on Piketty and Capital in the 21st Century*. Presented on panel Piketty and Education, CIES, Washington, March 7-13th. Submitted to British Journal of Sociology of Education, p.24. Retrieved: <https://susanleerobertson.files.wordpress.com/2009/10/robertson-2015-piketty-education-solution-or-problem.pdf>. Access: 16.12.2016.
32. Smas, L. (2009). Higher education institutions as drivers of regional development. Nordregio Working Paper 2009 (3). Hedin Sigrīd (Ed.), p.46.
33. Thaman, K. H. (2008). The Role of Higher Education in Regional Development in Pacific Island Countries. with specific reference to the University of the South Pacific. Retrieved: https://portal.unesco.org/education/.../Konain_H_Thaman.pdf Access: 20.12.2016.
34. The World bank (2017). World Development Indicators. Retrieved: <http://data.worldbank.org/data-catalog/world-development-indicators>. Access: 05.03.2017.
35. Vilerts, K., Krasnopjorovs, O., Breķis, E. (2015). Izglītības ietekme uz algām Latvijā ekonomiskās krīzes laikā un pēckrīzes periodā (2006.-2012. gada datu vērtējums) Latvijas Banka (3). Retrieved: https://www.bank.lv/images/stories/pielikumi/publikacijas/petijumi/P_03_2015.pdf Access: 20.12.2016.

RESOURCE CONDITIONS AND SUBSIDIES FOR PUBLIC GOODS IN THE EU

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Abstract. The work constitutes an effort of assessing the impact of resource conditions of the EU agriculture on the share of subsidies for public goods in the total value of subsidies. Based on the conducted analysis, it was indicated that in 2007-2013, there were three clusters of regions in the EU, which significantly varied in terms of the agricultural resource conditions. It was also proven that the fact of belonging to these clusters determined the variety in terms of the amount of shares in agricultural and environmental subsidies as well as other subsidies for rural area development in the total value of subsidies in particular EU regions. In the case of subsidies for setting fields aside and subsidies for areas with non-beneficial conditions of use, the resource conditions did not determine their share in the total value of subsidies. The timeframe of the analysis covered a period in 2007-2013, the spatial scope covered particular EU regions while the subject scope covered representative farms in a given region.

Key words: resource conditions, public goods, EU regions, EU agricultural policy.

JEL code: E02, H23, Q18

Introduction

The European Union is characterised by large heterogeneity of agricultural resource conditions. They are reflected in differences between farms from particular EU regions in terms of availability of the factor of capital, land and labour (Matuszczak, 2013). Furthermore, the EU agricultural policy exhibits a change consisting in a transition from remunerating farmers for fulfilling production functions to remunerating them for supplying public goods. This has been specifically visible since the MacSharry reform from 1992. The next CAP reforms after that year are a continuation of changes initiated with the MacSharry reform due to which they underline the transition in the EU agricultural policy from remunerating farmers for supplying food goods to remunerating them for supplying public goods (Poczta, 2010; Czyzewski, Stepień, 2014; Fiedor, 2004; Smedzik-Ambrozy, 2013; Brelik, Matuszczak, 2013), which constitute one of the categories of market failures. Public goods are the basic provisions commonly available that can be used by anyone. In literature, there is an opinion that they differ from private goods only in that the latter goods become property of people after they pay for them, while this rule does not apply to the former goods (Cooper, Hart, Baldock, 2009), which causes that receiving a payment for supplying such goods will be more

difficult, which in turn implies absence of stimuli for their supply (Baldock, Hart, Scheele, 2014). You can state that public goods are goods that the society demands and which the market mechanism is unable to deliver to the society. It is assumed that some agricultural systems, often extensive livestock farm systems and mixed systems or systems of permanent cultivation with a high share of semi-wild plants and ecological systems as well as selected agricultural practices included in the concept of sustainable agriculture, contribute to generating a broader scope of public goods, as compared to industrial systems. In agriculture, public goods are produced on private land, despite the fact that soil is a national heritage. A part of the benefits resulting from farming is hence transferred onto third parties without any compensation provided to the farmer (Baum, Sleszynski, 2009). This means that without adequate incentives (social expenditures) public goods will not be produced in the optimum amount – an insufficiency may occur or even their total shortage in the case of a lack of intervention, which will result in ineffective allocation of the society's resources. In the subject's literature, compared with: Cameron and Englin, 1997; Breffle and Morey, 2000; Hanley, Kriström, Shogren, 2009; Carson and Louviere, 2011; Czajkowski, Hanley, La Riviere, 2014, a number of methods of

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remunerating farmers for providing public goods can be listed, including direct cost evaluation of the supplied goods and payment for them, payment for using ownership rights to the resources or production factors in the scope necessary to supply public goods, payment for lost income in the case of supplying public goods relating to the environment, or covering the transaction costs or other barriers in relocation of resources necessary to supply public goods (FAPA, 2009). Nevertheless, one should remember that creating a remuneration system for public goods generated in agriculture will result in additional costs, which can include incentives, costs of administration, advice, communication, implementation, monitoring and evaluation. The governments of various countries and interstate organisations offer a number of regulations for the supply of public goods, such as the system of subsidies, tax mechanisms and legal regulations (RISE 2009). In the case of the European Union, the European Agricultural Fund for Rural Development (EAFRD) is a support instrument with a significantly bigger potential of actively encouraging one to supply public goods by means of an intentional and focused approach. Nevertheless, the degree in which it is used for supplying public goods highly depends on the method in which the Member States develop their internal growth programmes for rural areas, e.g. activities that are given a priority, the applied qualification criteria, the methods in which means are developed and directed as well as the way of implementing particular systems (European Network or Rural Development, 2010).

Due to a large variety, it is questioned whether the agricultural resource conditions in particular EU regions constitute a determinant of the share of subsidies for public goods in the total amount of subsidies in the EU. It was decided to study this phenomenon through a paper with the following hypothesis: the resource conditions in the EU constitute a quality predictor

for the share of subsidies for public goods in the total amount of subsidies from the common agricultural policy.

Research methodology

The authors of this paper made an effort of assessing the impact of resource conditions on the share of public subsidies in the total amount of subsidies (SE 605) taking into account the fact that the absolute amount of these subventions is limited. The resource conditions were determined on the basis of the availability of the land factor for representative farms in particular EU regions (the average size of farm in ha), labour (annual work unit¹) and capital (fixed assets after eliminating the land value). Subsidies for public goods covered the following subsidies: for setting fields aside (SE 612), agricultural and environmental (SE 621), subsidies for areas with adverse use conditions (SE 622) and other subsidies for developing rural areas (SE 623), covering subsidies for adjusting farms to the EU standards, for agricultural advice services, subsidies for improving the quality of farm products, for training, foresting and retaining ecological balance of the forest environment (Florjanczyk et al., 2014, p. 26; Czyzewski, Smedzik-Ambrozy, 2016). The average shares in these subsidies were applied in the total value of subsidies for particular years between 2007-2013, namely a period constituting the last financial perspective in the EU. Due to the lack of information in the EUFADN statistics concerning the value of subventions in farms of representative regions of France (Guadeloupe, Martinique and La Reunion), Hungary (Kozep-Magyarorszag, Kozep-Dunantul, Nyugat-Dunantul, Del-Dunantul, Eszak-Alfold, Del-Alfold, Entre Douro e Minho, Tras-os-Monte) and Portugal (Entre Douro e Minho/Beira litoral, Norte e Centro and Tras-os-Montes/Beira interior), they were excluded from the analyses. In order to separate the clusters of EU regions varying in

¹ One AWU is equal 2200 hours in 2007-2010 and 2 200 hours from 2011 year. This is equal to annual labour time of a person working full-time (Florjanczyk et al., 2014).

terms of resource conditions for agricultural production in 2007-2013, Ward's cluster analysis along with Euclidean distance was used. As a result of the analysis, three clusters of EU-28 regions were obtained varying in terms of the agricultural resource conditions (Table 1). The statistical significance of differences between region clusters in the scope of availability of production factors were assessed by means of a t test for independent samples (in relation to the groups) because the number of regions exceeded 50 (Stanisz, 2007). Then a one-way and single-factor analysis was conducted (ANOVA) where the quality predictor was constituted by a given region being a member of cluster A, B or C while the dependant variables were constituted by the average share of particular types of subsidies for public goods in the total value of subsidies for the period of 2007-2013¹ (Table 2). At this point it is worth mentioning that the differences between clusters are statistically important if the significance level is $p < 0.05$. In consequence, the applied research methodology allowed determining whether the separated groups of regions significantly varied in terms of the share of subsidies for public goods in the total subsidy value. In the final stage, the differences in the shares were compared between clusters (Table 3). The timeframe of the analyses concerned the last financial perspectives of the EU (2007-2013), the spatial scope covered particular EU regions, while the subject scope covered representative farms for those regions.

Agricultural resource conditions in the EU

In 2007-2013, there were three clusters of regions in the EU, which varied in terms of the agricultural resource conditions. The cluster with the least number of regions (seven) of the EU was characterised with a significantly higher availability of production resources than regions from the remaining two clusters. This results from an analysis of average values for 2007-

2013 (Table 1) and was confirmed by means of a t test, which proved that the differences between availability of soil resources, capital and labour between regions of cluster A and cluster B as well as regions of cluster A and cluster C were statistically significant.

Table 1

Average availability of production factors in the EU region clusters in 2007-2013

CLUSTER	Number of regions	Land availability [in ha]	Labour availability [in AWU]	Capital availability [in EUR]
A	7	420.72	7.49	639395.82
B	71	26.69	0.44	55786.63
C	50	87.86	0.48	215105.51
Total	128	72.14	0.84	149936.70

Source: authors' work based on the EUFADN data

In regions from cluster C, in 2007-2013 there was a higher availability of capital as compared to cluster B regions, which exhibited through a two-times higher value of fixed assets falling for one farm from regions being a part of cluster C as compared to farms from cluster B. Availability of land for farms from cluster C was also bigger (more than 3-times) as compared to cluster B. Farms from both these clusters did not vary in terms of the labour factor availability. Also the results of statistical significance of differences between availability of particular resources completed using the t test confirmed that there were significant statistical differences between regions from clusters B and C, in terms of the land factor and capital factors (p levels in both cases were below 0.05). In the case of availability of the labour factor, p amounted to 0.10, which proved that the variety in this scope between regions from cluster B and cluster C was statistically insignificant.

Subsidies for public goods in the EU region clusters varying in terms of the agricultural resource conditions

The results of assessing the statistical significance confirmed the impact of resource

¹ Leven's test confirmed that the assumption about homogeneity of the variance by all dependant variables was met.

conditions on the share of agricultural and environmental subsidies as well as interest from other subsidies for developing rural areas in the total amount of subsidies for representative farms in particular regions in the EU in 2007-2013. In the remaining two cases of subsidies for public goods, their share in the total value of

subsidies, between the region clusters, did not significantly vary. On this basis, one can state that the resource conditions do not impact the amount of shares in subsidies for setting fields aside and for areas with non-beneficial conditions of use in the total amount of subsidies (Table 2).

Table 2

Result of the assessment of statistical significance of the differences in share of subsidies for public goods between particular EU region clusters (one-way tests of significance, parameterization with sigma-limits, decomposition of effective hypotheses – differences are significant: $p < 0.05$)

	Variable	SS	MS	F	p
Resource conditions as the quality predictor	Share of subsidies for setting field aside (SE 612) in total value of subsidies	0.011255	0.005627	0.707961	0.494612
	Share of agricultural and environmental subsidies (SE 621) in total value of subsidies	260.060	130.030	3.62393	0.029518
	Share of subsidies for areas with non-beneficial conditions of use (SE 622) in total value of subsidies	87.281	43.641	0.73403	0.482027
	Share of other subsidies for rural area development (SE 623) in total value of subsidies	190.7365	95.36824	17.19774	0.000000

Source: authors' work based on the EUFADN data

Farms from clusters A and C were characterised with the largest average share of subsidies for agricultural and environmental subsidies, in the total amount of subsidies. In the cluster of farms with the biggest and significantly varying availability of the soil, work and capital factors (cluster A), the share of other subsidies for developing rural areas was clearly the lowest. The factors were also low for farms from regions

in cluster C (Table 3). On this basis, one can state that the relatively high availability of production factors, particularly land and capital, characteristic for farms from clusters A and C is a premise for increasing the share of agricultural and environmental subsidies and relatively low share of other subsidies for development of rural areas in the total amount of subsidies.

Table 3

Shares of subsidies for public goods in clusters of EU-28 regions

Cluster	Share of subsidies for setting field aside (SE 612) in total value of subsidies	Share of agricultural and environmental subsidies (SE 621) in total value of subsidies	Share of subsidies for areas with non-beneficial conditions of use (SE 622) in total value of subsidies	Share of other subsidies for rural area development (SE 623) in total value of subsidies
A	0.00	8.22	6.72	0.11
B	0.03	5.74	5.96	2.97
C	0.04	8.65	7.68	0.58
Total	0.03	7.01	6.67	1.88

Source: authors' work based on the EUFADN data

When it comes to regions from cluster B, characterised with the lowest level of availability of land resource as compared to the other two clusters, the share in agricultural and environmental subsidies in the total amount of subsidies was the lowest. There was also the biggest share of other subsidies for developing rural areas in the total amount of subsidies

(Table 3). When comparing the results of analysis of region clusters, varying in terms of agricultural resource conditions, it should be stated that the relatively low availability of land factor is a premise for low share of agricultural and environmental subsidies and high share of other subsidies for developing rural areas, in the total amount of subsidies. In the remaining two cases

of subsidies for public goods (share of subsidies for setting fields aside and for areas with non-beneficial conditions of use in the total subsidy amount), the region clusters did not significantly vary (Table 2) Hence, the difference in the scope of resource conditions did not constitute a factor allowing to predict their size. Based on the above, the following hypothesis was only partially verified: the resource conditions in the EU constitute a quality predictor for the share of subsidies for public goods in the total amount of subsidies from the Common Agricultural Policy. This only related to the agricultural and environmental subsidies and other subsidies for rural area development.

Conclusions, proposals, recommendations

To sum up, it should be stated as follows:

- In the European Union, there is a visible transition from the support of agriculture, determined by the size of farm production to the support due to supplying public goods by that sector, e.g. natural environment protection or retention of biodiversity. This is visible specifically in the agricultural policy of the EU after 1992, where through McSharry reform, conditions were created so that profitable support of agriculture is provided according to the principle that this sector is not only remunerated for the production function but mainly for supplying public goods, which the entire society can use.
- Particular EU regions are characterised by a high level of heterogeneity when it comes to resource conditions of agricultural production.

In 2007-2013, three EU region clusters could

be listed which varied in terms of these conditions. Specific importance in this scope was constituted by the variety in availability of the land and capital factors of representative farms in particular EU regions.

- Variety in the scope of agricultural resource conditions in particular EU regions significantly impacted supply of some public goods by farms. Their relatively high provision of availability in the land and capital factor contributed to increased share of agricultural and environmental subsidies in the total amount of subsidies. The opposite situation occurred in the case of the share of other subsidies for rural area development in the total value of subsidies. It was the lowest in farms in regions varying from the remaining ones with the relatively highest availability of the capital and land factors at farms. Resource conditions were a quality predictor for the share of those subsidies in the total value of subsidies. They did not constitute the predictor in relation to the share of subsidies for setting fields aside and for areas with non-beneficial conditions of use in total value of subsidies.

Remark

The project was funded with the means of the National Science Centre allocated on the basis of decision number DEC-2012/07/D/HS4/01601.

Bibliography

Journal paper with author(s)

1. Baum, R., Sleszynski, J. (2009). Nowe funkcje rolnictwa – dostarczanie dóbr publicznych (New functions of agriculture – supply of public goods). Association of Agriculture and Agricultural Business Economists. Scientific Annual Publications, volume XI, book 2, pp. 19-25.
2. Breffle, W.S., and E.R. Morey. (2000). Investigating Preference Heterogeneity in a Repeated Discrete-Choice Recreation Demand Model of Atlantic Salmon Fishing. *Marine Resource Economics*, No. 15 (1), pp. 1-20.
3. Brelik, A., Matuszczak, A. (2013). Zagadnienia dóbr publicznych w wielofunkcyjnym rozwoju obszarów wiejskich (Issues of Public Goods in a Multi-Functional Development of Rural Areas). *Economic Science for Rural Development Conference Proceedings*. 2013, Issue 31, pp. 28-32.
4. Cameron, T.A., and J. Englin. (1997). Respondent Experience and Contingent Valuation of Environmental Goods. *Journal of Environmental Economics and Management*, No. 33 (3), pp. 296-313.

5. Carson, R., and J. Louviere. (2011). A Common Nomenclature for Stated Preference Elicitation Approaches. *Environmental and Resource Economics*, No. 49 (4), pp. 539–59.
6. Czyzewski A., Stepień S. (2014). Budget of the EU and Common Agricultural Policy for 2014-2020 in the Light of the Polish interests. *Management* No. 1. pp. 34-45.
7. Czyzewski B., Smedzik-Ambroży (2016). The Regional Structure of CAP Subsidies and Factor Productivity in Agriculture in the EU28. *Agricultural Economics (Zemledelska ekonomika)* (in print).
8. Fiedor, B. (2004). Polish Agricultural Policy in the Context of Transition from CAP to CARP in European Union. *Argumenta Oeconomica* No. 1(15). pp. 139-158.
9. Hanley, N., B. Kristrom, and J.F. Shogren (2009). Coherent Arbitrariness: On Value Uncertainty for Environmental Goods. *Land Economics*, No. 85 (1), pp. 41–50.
10. Smedzik-Ambroży, K. (2013). Impact of Direct Payments on Sustainability of Farms in Poland - Simulation Based on the Example of FADN Farms from Wielkopolska and Slask Region. *Production and Cooperation in Agriculture Finance and Taxes*, Issue 30, pp. 81-86.
11. Począta, W., (2010). Common Agricultural Policy after 2013 – Justification Functions, Development Direction in the Context of the Interest of Polish agriculture. *Wies i Rolnictwo* No. 3(148). pp. 38-55.

Books

12. FAPA (2009). *Koncepcja dóbr publicznych w dyskusji o przyszłości Wspólnej Polityki Rolnej* (Concept of public goods in the discussion about the future of the Common Agricultural Policy) initial version, Warsaw, December 2009, pp. 3-6.
13. Florjanczyk, Z., Manko, S., Osuch, D., Plonka, R. (2014). Standard Results 2013 Obtained by Farms Participating in Polish FADN, Part 1. Standard Results. Warsaw IERiGZ-PIB. p. 26.
14. Matuszczak, A. (2013). *Variety of Agriculture Development in the Regions of EU in the Aspect of its Sustainability*. PWN. Warsaw 9-363.
15. RISE (2009), *Public Goods from Private Land*. RISE Task Force, 2009, pp. 4-12.

Internet sources

16. Baldock, D. Hart, K. Scheele, M. (2014). *Public Goods and Public Intervention in Agriculture*, Retrieved: <http://enrd.ec.europa.eu>, Access:10.09.2014.
17. Cooper, T., Hart, K. Baldock, D., 2009, *Provision of Public Goods through Agriculture in the European Union*, pp. 1-396, Retrieved: http://ec.europa.eu/agriculture/sites/agriculture/files/external-studies/2009/public-goods/report_en.pdf, Access:10.12.2016.
18. Czajkowski, M. Hanley, N., La Riviere J. (2014). The Effects of Experience on Preferences: Theory And Empirics For Environmental Public Goods, *Amer. J. Agr. Econ.* 97(1): 333–351; Retrieved: 10.1093/Ajae/Aau087, Access:29.10.2014.
19. European Network on Rural Development (2010). *Public Goods and Public Intervention System, Analytical Report* Paneuropejski przegląd podejścia państw członkowskich do dostarczania środowiskowych i społecznych dóbr publicznych w programach rozwoju obszarów wiejskich na lata 2007-2013 (Pan-European review of the approach of member states to supplying environmental and social public goods in rural area development programmes for 2007-2013) (report from step 3), Retrieved: ksow.pl/fileadmin/user_upload/ksow.pl/pliki/analizy_ekspertyzy/raport_dobra_publiczne.pdf, Access:10.09.2014.

LOCAL ACTION GROUPS AS NEW ORGANISATIONS IN RURAL DEVELOPMENT AN EXAPMLE OF THE LUBLIN REGION (POLAND)

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Abstract. The aim of this article is to determine the resource potential and the importance of the new forms of organization that are LAGs in rural development on the example of the Lublin region. The paper presents the characteristics of the resource potential of the LAGs, the evaluation of the effectiveness of the activities of the LAG perspective 2007-2013 and 2014-2020 and the analysis of the objectives of LAGs in terms of their impact on the processes of local and regional development on the basis of the statutes and LDSs for 2014-2020. The study used the following methods: a diagnostic survey, a document analysis, desk research. The interview was conducted in the third quarter of 2016. The study verified two hypotheses: 1) LAGs are organizations with growing resource potential and the scope of impact on the development processes of the region, especially in the area of stimulating the integration process of sectors (cross-linking); 2) bureaucracy is still the main barrier to the functioning and implementing the strategic / statutory objectives of LAGs. The assessment of the operation of LAGs in the perspective of 2014-2020, as compared to 2007-2013, indicates their growing role in influencing the processes of local and regional development. This role is reflected in the growth of the resource potential of the organisations and the high effectiveness of LAGs. LAGs insufficiently focus on creating various network links. Bureaucracy is still the main barrier to the effectiveness of achieving the objectives. In the current term, the LDS objectives seem to be the objectives common to all interest groups that constitute these organizations. The objectives formulated in LDSs enable the accomplishment of all of the assumed principles of the LEADER approach.

Key words: LAGs, rural networks, rural development.

JEL code: O17

Introduction

The role of the organizations in the process of socio-economic research is the subject of many sciences, especially sociology and economics. However, the representatives of both of the disciplines differently examine the organizations, focusing on other aspects of their creation, operation and impact on the environment. Economists are primarily interested in economic organizations (seeking economic objectives) and their activities in the field of management. Economists, studying the impact of organizations and interest groups on the environment, focus on the "economic environment" and economic resources, conducting research on the economic impact, including the impact of the organisations on economic growth. The development of institutional economics, especially the new institutional economics, has led to a greater interest of economists in the notion of the organization. What, according to D. C. North, is the common characteristic of the different types of organisations are the conscious activities of their members focused on the implementation of

specific objectives (Milczarek-Andrzejewska D., Spiewak R., 2015).

The difficulties in defining the organization as a social phenomenon result from its nature. It is easier to point out the universal characteristics of constituent organisations. Organisations are purposeful (define the tasks aimed at achieving the objectives), social (are created by people in various relationships), economic (they raise funds for the implementation of the objectives), structural (they are often based on informal social contracts, customs, law and the behaviour of the members is regulated by values, norms and principles). For organizations it is also characteristic that their members identify themselves with them (Kozminski A. K., Latusek-Jurczak D., 2011).

The assumptions of the main streams of economics about rationality mean that economists are closest to the definitions of sociologists that refer to the desirability of the creation of the organization and the activities of the members targeted at certain benefits (Milczarek-Andrzejewska D., Spiewak R., 2015).

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The classic paper on collective activities, "The Logic of Collective Action" by M. Olson emphasised that the only purpose that is a characteristic of most organizations, and certainly all organizations with a significant economic aspect, is to promote the interests of its members (Olson M., 2012).

As the degree of the complexity of the processes taking place in the organization and its environment increases, greater and greater is the need for cooperation that transcends the boundaries of the organisation, and even the boundaries of sectors. On the other hand, one can observe an increase in the awareness of one's own subjectivity of the participants of the numerous relationships and the understanding how organized activities affect the organisation, the people making them and the organizational and natural environment. This is a good platform for the development of cooperation of local government entities and their environment (Kozuch B., 2011). An example of an organisation in which municipal governments work together, including working with actors outside the sector are Local Action Groups (LAGs). They are the units dealing with implementation of the LEADER initiative into life (Kisiel R., Gierwiatowska M., 2013). This initiative contributed to emergence of the territorial partnership idea (Mosely M. J., 2003). Within its framework collaboration of three sectors: public, private and non-government take place (Furmankiewicz M., Stefanska J., 2010). This partnership is realized within the framework of LAGs.

The LEADER programme begun in 1991 but in Polish social reality LAGs appeared in 2004, after Polish accession to the EU. Due to ever-increasing role the LEADER approach has played in realizing rural development policies, LAGs have become crucial to the institutional system of European rural development (Shucksmith M., 2000; Dargan L., Shucksmith, M., 2008; Labianca M. et al., 2016).

The functioning of LAGs can be clarified through the prism of the theory of collective activities, including the concepts by M. Olson, the so-called traditional, but the modern theories represented by E. Ostrom (Grodzicki M., 2015) are more appropriate to clarifying collective behaviours within LAGs, not always subject to the principle of rational behaviour. Utilising them can justify the behaviours of various local governments and non-governmental units cooperating in LAGs.

As pointed out by K. Krzyzanowska (2016), studies of group behaviour should systematically monitor such factors as the size of the group, motivation, democracy, the role of leaders, possession and protection of valuable resources, so that information about the importance of them could be used in the creation of cooperation.

The start of a new EU Financial Perspective 2014-2020 is the right moment to study the effects of the impact achieved in the previous term, as well as the factors determining the institutional capacity of those organizations. The aim of this article is therefore to determine the resource potential and the importance of the new form of organization, that are LAGs, in rural the development, as exemplified by the Lublin region.

The specific objectives include: 1) the characteristics of the resource potential of LAGs through the description of the spatial extent and LAG population territory, membership and decision-making structures and budgets; 2) assessment of the effectiveness of LAG activities in the 2007-2013 perspective based on surveys (description of the key barriers to success and effectiveness in achieving the objectives of LAGs), and an analysis of the LDS documents for 2014-2020 (an analysis of the achievement of the indicators of the product and the indicator of the implementation of the budget); 3) an analysis of the objectives of LAGs in terms of their impact on the local and regional

development processes in the current term on the basis of statutes and the LDS for 2014-2020.

The study used the following methods: a diagnostic survey (in the form of telephone interviews), a document analysis, desk research. A thorough analysis was performed of the content of the LDS, websites, statutes, literature, including a national report (Report ..., 2012) on the functioning of LAGs in the 2007-2013 perspective, which allowed to reference the results to the results of previous research. The telephone interview was conducted in the third quarter of 2016. It was utilised to gather feedback on the experience in the functioning of LAGs in the 2007-2013 perspective and the first experiences of LAGs in the implementation of the calls for proposals for 2014-2020.

The study verified two hypotheses: 1) LAGs are organizations with growing resource potential and the scope of impact on the development processes of the region, especially in the area of stimulating the integration process of sectors (cross-linking); 2) bureaucracy is still the main barrier to the functioning and implementing the strategic / statutory objectives of LAGs (despite the greater experience of the managing institution – marshals' offices and the LAGs themselves).

Research results and discussion LAGs as a new form of organization in the rural space

As L. Melece (2015) stresses, one way to operate the initiatives of local communities in rural areas are LAGs, made up of public and private partners from the particular territory, and may include representatives from different socio-economic sectors and act under the LEADER initiative. They receive financial assistance to implement Local Development Strategies (LDSs), by awarding grants to local projects. LAGs, organized as tripartite (civil, governmental and business) rural development partnerships, are good examples of where different spheres can cooperate without major problems. LAGs in their functioning implements the main principles set

out by the LEADER programme such as: area-based, bottom-up, public-private partnership, innovation, integration, networking, co-operation (The Leader approach..., 2006). According to R. Lukesh (2007), depending on the state of development or maturity of the rural area, as "instruments for change" LAGs can play this role at various levels: starting from simply defining local needs, through acting as facilitators, creating platforms for negotiation, to becoming key players of local governance, enhancing practical development in many areas of rural life.

The main aim of LAGs is to develop, update and implement the objectives identified in LDSs. These strategies are the basis for action of each LAG and contain directions for the development of areas which belong to the group. In addition to performing LDSs, LAGs use the resources of the area for which they operate also in "cooperation projects". This activity allows for the implementation of joint projects within the framework of interregional or international (transnational), cooperation and serves to strengthen the competence of cross-organizational cooperation of LAGs. Therefore the functioning of LAGs can be identified as a model example of cooperation, the essence of which is to run the local potential of resources human, social, relational capital aimed at identifying and mobilizing utilization (by definition, in an innovative way) of resources in the local development process (Guzal-Dec D., 2016).

Local Action Groups, also referred to as "partner groups" or "territorial partnerships" (Furmankiewicz M., 2006), exist in the form of associations and represent cross-sectoral organisations, very complex with respect to their objective. They represent the objectives of particular interest groups, subject to compliance with the shared - statutory objectives. Such territorial partnerships, as groups made up of the representatives of formal (organisations) or individual units, may be the subject of network analysis, as emphasised by N. Stenlas (1999).

In the context of the objectives implemented by them (which relate to the objectives of the LEADER initiative), it should be noted that LAGs are support institutions of social economy entities (The National Programme ..., 2014). One of the leading objectives in the 2014-2020 perspective implemented by LAGs is to support social inclusion, enterprise growth and job creation (Regulation..., 2013) 1.

The research carried out in the Lublin region on environmentally valuable areas has shown that the formation of such local cooperation form as LAGs, based on the integration of local entities to cooperate for the innovative use of local resources is an important factor in the development of those areas. In rural areas, with a not-too-active advisory system (excluding advice for agriculture), LAGs filled the gap in the system of institutional support of non-agricultural entrepreneurship development (Guzal-Dec D., Zwolinska-Ligaj M., 2015, p. 269, Zwolinska-Ligaj M., 2015, p. 44).

The fulfilment of the above-mentioned role of the LAGs depended on the effectiveness of their activities. Polish research on the functioning of LAGs in the period 2007-2013² showed that larger LAGs in terms of the number of residents living in the area - at least more than 50,000 people, possessing a larger budget (over 2 million) and increasing the number of partners are more effective in their functioning, activate the local community more and better implement the principle of partnership (Report ..., 2012).

Characteristics of the study area and studied LAGs

The Lublin Region is located in the border zone, in the Eastern Polish macro-region. The Lublin Region is one of the least populated and urbanized regions of the country. In this region,

the share of the persons employed by the kind of activity in 2014 in section "Agriculture, forestry, and fishing" was the highest in the country (in 2015 it was 23.3 % versus 11.5 in Poland) (Regions..., 2015).

Leader is a very popular programme for the rural areas of the Lublin Region. In the period 2007-2013, all rural and urban-rural communes were affiliated to 26 LAGs. These associations were very diverse in terms of the number of municipalities. This number ranged from 2 to 17 (Catalogue..., 2012).

In the 2014-2020 perspective, the legal form under which LAGs may operate are associations³. The basic framework of their functioning is determined, therefore by the *Law on Associations and the Law of 20 February 2015 on local development with the participation of local community*. In the context of the functioning of LAGs, they should be defined as associations with specific characteristics. It should be noted that the supervision over LAGs is exercised by an executive authority and a provincial government, what significantly differs LAGs from the typical social organisations is their permission to do business. LAG, to the extent specified in their statutes, may conduct economic activity which pursues the LDS objectives.

After the end of the 2007-2013 perspective, the 3 smallest LAGs in the Lublin region joined the other already-functioning LAGs in the region. Therefore, their number as at 01.01.2016 amounted to 23, except that during the study period 1 LAG had no LDS approved and was excluded from the analyses. The 22 LAGs studied (as at 31.12.2013) covered a total area of 23 977.7 km² inhabited by 1 388 007 people - which accounted for 95.44 % of the area of the region and 64.09 % of the total population in the region. The average area of the study LAGs was 1089.89 km² with a standard deviation of

¹In accordance with the requirements of the RDP 2014-2020, the min. of 50 % of the LDS budget allocated for the measure 19.2 "Support for the implementation of operations under local development strategies driven by the community" is allocated to projects related to the creation or maintenance of jobs under the RDP. The value of cooperation projects may be up to 5 % of the LDS budget plus the current costs and activation (www.minrol.gov.pl) 15/12/2016

² The study conducted in June-July 2012 with a group of 97 % of the LAGs in Poland, commissioned by the Ministry of Agriculture and Rural Development

³ In the previous perspective, the legal form of a foundation was rarely utilised, the Act on Community-led Local Development art. 4 indicates that the creation and operation of LAGs are subject to the provisions of the Act of 7 April 1989 - Law on Associations (Journal of Laws of 2001, No. 79, item 855, as amended)

Table 2

Application for project implementation by persons not involved in the activities of LAGs by social groups

No	Groups	% of LAGs which reported applications of people from outside the LAGs
1.	Entrepreneurs	0.90
2.	Farmers	0.70
3.	Organisations	0.95
4.	Local authorities	0.55
5.	Non-agricultural population	0.80

Source: authors' study based on research

458.34, and the average number of residents was 63091.23, with a standard deviation 24813.03. The number of member local governments ranged from 5-17.

Experience of LAGs in the 2007-2013 perspective

By far the greatest interest in forming all tested LAGs was displayed by the local government sector, and local authorities most often initiated the formation of LAGs. The least interest was shown by citizens. The interest in LAG membership among entrepreneurs was average (Guzal-Dec D., Zwolinska-Ligaj M., 2016) (Table 1).

When assessing the possibility of further development (increasing the number of members) of these organizations, it is essential to note that the applicants for the LAGs' projects in the period 2007-2013 included entities that were not directly involved in the activities of the LAGs, especially the new non-governmental organizations which, as pointed by office directors of LAGs, began to emerge actively with the beginning of LAGs, but also entrepreneurs and non-agricultural population, the groups less involved in the actual process of creating the organisations (Table 2).

Table 1

Assessment of interest in forming LAGs in particular groups of local population

No	Local population groups	Measures of descriptive statistics		
		Arithmetic average (x)	Standard deviations (s)	Variation coefficient $s/x \cdot 100 \%$
1.	Local government authorities	4.65	0.65	0.13
2.	Non-government organizations	4.15	0.85	0.21
3.	Entrepreneurs	3.00	1.00	0.25
4.	Citizens	2.67	1.09	0.41

Source: authors' study based on research; evaluation scale (0-5), where 0=lack of interest, and 5=very high level of interest

Since the establishment of the surveyed LAGs, an average of 13 jobs (statistical deviation 8.41) was created in each of the groups. The number of jobs created in each group ranged from 2 to 34. In the Lublin voivodship, most micro-enterprises established, were in the tourist services (40.22 %) and services for the population (21.74 %). The jobs under the measure "diversification into non-agricultural activities" were created mainly in services for farms and forestry (47.56 %). Thus, it has been shown how small the scale of projects aimed at the development of non-agricultural functions of rural areas is. The surveyed LAGs facilitated diversification of economies mainly in the development of the tourism sector (Guzal-Dec D., Zwolinska-Ligaj M., 2016). Similar problems were indicated in the functioning of LAGs in Poland (Final Report. Impact assessment ..., 2016) and other EU countries. For example, as stresses Krievina et. al. (2015) on a Lithuanian case in practice, the implementation of the LDS in the framework of LEADER RDP 2007-2013 was not balanced: at the planning level, priorities and activities of LDS widely cover entrepreneurship development, though among the implemented projects economy related projects account for only about 18 % of the total approved financing. Most of LEADER projects have been implemented to facilitate the development of infrastructure related to active recreation and quality leisure time as well as culture and sports.

In the Lublin region, the LDS budgets in the financial perspective 2007-2013 were, on average, implemented in 96.10 % (standard deviation of 4.43, and the coefficient of variation 4.61). The implementation of their statutory objectives was not only carried out with the use of the RDP resources, but they often (54.55 % of the total) effectively applied for support from other sources of external financing (the total of 13 sources). Most often, these were funds from the European Social Fund under the Operational Programme Human Capital (11 responses).

Inter-organizational activity was noted in the case of all of the studied LAGs implementing cooperation projects (usually one – 45.46 %), but 54.54 % of all respondents implemented more than one project (27.27 % - two projects and 27.27 % three projects). The LAGs studied created networks with different numbers of members (number of partners ranged from 2 to 20) in these projects¹.

The greatest successes of the LAG impact on the local development processes indicated by the surveyed office directors were primarily achievements in the social dimension of local development processes. The respondents particularly indicated the following: increased social activity and the emergence of new NGOs and strengthening the role of local leaders (12 responses), high rate of the LDS implementation (8), the creation of local products (5), development of tourist infrastructure (4), entrepreneurship development and the creation of new jobs (4), the integration of the population (3), the integration of sectors, (3) increase in the recognisability of LAGs among the members of the local community and success in promoting LAGs (4), the implementation of projects serving the local community (2) improving the quality of life (2), strengthening the territorial identity and the preservation of traditions and culture (2),

obtaining a large budget support in the new term (1), preparation of a two-fund development strategy for the period 2014-2020 awarded by the Marshal's Office (1) and the development of a network of cooperating undertakings (1).

The greatest difficulties in achieving efficiency in relation to the objectives of the LAGs included: a large number of documents required with the support applications (bureaucracy) - 10 indications and complexity of the legislation - 7 indications. These problems are also identified in the LAG nationwide study (Report ..., 2012) where the bureaucracy was indicated as the main barrier (83 % of responses) hindering the activities of the LAGs.

Other barriers to the effectiveness of the respondent LAGs in the Lublin region, as indicated by the applicants, included: non-compliance of the beneficiaries of the projects (interrupting projects, failure to comply with time limits) (3 indications), the lack of sufficient knowledge of applicants on fundraising and the applicable procedures and concerns of projects concerning the submission of applications (one indication each). With regard to the functioning of the LAGs, the identified problems included: problems with maintaining the stability of the executive offices of the LAGs (1), financial constraints hindering the marketing activity of the LAGs (1), and the dominance of the local government sector, which limited the activity of social organisations (1). In addition, attention was paid to such institutional problems as insufficient nationwide promotion of LAGs (the issue was also reported in a nationwide study of the functioning of LAGs which recognised that rural residents often do not identify a number of projects implemented under the LEADER programme - Report ..., 2012), the failure of the units managing the RDP to consider the arguments and ideas of LAGs, the lack of a well-developed model of cooperation between local social organizations and the issue of the ever-

¹ An example of cooperation with the largest range can be the cooperation of the LAG "Kraina wokół Lublina" and nineteen partners in the international project ENERDECA whose aim was the development of rural tourism by strengthening cooperation between entrepreneurs of the tourism industry and the representatives of local authorities and the use of modern e-promotion.

Table 3

Characteristics of resource-member potential of the LAGs surveyed in 2009 and 2015

No	Feature / descriptive statistics	Measures of descriptive statistics		
		Arithmetic average (x)	Standard deviations (s)	Variation coefficient s/x*100 %
1.	Number of members as at 2009	73	21.87	29.95
2.	Number of members as at 2015	98.991	28.88	29.20
3.	Change in the number of members between 2009 and 2015.	40.64	38.82	95.53
4.	Share of the social sector in the membership in 2015	58.36	5.69	9.75
5.	Share of the public sector in the membership in 2015	17.49	4.64	26.56
6.	Share of public sector in the structure of the board for 2009	37.23	14.23	38.22
7.	Share of the public sector in the structure of the board for 2015	22.48	7.85	34.94

Source: authors' study based on LDSs for period 2007-2013 and 2014-2020

Table 4

Characteristics of the financial-resource potential (LAG budgets for the programming period 2014-2020)

No	Feature / descriptive statistics	Measures of descriptive statistics		
		Arithmetic average (x)	Standard deviations (s)	Variation coefficient s/x*100 %
1.	Total budget of the LAG	9824804.29	3431250.63	34.92
2.	Total budget per capita	160.13	35.70	22.30
3.	LDS budget	7918145.16	2965937.61	37.46
4.	Share of co-operation projects in the LDS budget plus current costs and activation	1.74	0.51	29.55
5.	Share of spending on job creation	50.85	1.84	4.00

Source: authors' study based on LDSs for period 2014-2020

The value of the total budgets for the period of 2014-2020 in the studied LAGs in the Lublin region ranged from PLN 6032500 to

changing needs of the residents of LAGs was also highlighted.

Analysis of the resource potential of LAGs in the 2014-2020 perspective

In the context of the analysis of human resources of the 22 surveyed LAGs (quantitative approach the number of members of the LAG), it was shown that there was a significant increase there¹. The number of the members of all of the surveyed organisations between 2009 and 2015 increased by an average of 40.64 % with a standard deviation of 38.82, where the communes studied were very much different in terms of their changes in membership. The maximum increase in the number of their members amounted to 161.76 %. Table 3 details the characterization of the member potential with the participation of the sectors in the decision-making body – the board.

The share of the social sector in membership in 2015 averaged 58.36 %, as compared to the 17.49 % of the share of the public sector. The share of the public sector in the structure of the decision-making authorities between 2009 and 2015 decreased significantly from 37.23 % to 22.48 %². The LAGs studied showed little differentiation in terms of their structure and the membership of the decision-making body (the coefficient of variation does not exceed 40 %). Reducing the share of the public sector in the decision-making body as a solution called for in the new perspective (the Act of 20 February 2015 on local development ..., 2015) is a factor that helps to solve the problem of the so-called "hidden dominance of the public sector" recognized in the research concerning the LAGs in Poland for the perspective 2007-2013 (Furmankiewicz M., 2013).

¹ In the case of 20 LAGs, an increase was recorded of 90,91, and only two decreased by approx. 10 %.

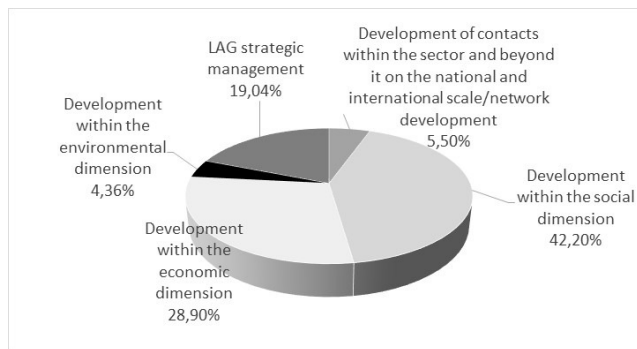
²Only one LAG did not meet the additional criterion for the assessment of the LDS in the 2014-2020 perspective for the sector participation in the public decision-making body to be less than 30 %.

PLN 18970000. In comparison to the budget for the perspective 2007-2013, there was an average increase in the value, by 22.71 % with a standard deviation of 29.53 %. The studied LAGs were not largely varied in terms of the total budget and the budget per capita, as well as the LDS budget (Table 4). All of the studied LAGs assumed to incur the min. of the 50 % of the share of spending on job creation (the maximum value here was 58.25 %).

The share of co-operation projects in the LDS budget plus the current costs and activation did not exceed the permissible level of 5 % - the average was 1.74 %.

Development objectives, as pursued by LAGs in the 2014-2020 perspective

The statutes of LAGs updated in 2016 focused on the social objectives of the activities of these organisations, mainly the development of social capital and social inclusion. The second group of statutory objectives were those aimed at the transformation of the local economy, related to the development of entrepreneurship, development of selected sectors (mainly rural tourism), local products and services. However, little attention was devoted to the issues of innovation in the economy. Quite extended objectives related to the provisions concerning the strategic management of the LAGs, including the processes of preparation, update and implementation of LDSs. Some attention was paid to the socialization of the process. To a small extent, the statutes of the studied LAGs relate to matters concerning the integration of sectors (development of cross-sectoral cooperation) and the overall development of LAG relationships with other entities on the national and international scale, as well as issues to the concerns about the state of the local environment and the ecological awareness of local communities (Figure 1).



Source: authors' study based on research

Fig. 1. **Structure of the statutory objectives of LAGs**

The content of the objectives of the analysed statutes referred largely to the social sector. Half of them (49.77 %) - to all of the three interest groups - the public, economic and social sectors. These included, among others, the development, updating and implementation of local development strategies, assumptions relating to the development of the local economy, the growth of innovative local integration sectors and the development of entrepreneurship. Considerable was also the share (33.03 %) of the objectives related to the interest of local communities, including development support for the social capital, social inclusion and care for the culture. In the structure of the provisions of the statutes, the smallest was the share (17.20 %) of the objectives relating jointly to the public and social sectors, including such as the development of education, environmental education and the care for the natural environment and the health and safety of residents.

A wide range of the objectives indicated in the statutes of LAGs was narrowed down to the most urgent / most priority ones in LDSs. The LDS objectives for 2014-2020 were concentrated on the economic dimension more than the social impact of these organisations on local development (Table 5).

Table 5

LDSs specific objectives for the years 2014-2020 (number of indications)

No	Subject / content of objective	Number of responses
1.	Increase in the competitiveness of the economy based on local resources	21
2.	Development of entrepreneurship	17
3.	Development of social capital	13
4.	Improving the quality of life	12
5.	Preservation of cultural heritage	11
6.	Social inclusion of disadvantaged groups	8
7.	Development of human capital	7
8.	Increase in innovativeness	6
9.	Development of integration links	5
10.	Multifunctionality	5
11.	Sub-regional identity	4
12.	Increasing environmental awareness	4
13.	Reduction of migration and depopulation	3
14.	Improving the efficiency of LAGs	3
15.	Promoting the LAG area	2

Source: author's calculations based on LDSs for period 2014-2020

The development of social capital was indicated relatively less often, as compared to the need for increase in the case of the entrepreneurship of the residents. The most frequently mentioned goal was to strive for the economic use of local resources, primarily through the development of tourism, fine processing, rarely - farming. It should be noted as positive that the objectives were different for each LAG (which gave the impression that were created "as needed" and not on the basis of the mapping of the strategies of other LAGs). Pawlewicz A and Szamrowski P. (2012) pointed out the issue in the initial planning phase of the LDS in the Warmia-Mazury region.

The objectives which should be more exposed should include the multifunctional and innovative development of the local economies in conjunction with the attention to the development of integration links, both on the local and supra-local - regional, national and

international scales. With regard to the innovativeness perceived as under-articulated in the LDS objectives, a mention should be made that a detailed analysis of these documents can claim that innovativeness was widely assumed as a criterion for the evaluation of operations to be financed.

Conclusions, proposals, recommendations

- 1) Evaluation of LAGs' operation in 2014-2020, as compared to the 2007-2013 perspective, indicates their growing role in influencing the processes of local and regional development. This role is reflected in the growing resource potential of the organisation - the increase of the number of members and positive changes in the structure of the membership consisting of a clear increase in the participation of partners from the social and economic development and a clear increase in the budgets of the LAGs. At the same, the effectiveness of the LAGs was highly evaluated.
- 2) In the period 2007-2013, LDSs allowed mainly the development of the social capital, increase in the impact of job places and the current area is expected to increase impact in the creation and business development of inhabitants and the growth of the innovative projects undertaken. The LAGs still insufficiently focused on creating various network links. The issues are not significant in the on-going development strategies, and should be perceived as one of the main local and regional development factors of the socio-economic systems. Thus, the first hypothesis is partly verified positively. In contrast, negative verification concerns the issue of the positive impact of LAGs on the development of networking.
- 3) In the current perspective, the LDS objectives seem to be objectives common to all of the interest groups that constitute these organisations. The objectives formulated in the LDS enable the accomplishment of all of

the assumed principles of the LEADER approach, but more emphasis should be placed on the development of public-private partnerships.

- 4) In their activities of LAGs, a greater emphasis should be placed on environmental issues. This issue should be a selection criterion of projects. LAGs should also be involved to a greater extent in the environmental education of the local community.
- 5) The bureaucracy associated with the operation of LAGs is still the main obstacle to the effectiveness of attaining the objectives. To a lesser extent, difficulties arise from the

attitudes of the applicants and management difficulties of LAGs and the general measures governing the management of LAGs on a national scale. The second hypothesis must be then verified positively.

- 6) The activity of the LAGs should be better promoted, residents often do not identify the actions undertaken by LAGs, it negatively affects the assessment of their impact on the development and interest in joining these organisations.

Bibliography

1. Dargan, L. Shucksmith, M. (2008). LEADER and Innovation. *Sociologia Ruralis*, Volue 48, pp. 271-294.
2. Furmankiewicz, M. (2006). Współpraca międzysektorowa w ramach tzw. partnerstw terytorialnych na obszarach wiejskich w Polsce (Cross-sectoral cooperation within the framework of the so-called. territorial partnerships in the rural areas in Poland). *Studia Regionalne i Lokalne*, No. 2(24), pp. 113-132.
3. Furmankiewicz, M. (2013). Współzadanie czy ukryta dominacja sektora publicznego? Koncepcja governance w praktyce lokalnych grup działania LEADER (Co-government or hidden dominance of the public sector? The concept of governance in practice of LEADER local action groups). *Studia Regionalne i Lokalne*, No. 1(51), pp. 71-89.
4. Furmankiewicz, M. Stefanska, J. (2010). Partnerstwa terytorialne jako sieci organizacyjne. Analiza powiązań w trzech wybranych „lokalnych grupach działania” w Polsce (Territorial partnerships as a network organization. Analysis of connections in the three selected "local action groups" in Poland). *Studia Regionalne i Lokalne*, No. 1(39).
5. Grodzicki, M. (2015). Dlaczego grupom udaje się podejmować działania? Przedstawienie teorii działań zbiorowych Elinor Ostrom (Why groups manage to take action? Presentation of the theory of collective action Elinor Ostrom). *Ekonomia Społeczna*, No. 1, pp. 66-78.
6. Guzal-Dec, D. (2016). Local Action Groups in the Development of Rural Areas in Lubelskie Voivodeship (Poland). *Proceedings of the 2016 International Conference "Economic Science for Rural Development"*, No. 42, Jelgava, LLU ESAF, 21-22 April 2016, pp. 65-71.
7. Guzal-Dec, D. Zvolinska-Ligaj, M. (2015). *Propozycja modelu instytucjonalno-organizacyjnego wsparcia wykorzystania zasobów i walorów środowiska przyrodniczego w procesach stymulowania rozwoju obszarów przyrodniczo cennych (Proposal of the model of institutional and organizational support for the use of resources and natural assets in the process of stimulating the development of environmentally valuable areas)*. In: Guzal-Dec, D. Siedlecka, A. Zvolinska-Ligaj, M. (2015). *Ekologiczne uwarunkowania i czynniki rozwoju funkcji gospodarczych na obszarach przyrodniczo cennych województwa lubelskiego (Environmental conditions and factors of development of economic functions on environmentally valuable areas of Lublin voivodeship)*. Monografie i rozprawy No. 7, Wydawnictwo PSW JPII, Biała Podlaska.
8. Guzal-Dec, D. Zvolinska-Ligaj, M. (2016). *The impact of LEADER Programme on Entrepreneurship and Employment in the Context of Multifunctionality of Rural Areas. A case study of UE peripheral region (Lublin voivodeship, Poland)*, European Association of Agricultural Economists, 160th Seminar, December 1-2, 2016, Warsaw, Poland, Retrieved: <http://purl.umn.edu/249763>. Access: 10.12.2016.
9. *Katalog LGD – lokalne grupy działania i ich działalność na obszarach wiejskich (Catalogue of LAG - local action groups and their activities in rural areas)* (2012). Ministerstwo Rolnictwa i Rozwoju Wsi, Warszawa, pp. 52-78.
10. Kisiel, R. Gierwiatowska, M. (2013). Functioning of the Polish LAG in the Context of the Leader Initiative. *Acta Scientiarum Polonorum. Oeconomia*. Volume 12, No. 3, pp. 39-5.
11. Kozminski, A. K. Latusek-Jurczak, D. (2011). *Rozwój teorii organizacji (The development of the theory of organization)*. Wolters Kluwer, Warszawa.
12. Kozuch, B. (2011). *Skuteczne współdziałanie organizacji publicznych i pozarządowych (Effective cooperation of public and non-governmental organizations)*. Monografie i Studia Instytutu Spraw Publicznych Uniwersytetu Jagiellońskiego, Kraków.
13. *Krajowy Program Rozwoju Ekonomii Społecznej (The National Programme for the Development of Social Economy)* (2014). Ministerstwo Pracy i Polityki Społecznej, Warszawa.
14. Krievina, A., Leimane, I., Melece, L. (2015). Role of Local Action Groups in Addressing Regional Development and Social Problems in Latvia. *Research for rural development* 2015, No. 2, pp. 146-153.
15. Krzyzanowska, K. (2016). *Ekonomiczno-społeczne uwarunkowania innowacji w zespołowym działaniu w rolnictwie (Economic and social conditions of innovation in a team activity in agriculture)*. Wydawnictwo SGGW, Warszawa.

16. Labianca, M. De Rubertis, S. Belliggiano, A. Salento, A. (2016). Innovation in Rural Development in Puglia, Italy: critical issues and potentialities starting from empirical evidence. *Studies in Agricultural Economics*, No. 118, pp. 38-46.
17. Lukesh, R. (2007). The LAG-Handbook. *A Guide through the Stunning World of Local Action Groups*. Brussel: Leader+ Observatory Contact Point.
18. Melece, L. (2015). Social Innovation and its Types in Rural Areas. *Proceedings of the 2015 International Conference "Economic Science for Rural Development"*, No. 38 Jelgava, LLU ESAF, 23-24 April 2015, pp. 142-153.
19. Milczarek-Andrzejewska, D. Spiewak, R. (2015). Organizacje rolnicze i ich wpływ na otoczenie - podejście teoretyczne z perspektywy socjologicznej i ekonomicznej (Agricultural organizations and their impact on the environment - a theoretical approach from the perspective of a sociological and economic). *Wies i Rolnictwo*, No. 4(169), pp. 67-76.
20. Moseley, M. J. (ed.). (2003). *Local Partnerships for Rural Development. The European Experience*. CABI Publishing, Wallington Oxon.
21. Olson, M. (2012). *Logika działania zbiorowego. Dobra publiczne i teoria grup. (The logic of collective action. Public goods and the theory of groups)*. Wydawnictwo Naukowe Scholar, Warszawa.
22. *Otoczenie podmiotów ekonomii społecznej (Setting of social economy entities)*. Retrieved: http://www.ekonomiaspoleczna.pl/files/ekonomiaspoleczna.pl/public/_ZSWES_spotkania_lokalne_2010/100917_publikacja_otoczenie_podmiotow_es.pdf. Access: 12.12.2016.
23. Pawlewicz, A., Szamrowski P. (2012). Perspektywy funkcjonowania osi Leader w nowym okresie programowania 2014-2020 (Prospects for the functioning of the Leader axis in the new programming period 2014-2020). In "Research Papers of the Wrocław University of Economics", Issue 269, pp. 133-143.
24. *Raport końcowy. Ocena funkcjonowania lokalnych grup działania realizujących lokalne strategie rozwoju w ramach PROW 2007 – 2013, 2012 (Final Report. Evaluation of the functioning of local action groups implementing a local development strategy within the framework of the RDP 2007-2013)*. Retrieved: http://ksow.pl/fileadmin/user_upload/ksow.pl/pliki/ANALIZY_ekspertyzy/LGD_raport_poprawiony_ost_bis_10_09_2012.pdf. Access: 20.06.2016.
25. *Raport końcowy. Ocena wpływu PROW 2007-2013 na jakość życia na obszarach wiejskich z uwzględnieniem podejścia LEADER, 2016 (Final Report. Assessment of the impact of RDP 2007-2013 on quality of life in rural areas, taking into account the LEADER approach)*. Retrieved: <http://www.minrol.gov.pl/Wsparcie-rolnictwa/Program-Rozwoju-Obszarow-Wiejskich-2007-2013/Dokumenty-analzy-raporty/Analizy-i-raporty>. Access: 20.06.2016.
26. *Regiony Polski (Regions of Poland) (2015)*. GUS, Warszawa.
27. *Rozporządzenie Parlamentu Europejskiego i Rady (UE) nr 1305/2013 z dnia 17 grudnia 2013 r. w sprawie wsparcia rozwoju obszarów wiejskich przez EFRROW (Regulation of the European Parliament and of the Council (EU) No 1305/2013 of 17 December 2013. On support for rural development by the EAFRD)*.
28. Shucksmith, M. (2000). Endogenous Development, Social Capital and Social Inclusion: Perspectives from LEADER in the UK. *Sociologia Ruralis*, No. 40(2), pp. 208-218.
29. Stenlas, N. (1999). *Organisation, Management and Social Networks – Theories of Relevance to Partnerships*. In: Westholm, E. Moseley, M. Stenlas, N. (ed.), *Local Partnerships and Rural Development in Europe. A Literature Review of Practice and Theory*, Dalarna Research Institute, Falun, pp. 209–228.
30. *The Leader approach — A Basic Guide*. (2006). European Commission, Luxembourg: Office for Official Publications of the European Communities.
31. *Ustawa z dnia 20 lutego 2015 r. o rozwoju lokalnym z udziałem lokalnej społeczności (The Act of 20 February 2015 on local development with the participation of local community)*, Dz.U. 2015, nr 0, poz. 378.
32. *Ustawa z dnia 7 kwietnia 1989 r. – Prawo o stowarzyszeniach (The Act of 7 April 1989 - Law on Associations)*, Dz. U. 2001, nr 79, poz. 855, z późn. zm.
33. Zwolinska-Ligaj, M. (2015). The Influence of Natural Valuable Areas on the Development of Entrepreneurship (Based on the Example of Lublin Voivodeship). *Proceedings of the 2015 International Conference "Economic Science for Rural Development"*, No. 39, Jelgava, LLU ESAF, 23-24 April 2015, pp.34-46.

ASSESSMENT OF LAND DEGRADATION FOR SUSTAINABLE DEVELOPMENT OF MUNICIPALITY TERRITORIES

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Abstract. The global economic growth results in the increase of intensity of land use, which is one of the main natural resources. The degradation processes of land and soil occur as a result of economic activities and natural conditions creating degraded territories. Restoration of degraded territories and degradation risk prevention is an important task of each local government for sustainable development of a territory. It is determined by international and national legislation. As regards land degradation risks and their prevention, the Law on Land Management has come into force on 1 January 2015, which defines the notion of land and soil degradation requiring local governments to depict such territories in their planning documents as well as land owners to prevent their lands from degradation. However, in spite of the law, land and soil degradation identification criteria have not been approved in Latvia, there is neither relevant degradation classification system, nor regulations of the procedure how to identify and evaluate the current degree of land degradation and its possibility, how to determine measures for soil degradation prevention. The aim of the research was to work out scientifically grounded recommendations for the procedure of identification of land and soil degradation, classification and evaluation of degradation processes in Latvia, which could serve as the basis for the design of the regulations of the Cabinet of Ministers in the framework of the Law on Land Management. The survey was carried out among senior staff members of competent public institutions and local governments. The survey found out the respondents' opinion regarding types of land degradation, degraded land territories, their identification and division, storage of information about the maintenance of brownfields.

Key words: land degradation, degraded territory, brownfields, sustainable development, municipality territory.

JEL code: Q24, R52

Introduction

Land is a non-renewable resource with restricted accessibility; therefore, preservation of land's useful features as well as full and sustainable land use is of utmost importance. Economic activities are the main driving force of resource utilization. The global economic growth results in the increase of the intensity of land use, which is one of the main natural resources. The degradation processes of land and soil are observed as a result of economic activities and natural conditions creating degraded territories. The degraded territory is land which has been harmed by industrial and other kinds of activities or inaction to such an extent that its economically efficient use is impossible without special recovery measures.

The UN General Assembly on 25 September 2015 adopted a resolution "Transforming Our World: the 2030 Agenda for Sustainable Development" including seventeen sustainable development goals which cover economic, social and environmental dimensions. One of the aims

of environmental dimension is: "to restore degraded land and soil and strive to achieve a land-degradation neutral world". This document is one of the first worldwide documents to call for comprehensive and integral action.

The issue of sustainable growth has been included in the strategy "Europe 2020 –Resource-efficient Europe". It means that land should be managed by sustainable measures, but obstacles that hamper effective use of land should be removed. According to the strategy, soil recovery measures should be carried out until 2050 in order to reduce soil erosion and increase the amount of organic substances.

As regards Latvia, in the planning period from 2014 to 2020, the EU Regional Development Funding Programme is available to the local governments' national importance development centres. The aim of the funding programme is revitalization of territories, regenerating degraded territories according to the municipalities' integrated development

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programmes (Regulation No 593 of the Cabinet of Ministers from 13 October 2015).

The above mentioned problem is defined at the international and European level and it is topical also in Latvia. The Law on Land Management has come into force on 1 January 2015 to deal with land degradation risks and their prevention. The Law on Land Management defines the notion of land and soil degradation requiring not only local governments to depict such territories in their planning documents but also land owners to prevent their lands from degradation. In addition, starting with 2018, the law prescribes that the government shall issue the land report once in five years, which is entitled to include the information about the degraded territories and their areas.

However, in spite of the adopted law, land and soil degradation identification criteria have not been worked out and approved in Latvia, there is neither relevant degradation classification system, nor a regulation of the procedure how to identify and evaluate the current degree of land degradation or its possibility taking into account the current and envisaged type of land utilization, as well as how to determine measures for soil degradation prevention.

The Law on Land Management describes obligations with regard to identifying and formation of these territories, as well as obligations with regard to their prevention. However, the unified criteria for identifying such territories have not been worked out and substantially specified; therefore, the measuring of degraded land in each municipality is very subjective and it is impossible to compare the measurements at the national level. Consequently, the situation has caused misunderstanding among land owners, local governments and the country's government.

Another point to consider is the risk of ineffective use of the financial support of local governments and the EU Regional Development Fund meant for investing money in the territories

which do not have the features of degraded land or which do not need prevention measures in the nearest future. Inefficient and inadequate spending of the EU financing could lead to financial corrections.

Researchers from Latvia and other countries have studied the problem of land and soil degradation and their impact on sustainable development, however, their attention is mostly paid to soil degradation, its influence and prevention measures (Klavins et al., 2008; Juozapaviciute, 2016; Parsova et al., 2016, Land Degradation, United..., 2017; Brabant, 2010). The point is that degradation process may affect not only agricultural land but also land in rural territories, towns and cities, and it may take various forms. Therefore, conditions and the level of degradation should be analysed.

The aim of the research is to work out scientifically grounded recommendations for the procedure of identification of land and soil degradation, classification and evaluation of degradation processes in Latvia, which could serve as the basis for the design of the regulations of the Cabinet of Ministers in the framework of the Law on Land Management.

To achieve the aim, the available literature regarding the types of land and soil degradation as well as its features was analysed. The authors of the research analysed legislative acts of the Republic of Latvia, depiction of brownfields in municipalities' spatial plans, studied international experience and interviewed competent executives in the public institutions of the Republic of Latvia (the Ministry of Agriculture, Ministry of Environmental Protection and Regional Development, State Plant Protection Service etc.).

The analysis of strategic planning documents of the Republic of Latvia, which has been issued according to the EU directives, has led to the conclusion that sustainable use of soil and land is one of the main aims. Sustainable use of soil and land is related to the necessity of recovery and

preservation. In addition, the attention in these documents is paid not only to long-term utilization of agriculture land as a resource, but also to revitalisation of degraded urban areas (Latvijas ilgtspējīgas attīstības..., 2010; Vides politikas pamatnostādnes..., 2014; Zemes politikas pamatnostādnes..., 2008).

As regards the research activities in Latvia, several studies have focused on land degradation process in order to highlight either a relatively new problem or develop sustainable urban development standards (Jackson, 2010; Degradēto teritoriju izpētē..., 2004; Petijums par degradēto..., 2012). The authors of the above mentioned studies claim that the formation process of brownfields in Latvia was similar to that of other Eastern European countries and some of Western European countries. The majority of brownfields were formed after the collapse of the Soviet Union. The process was influenced by the transition from planned economy to market economy and the changes in production. The most typical degraded areas include industrial and agricultural buildings and their infrastructure, abandoned military bases and surrounding territories, abandoned half-finished buildings. Therefore, the issue of degraded land in Latvia is very important since many questions should be answered as regards their identification and classification in particular.

The research method includes the survey of senior staff members of competent public institutions and local governments. The aim of the survey was to find out the respondents' opinion on types of land degradation, degraded land territories, their identification and division, information storage about the maintenance of brownfields.

The quantitative research method was used to prepare the questionnaire (mostly multiple choice questions, evaluation scales, answer stratification, avoidance of open-ended questions etc.). The number of respondents was 77, including 64 respondents from local government

offices, 6 respondents from government institutions and 7 respondents from non-governmental organisations. The respondents represented specialists of land ownership, land management, real estate, environmental management and territorial development planning, chairmen of councils of municipalities from different regions of Latvia. The state public institutions were represented by employees of "Environmental, Geological and Meteorological Centre of Latvia", "Latvian Geo-spatial Information Agency" and "State Environmental Service".

The survey questions were based on the following definition of **degraded territory** (included in the Law on Land Management, as of 1 January 2015): it is a territory with a destroyed or damaged surface of soil or an abandoned territory of a building site, mining site, a site of economic or military activity. The words "a destroyed or damaged surface of soil" in the definition refer to soil degradation, however, the part of the definition which mentions four types of abandoned territories refers to land degradation which is the subject matter of the survey. Consequently, degraded land could be divided into four types of unused areas:

- abandoned building site;
- abandoned mining site;
- abandoned site of economic activity;
- abandoned site of military activity.

The survey questions were related to identification of these territories, the criteria of identification, the division, as well as storage of the information about the degraded territories.

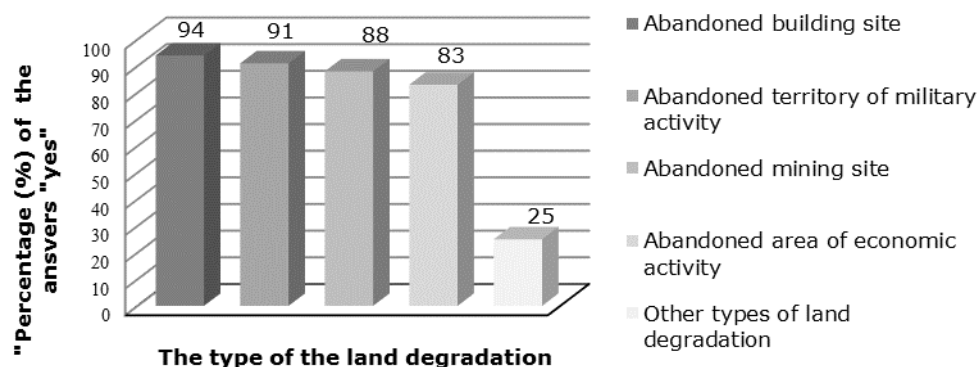
The questions in the questionnaire were formulated in such a manner that respondents had to give a positive answer "Yes", a negative answer "No" or "No answer" to questions, as for example, in the question regarding the types of land degradation: "Does an abandoned building site refer to one of the types of land degradation, according to the definitions given in

the Law of Land Management?". In addition, the respondents were given an opportunity to add other, previously not mentioned types of land degradation. Further questions required information concerning the necessity of more detailed division, identification, maintenance of degraded territories.

Research results and discussion

The results of the survey show that in respondents' opinion all given types of land degradation are relevant, since 72 respondents or 94 % considered an abandoned building site,

70 people or 91 % considered abandoned territory of military activity, 68 respondents or 88 % considered abandoned mining site and 64 respondents or 83 % considered abandoned area of economic activity as one of the types of degraded land (See Fig. 1). It is interesting to note that only 19 respondents (25 %) mentioned other possible types of land degradation, which included polluted areas with waste, chemicals, bogging, coastal erosion which could be included in the four offered types.

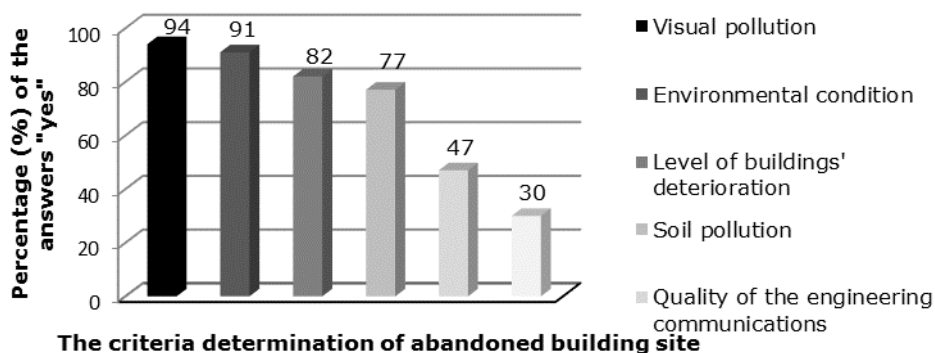


Source: the authors' calculations based on results of the survey

Fig. 1 Respondents' opinion regarding the types of land degradation

There was a question asked about the necessity to subdivide each of the types or their criteria. The following criteria were offered for evaluation of the quality of land comprising an abandoned building: visual pollution, the quality of engineering communications, environmental condition, the level of buildings' deterioration etc. Figure 2 ranges the positive answers to the

above mentioned question: visual pollution with a positive answer from 72 respondents or 94 % ranges first, which is followed by the environmental condition (70 respondents or 91 %), the level of buildings' deterioration (63 respondents or 82 %) and soil pollution (59 respondents or 77 %).



Source: the authors' calculations based on results of the survey

Fig. 2 Respondents' opinion regarding the evaluation criteria of abandoned building site

As regards such a type of land degradation as abandoned mining site, the respondents were asked to provide the time period of mines not being used (in years) from which mines could be considered as abandoned or degraded. The offered variants included (1 year; 3 years; 5 years; no answer). The positive answers could be ranged as follows: the positive answers for 5 years from 49 respondents or 64 % range first, followed by 3 years (24 respondents or 31 %), and no answer for 1 year. The next question was asked to find out if a type of an abandoned mining site should be subdivided. Respondents gave 41 or 53 % positive answers and 33 or 43 % negative answers, but 4 (5 %) respondents did not have an opinion. The respondents did not have any suggestions for subdivisions of such territories.

Similar results were obtained regarding subdivisions of types of land degradation from abandoned military activity and economic activity. Concerning the point of an abandoned site of military activity, the respondents gave 42 or 52 % positive answers and 34 or 44 % negative answers, but 3 (4 %) respondents did not have an opinion. The respondents mentioned different criteria for defining abandoned site of military activities: existence of explosive objects, existence of toxic and dangerous substances (70 or 91 % positive answers), a production unit or a building meant for military purposes (70 or 91 % positive answers) and an abandoned residential area built for military purposes (62 or 80 %).

The next question was asked to provide the time period in years from which a site for economic activities could be considered as abandoned. The offered variants included 1 year; 3 years; 5 years; no answer. The positive answers could be ranged as follows: the positive answers for 5 years from 37 respondents or 48 % range first, followed by 3 years (36 respondents or 47 %), only one respondent chose 1 year and 3 respondents did not have an opinion.

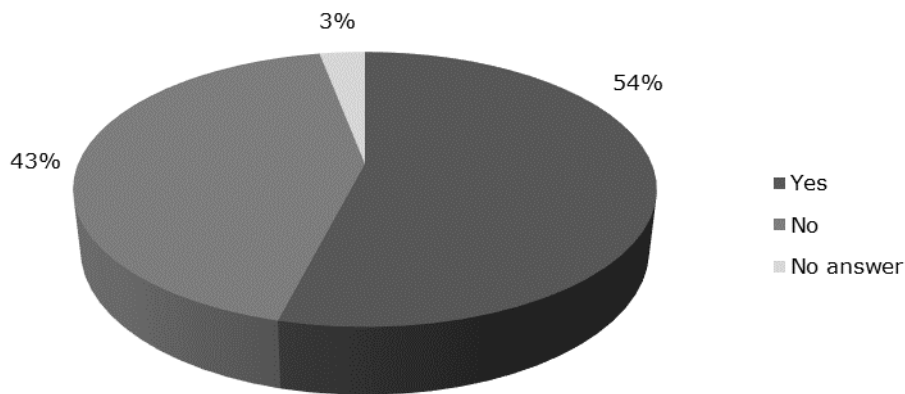
Concerning the necessity to subdivide the type of an abandoned site for economic activity, 39 or 51 % respondents gave positive answers and 34 or 44 % respondents gave negative answers, but 4 (5 %) respondents did not have an opinion. The respondents did not have any suggestions for subdivisions of such territories.

The next question of the survey focused on the information sources of degraded territories. The respondents had to choose from two variants: the information could be obtained from public information systems or by examining the site on the spot. The majority of respondents (65 respondents or 84 %) hold the view that the information on degraded territories should be obtained from real-life inspection, but 51 respondents or 66 % think that the information should be obtained from public information systems. The next question was meant to find out if respondents knew any other ways how to detect such degraded land. Mostly, answers combined the two already offered variants in one. However, some respondents thought that only real-life inspection is appropriate, some suggested that such information is available in the local governments in relation to spatial planning.

There was a question if the data on degraded territories should be stored in one separate information system. 42 respondents (54 %) gave a positive answer, 33 respondents (43 %) gave a negative answer, but two respondents (3 %) did not know the answer (Figure 3).

It was important to find out the respondents' opinion regarding a person or institution responsible for submitting an application for receiving of the status of degraded territory. Respondents had to choose from four variants (an applicant is an owner of the real estate, an employee of the local government, it is a public institution, any of these three). The analysis of the results show that the majority of respondents (78 %) considered an employee of the local

government as the most suitable candidate (Table 1).



Source: the authors' calculations based on results of the survey

Fig. 3. Respondents' opinion regarding the storage of data on degraded territories in a separate information system

However, almost the same amount of respondents (72 %) considered that any of the above mentioned applicants could suggest that a site could receive the status of a degraded territory. Nearly a half of respondents (38 or 49 %) mentioned a public institution as the most suitable applicant. The respondents suggested the following institutions: the State Environment Service (20 answers or 47 % out of those 38 respondents who suggested a public institution), the State Land Service (7 answers or 16 %), and two positive answers were given for each of these institutions: the State Environmental Office, State Environmental Service in Cooperation with Local Government, Rural Support Service and the Ministry of Environmental Protection and Regional Development.

The authors agree that employees of local governments are the most suitable applicants since local governments will be responsible for identifying and fixation of boundaries of the degraded territories. Therefore, another question of the survey was asked to find out which specialist of a local government should be responsible for submission of an application. The respondents had to choose from two variants: a specialist of real estate issues or a specialist responsible for the territorial planning in a local government. The analysis of the results shows

that 55 respondents (71 %) considered that a specialist responsible for the territorial planning, but 29 respondents or 38 % considered that a specialist of a local government in real estate issues should perform the identification of degraded territories.

Table 1

Respondents' opinion regarding an applicant for receiving the status of degraded territory

Applicant for receiving the status of degraded territory	Number of positive answers	Share of positive answers	Total number of respondents
An owner of real estate	43	56 %	77 or 100 %
An employee of a local government	60	78 %	
A public institution	38	49 %	
Any of them	55	72 %	

Source: the authors' calculations based on results of the survey

This question is related to the question which is meant to find out if it is necessary to update the information on degraded territories and to design respective thematic planning. The analysis of the answers show that the majority (50 respondents or 65 %) agreed, but 23 respondents (30 %) did not consider it

necessary to update the information, 4 respondents (5 %) did not give any answers.

Conclusions, proposals, recommendations

- 1) Land degradation problem has become an important worldwide problem at all levels. As regards Latvia, the Law on Land Management (in force from 1 January 2015) was issued to draw an attention to land degradation risks and their prevention; however, the classification of land degradation has not been worked out, there is no regulation regarding identification of land degradation and its evaluation procedure.
- 2) Foreign and Latvian researchers have studied land degradation problems and its impact on sustainable development; however, the studies are mostly related to soil degradation, its influence and prevention. Land degradation processes affect not only agricultural land, but also rural and urban areas.

- 3) The most common degraded territories in Latvia cover industrial and agricultural production sites, their infrastructure, abandoned military bases, their surrounding areas and abandoned unfinished buildings from the Soviet period.
- 4) The results of the survey among the senior staff of local governments and public institutions show that respondents agree with the classification of degraded land suggested in the Law on Land Management, i.e., degraded land refers to abandoned building sites, abandoned mining sites, abandoned sites of economic activity, abandoned sites of military activity. The more detailed subdivision could be created after identification of degraded territories of a respective type.

Bibliography

1. Brabant P. (2010). *Les dossiers thematiques du CSFD. Nr.8. November 2010. CSFD/Agropolis International, Montpellier, France.* – 52 pp. Available: https://www.google.lv/?gws_rd=ssl#q=Brabant+P.+Les+dossiers+thematiques+du+CSFD
2. *Degradeto teritoriju izpete Rigas pilseta (2004).* Petniecības darbs. Atskaite. SIA "Grupa 93", Rigas Domes Pilsetas attīstības departaments, Rīga. 66 lpp.
3. Jackson J.B., Finka M., Hermann G., Kliucininkas L., Lemesenoka N., Petrikova D., Pletnicka J., Teirumnieks E., Velykiene D., Vojvodikova B., Zahnasova M., Zubkova M. (2010). *Degradetas teritorijas.* Rokasgramata. Starpdisciplinārs macību līdzeklis degradeto teritoriju atjaunosanai. Macību līdzeklis Latvijai un Lietuvai. VSB-Ostravas Tehniskās universitātes Būvniecības fakultāte, Ostrava. 140 lpp.
4. Juozapaviciute, K. (2016). Mokslininkai: pastaraisiais metais stebima ryski Lietuvos dirvozemio degradacija. Is: Zaliuji Lietuva. [Online], [Viewed 2016-05-05]. Available: <http://www.delfi.lt/grynas/aplinka/mokslininkai-pastaraisiais-metiais-stebima-ryski-lietuvos-dirvozemio-degradacija.d?id=59214483>
5. Klavins M., Nikodemus O., Seglins V. u.c. (2008). *Vides zinātne.* Rīga: LU Akademiskais apgads. – 595 lpp.
6. *Land Degradation;* United Nations Environment Programme. [Viewed 04.01.2017]. Available: www.unep.org/dgef/LandDegradation/tabid/1702/Default.aspx
7. Latvijas ilgtspējīgas attīstības stratēģija līdz 2030.gadam (2010). – 100 lpp. [Viewed 04.01.2017]. Available: http://www.pkc.gov.lv/images/LV2030/Latvija_2030.pdf
8. *National Development Plan of Latvia for 2014-2020,* Cross-Sectoral Coordination Centre (2012). 70 pp. Available: http://www.varam.gov.lv/lat/pol/ppd/ilgtsp_att/?d oc=13858
9. Parsova V., Berzina M., Zigmunde D. (2016) Invasive Alien Plants as Land Degradation Factor. In.: *Lucrari Stiintifice, Volumul 46. Cadastru și drept.* Chisinau, 31-34 pp.
10. Petījums par degradeto teritoriju un objektu apsekojumu Rīga (2012). [Viewed 04.01.2017]. Available: (<http://www.sus.lv/lv/petijumi/degradeto-teritoriju-un-objektu-apsekojums-riga>)
11. Vides politikas pamatnostādnes 2014-2020.gadam, [Viewed 04.01.2017]. Available: <http://www.varam.gov.lv/lat/pol/ppd/vide/?doc=17913>
12. Zemes politikas pamatnostādnes 2008.-2014.gadam (2008), [Viewed 04.01.2017]. Available: www.varam.gov.lv/in_site/.../download.php?file.../ZemesPolitikasPamatnostadnes

INVESTIGATION INTO EMPLOYEE MOTIVATION

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Abstract. The aim of the paper is to identify the motivation factors considered to be the most important for tourism enterprises by their employees. Research tasks: 1. To examine the factors influencing motivation; 2. To perform an analysis of the factors promoting and hindering the motivation of employees by employing the methods of survey and benchmarking. The research found that employees working for tourism enterprises were mostly motivated by a decent wage, an interesting job and career growth opportunities at the enterprises; the employees considered the feeling of job security and good work conditions to be also important. An employee of an enterprise engaged in the hotel industry of Latvia was mostly motivated by good work conditions, the feeling of job security and an opportunity to be involved and informed, while relations with the management and a decent wage were also considered to be important.

Key words: employee, employee motivation.

JEL code: M12,M54

Introduction

Author R. Oldcorn (*Oldcorn, 1989, 159*) has referred to motivation as "a very complicated problem, and there is no single magic formula that can be used to motivate every individual".

Employee motivation is one of the key factors in personnel management, and it is important to be aware of it at all levels of an organisation. Any manager has to be knowledgeable about the factors that motivate employees in order to increase labour productivity as well as the employees have to be clear about what they want from their employers. It is very important for any personnel management to comprehend the nature of motivation and introduce an effective monetary as well as non-monetary employee remuneration system at the enterprise.

Authors Latham and Ernst (*Latham, Ernst, 2006*) define motivation as a psychological process resulting from the reciprocal interaction between the individual and the environment that affects a person's choices, effort and persistence. However, M.Armstrong (*Armstrong, 2003*) stresses that a person is motivated to do anything only in case the clear goals set in advance are going to be achieved. R. Neimeyer and M.Zeifert define motivation as a complicated process that involves a driver, self-reliance, the psychological time perspective and emotional intelligence and the result, placing no focus on the effects of the surrounding environment.

The authors employed the benchmarking method for interpreting the research results and conducted a survey of employees at one of the leading hotels in Great Britain (hereinafter referred to as "London") and three leading hotels in Latvia: "Radisson Blu Latvija Conference & Spa Hotel", "Tallink Hotel Riga" and "Albert Hotel".

The research employed the following methods: monographic, graphic, a questionnaire survey, descriptive statistics, inductive statistics, a nonparametric Mann-Whitney test and a Spearman's rank correlation test.

The research aim is to identify the motivation factors considered to be the most important for tourism enterprises by their employees. Research tasks: 1. To examine the factors influencing motivation; 2. To perform an analysis of the factors promoting and hindering the motivation of employees by employing the methods of survey and benchmarking.

Research results and discussion

According to data of the Central Statistical Bureau, totally 563 accommodation establishments served tourists in Latvia in 2015. Hotels accounted for 43 % of the total accommodation establishments. Hotels, motels, resorts, resort rehabilitation centres, apartment hotels and guest houses are regarded as hotels and similar establishments.

The largest number of tourist accommodation establishments was reported in 2011 when 641 accommodation establishments operated in

Latvia, while in later years a sharp decrease in their number was observed; in 2013 compared with the previous year, their number declined by 14 %. At the end of 2014, according to Lursoft data, more than 1 300 enterprises were engaged in the tourism industry, of which 10 % operated for more than 20 years. Almost half of the enterprises (45.73 %) operated for more than 10 years (*Viesnicu nozare stradajoso ...*, 2014).

According to Lursoft data, half of the enterprises engaged in hotel business operated in nine cities of national significance; most of them – 37.4 % – were located in Riga, followed by Jurmala with 4.1 % and Liepaja with 3.3 %.

The total turnover of providers of accommodation services increased year by year, reaching EUR 190.8 million in 2015. In 2015 compared with 2010, the total turnover in the industry increased by 61.3 %, while the overall growth rate for the national economy was only 40.2 %. Enterprises engaged in the hotel industry had both a higher turnover per enterprise and a higher turnover growth rate than the averages for the national economy, which allowed concluding that the hotel industry was a fast growing one.

A survey was conducted within the research, which aimed to identify the factors that motivated employees. Questionnaires in English in paper form were distributed at "London". Questionnaires in Latvian in electronic form were filled in by employees of "Radisson Blu Latvija Conference & Spa Hotel", "Tallink Hotel Riga" and "Albert Hotel". The number of respondents at "London" reached 37 % of the hotel's employees; a similar percentage of employees were surveyed in Latvia as well. The respondents were requested to arrange ten motivation factors suggested by Kovach (*Kovach, 1987*) on a scale from 1 (the most important) to 10 (the least important):

- a feeling of job security;
- an interesting job;
- a decent wage;

- career growth opportunities;
- acknowledgement of work done from the management;
- relations with the management, trust;
- good work conditions;
- an opportunity to be involved and informed;
- tactful personnel management;
- assistance of the management to solve personal problems.

Each of the factors that had to be arranged by importance by the respondents were suggested by personnel motivation theories. According to Maslow's Theory of Needs, such a factor as an interesting job is at the top of Maslow's hierarchy of needs (self-actualisation needs); the feeling of security is characterised by the need for safety and security and relations with colleagues and relates to social needs (King, 2011).

By employing Adams' Equity Theory, one can analyse such factors as tactful management and acknowledgement of well-done work from the management. If it seems to employees that their colleagues are given more acknowledgement of well-done work or are higher paid, the employees, not receiving the same acknowledgement of well-done work, feel unfairly assessed and are not going to be motivated.

Vroom's theory of motivation may be employed to explain why an interesting job motivates employees. If an enterprise gives its employees an opportunity to develop themselves and acquire new skills through training that meet every individual's wishes and, in addition, the work environment and job tasks are adjusted too, the employees are certainly better motivated to work, as they clearly understand that their efforts yield results and they are given an opportunity to do a job that they like and are interested in (Vroom, 1964; Herzberg, 1987).

Applying the job characteristics model, designed by Hackman and Oldham, in analyses, one can examine such factors as control over job planning and the need of employees to be involved and informed. McClelland's Theory of

Needs focuses on the need for achievement and deals with such factors as open communication and relationships with colleagues, control over job planning and relations with the management (Latham, Ernst, 2006).

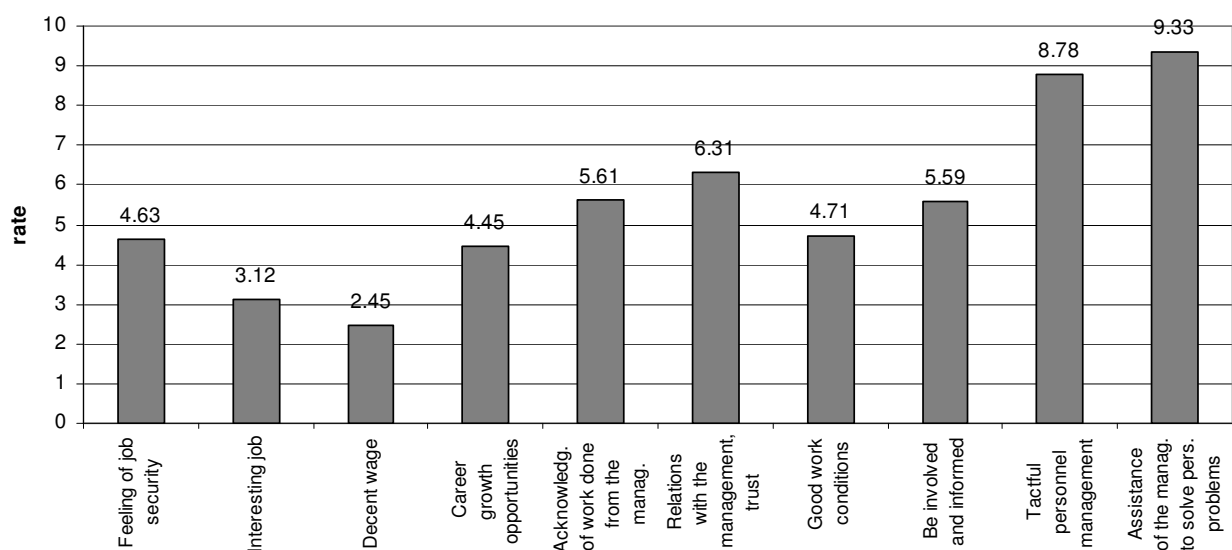
After examining the satisfaction of employees with their jobs, one can find that the number of employees being satisfied with their jobs at "London" was 11 % higher than that in Latvia, and more than half of the respondents – 58 % – admitted that they were satisfied with their jobs. The respondents who were not satisfied with their jobs at "London" were represented by both women and men aged 21-40, whereas in Latvia such respondents were mostly women aged 20 and under; besides, their length of service at their current jobs was less than three months.

Of the respondents from the hotels in Latvia who were partly satisfied with their jobs, 82 % were those who had worked at their current jobs for not more than three months; in addition,

most of them or 89 % were aged 30 and under. One can conclude that in Latvia mostly young individuals who were at the early stage of their careers and probably did their jobs in this industry only as temporary jobs or combined their jobs with studies were not satisfied with their jobs.

Performing an analysis of the questionnaire replies, first of all, the average rating of each factor was calculated, then the factors were arranged in their positions from 1 to 10. A factor with the lowest average score was the most important one, in the opinion of the respondents, and was placed in first position, while a factor with the highest average score was placed in tenth position, which was the least important one.

The average ratings of the ten motivation factors arranged by the "London" employees are presented in Figure 1.



Source: authors' construction based on the survey

Fig. 1. Average ratings of motivation factors at "London"

Table 1 shows the average ratings of the factors and their ranks broken down by gender. The authors performed a Mann-Whitney U-test ($U=48.5$, $p=0.908$, $\alpha=0.05$) and put forward a null hypothesis (both groups are similar) and an alternative hypothesis (both groups are different). The U-value acquired was equal

to 48.5, the p-value was 0.650. The critical significance level was set at 0.05, which meant that $p > \alpha$. One can conclude that the null hypothesis proved to be true – the gender differences among the "London" employees were statistically insignificant.

Table 1

Average ratings and ranks of motivation factors by gender of employees at "London"

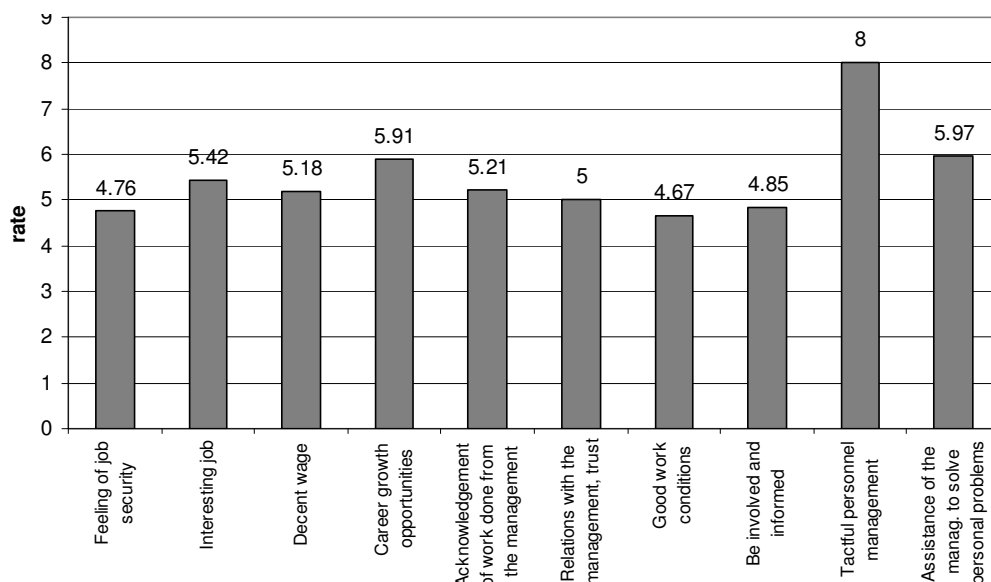
Factors	Women		Men	
	Average rating	Rank on a 10-point scale	Average rating	Rank on a 10-point scale
Feeling of job security	4.67	3	4.52	4
Interesting job	3.50	2	2.57	2
Decent wage	2.40	1	2.52	1
Career growth opportunities	4.73	4	4.10	3
Acknowledgement of work done from the management	5.40	6	5.90	7
Relations with the management, trust	5.93	8	6.86	8
Good work conditions	4.80	5	4.57	5
Be involved and informed	5.50	7	5.71	6
Tactful personnel management	8.80	9	8.76	9
Assistance of the management to solve personal problems	9.23	10	9.48	10

Source: authors' construction based on the survey

Performing a Spearman's rank correlation test the authors put forward a null hypothesis – a correlation between both groups is equal to 0 – and an alternative hypothesis – the correlation is not equal to 0. The correlation coefficient rho was 0.906, the p-value was equal to 0.000. The critical significance level was set at 0.01, which

meant that $p < \alpha$. One has to conclude that the null hypothesis has to be rejected and the alternative one has to be accepted – the correlation is strong and statistically significant.

The average ratings of the ten motivation factors arranged by the hotel employees surveyed in Latvia are presented in Figure 2.



Source: authors' construction based on the survey

Fig. 2. Average ratings of motivation factors in Latvia

The hotel employees surveyed in Latvia believed good work conditions were the most important factor. Even though only 9 % of them placed it in first position, overall it was

mentioned as the most important factor, as another 33 % of the respondents regarded it as the second or third most important factor.

The feeling of job security as the most important factor was mentioned by 21 % of the respondents, another 18 % placed it in second and third positions. The need to be involved and informed as one of the top three factors was mentioned by 45 %. The least important factor – tactful personnel management – was ranked in last position by 33 % and 12 %, respectively.

In Table 2, the authors presented the average ratings of the factors and their positions on a scale from 1 to 10 broken down by gender. Performing a Mann-Whitney U-test ($U=48.5$, $p=0.908$, $\alpha=0.05$), the authors put forward a null hypothesis (both groups are similar) and an alternative hypothesis (both groups are different). The U-value acquired was equal to 49, the p-value was 0.940. The critical significance level was set at 0.05, which meant that $p>\alpha$. One can conclude that the null hypothesis proved to be true – the gender differences among the hotel employees in Latvia were statistically insignificant.

Table 2

Average ratings and ranks of motivation factors by gender of hotel employees in Latvia

Factors	Women		Men	
	Average rating	Rank on a 10-point scale	Average rating	Rank on a 10-point scale
Feeling of job security	4.57	1	5.08	5
Interesting job	4.81	3	6.50	7
Decent wage	6.43	9	3.00	1
Career growth opportunities	5.48	7	6.67	8
Acknowledgement of work done from the management	5.05	4	5.50	6
Relations with the management, trust	5.76	8	3.67	2
Good work conditions	4.62	2	4.75	4
Be involved and informed	5.29	6	4.08	3
Tactful personnel management	7.81	10	8.33	10
Assistance of the management to solve personal problems	5.19	5	7.33	9

Source: authors' construction based on the survey

Women, compared with men, positioned higher such factors as the feeling of job security (first, while men placed it in eighth position), good work conditions and an interesting job. In contrast, men positioned higher a decent wage, relations with the management and the need to be involved and informed.

Analysing the average ratings and the positions broken down by the age of the respondents, one can find that the respondents in Latvia were not unanimous, as each age group positioned the factors differently. For the youth aged 20 and under, such factors as good work conditions, acknowledgement from the management and the feeling of job security were positioned the highest, whereas the respondents aged 31-40 considered the feeling of job security and relations with the management to be the most important ones.

Table 3.

Ranks of employee motivation factors on a 10-point scale at "London" and in Latvia

Factors	"London"	Latvia
Feeling of job security	4	2
Interesting job	2	7
Decent wage	1	5
Career growth opportunities	3	8
Acknowledgement of work done from the management	7	6
Relations with the management, trust	8	4
Good work conditions	5	1
Be involved and informed	6	3
Tactful personnel management	9	10
Assistance of the management to solve personal problems	10	9

Source: authors' calculations based on the survey

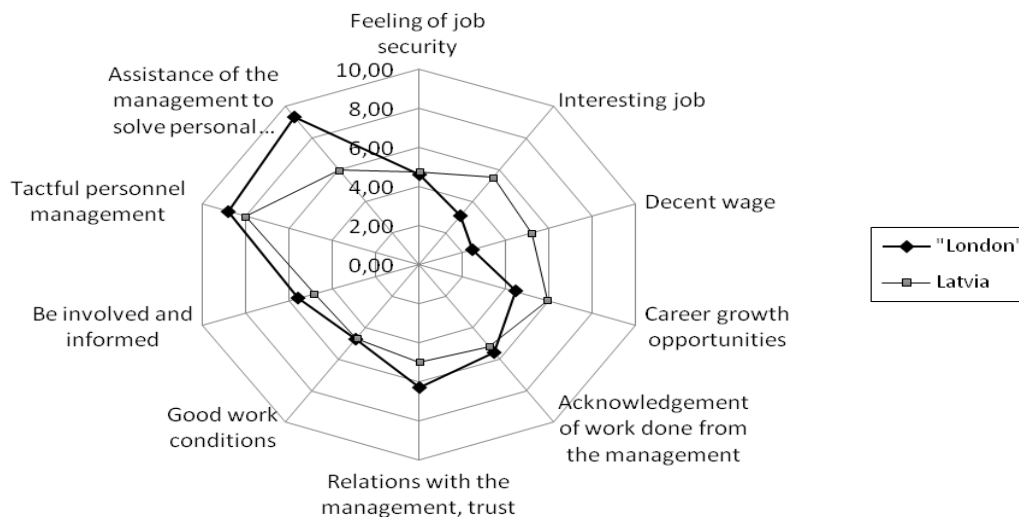
A comparison of the motivation factors arranged by the employees at "London" and at the hotels in Latvia on a scale from 1 to 10 allows concluding that there were significant differences between both countries. Both three most important factors and three least important ones were arranged differently. The differences may

be explained by different economic situations in the two countries as well as the multinational personnel of "London", as most of them were foreign employees.

The authors performed a Mann-Whitney U-test ($U=44.0$, $p=0.650$, $\alpha=0.05$) and put forward a null hypothesis (both groups are similar) and an alternative hypothesis (both groups are different). The U-value acquired was equal to 44.0, the p-value was 0.650. The critical significance level was set at 0.05, which meant that $p>\alpha$. One can conclude that the null hypothesis proved to be true – the differences

between the employees of "London" and those of the hotels in Latvia were statistically insignificant.

Figure 3 shows the ranks of the motivation factors based on their average ratings. The closer an average rating is located to the centre of the radar chart, the more important it was in the opinion of the respondents. The least important factors are located farthest from the centre. The authors conclude that even though there are considerable differences in the average rating among the factors, most of them were given similar scores.



Source: authors' construction based on the survey

Fig. 3. Ranks of employee motivation factors at "London" and in Latvia

According to Maslow's theory, remuneration is important to meet the lowest level needs (physiological) and the security and safety needs. For the respondents, remuneration was the most important motivation factor, as they were aware that it was an essential aspect for meeting their higher-level needs.

The survey results were consistent with McClelland's theory, which states that during the lifetime human needs change depending on the experience gained, i.e. the "London" employees aged 40 and above did not view their remuneration as the most important motivation factor.

Conclusions, proposals, recommendations

- 1) In Latvia, the employees of hotel industry enterprises were mainly motivated by good work conditions, the feeling of job security and an opportunity to be involved and informed, as well such factors as relations with the management and a decent wage. Assistance of the management to solve personal problems and tactful personnel management were regarded as the least important factors.
- 2) At the enterprise "London", 69 % of the employees were satisfied with their jobs, while in Latvia the number of satisfied employees reached only 58 %. In Latvia, the 9 % share of unsatisfied respondents was mainly

comprised of women aged under 20; besides, their length of service at their current jobs was no longer than three months.

- 3) Of the hotel employees in Latvia who were unsatisfied or only partly satisfied with their jobs, 93 % mentioned that they were unsatisfied or only partly satisfied with their pay, while 63 % of the "London" employees who were unsatisfied or only partially satisfied with their jobs admitted that nevertheless they were satisfied with their pay, which clearly indicated that the level of remuneration was the key motivation factor in the opinion of the employees.
- 4) At "London", the employees were mainly motivated by their remuneration, interesting jobs and career growth opportunities, while admitting the feeling of job security and good work conditions to be important as well.

Tactful personnel management and the assistance of the management to solve personal problems were considered to be the least important factors.

- 5) In Latvia, hotel industry enterprises should seek to meet the needs of as many employees as possible when designing and introducing an employee motivation system; besides, it has to be taken into consideration that the needs an employer focuses on involve various levels of the needs.
- 6) Since the employees regarded non-monetary motivation factors as the most important ones, a motivation system based only on monetary remuneration is not effective for hotel industry enterprises in Latvia. An optimum motivation level could be ensured by using both monetary and non-monetary factors.

Bibliography

1. Armstrong M. (2003) A Handbook of Human Resource Management Practice. London: Kogan Page, 216. lpp
2. Herzberg, F. (1987). One More Time: How do You Motivate Employees? Harvard Business Review, No. 5. pp. 112-113.
3. *Improved Performance Metrics Projected for London Hoteliers for 2017*. Retrieved: <http://www.hotelnewsresource.com/article89628.html>. Access: 16.10.2016.
4. King, P. W. (2011) *Climbing Maslow's Pyramid* (electronic resource): e-book. scribd.com, pp. 6-10.
5. Kovach, K. A. (1987). What Motivates Employees? Workers and Supervisors Give Different Answers. *Business Horizons*, No. 30. pp. 58-65.
6. Latham, G. P., Ernst, C.T. (2006). Keys to Motivating Tomorrow's Workforce. *Human Resource Management Review*, No. 16. p. 181.
7. Oldcorn, R. (1989). *Management*. London: Macmillan, p. 159.
8. *Viesnicu nozare stradajoso uzņemumu videjais apgrozījums kops 2011. gada audzis par 14,27 % (Average Turnover of Tourism Enterprises has Grown by 14.27 % since 2011)*. Retrieved: <http://blog.lursoft.lv/2014/08/15/viesnicu-nozare-stradajoso-uznemumu-videjais-apgrozijums-kops-2011-gada-audzis-par-1427-proc>. Access: 19.02.2016.
9. Vroom, V. H. (1964). *Work and Motivation*. New York: Wiley. pp. 22-26.

CORPORATE SOCIAL RESPONSIBILITY AS AN OPPORTUNITY FOR THE SUSTAINABLE DEVELOPMENT OF SMALL TO MEDIUM-SIZED ENTERPRISES

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Abstract. On an increasingly competitive market, corporate social responsibility is one of the most important business strategies. Activities of this type are not, however, widely promoted among small to medium-sized enterprises. This is why there is a need to deploy the principles and instruments of CSR in a way which is adapted to the specific ways in which such businesses function, as it represents an opportunity for sustainable development. The purpose of this article is to attempt to transpose the concept of corporate social responsibility to the small to medium-sized enterprise sector, and to determine the main benefits of and barriers to the development of that idea in the strategies applied by business people with a particular focus on businesses in the voivodeship of Malopolska in Poland.

Key words: corporate social responsibility, sustainable development, SME sector.

JEL code: Q 56

Introduction

In a dynamically developing market economy, it is increasingly often possible to observe a growing interest in the concept of corporate social responsibility, which involves engaging in economic activities, which are focused not only on profit and efficiency, but also on ecological and social interest understood in the broader sense.

The growth in ecological initiatives being taken in the development of businesses is leading to them increasingly, taking environmental aspects into account, as a factor with an influence on being perceived more favourably on the market (Wielewska I., 2016). This is reflected in the application of the idea of corporate social responsibility (CSR) by business people. The need to develop the aforementioned concept stems not only from those businesses themselves, but also from the local community, the competition, local and central authorities and many other participants in socio-economic life, which have an indirect or direct influence on economic entities (Zuzek D., 2012a).

The purpose of this article is to present the concept of corporate social responsibility, and to determine the main benefits of and barriers to the development of that idea in the strategies applied by business people with a particular focus on businesses in the voivodeship of Malopolska in Poland. The analysis of the results of the studies conducted is concerned with the small to medium-sized enterprise sector. The studies

were conducted using the survey questionnaire method in 2016. The aim of the studies was to assess familiarity with the concept of corporate social responsibility and the possibility of applying it to the businesses surveyed. 150 correctly completed surveys were accepted for the purposes of the analysis, and were subjected to statistical analysis.

Research results and discussion

1. Theoretical notion of corporate social responsibility (CSR)

For several years now, it has been possible to observe a growing interest in management based not only on generating profit and efficiency, but also on ecological and social interest understood in the broader sense. This is a result of the growing awareness among business people of the importance of principles of sustainable development and the widespread belief that taking voluntary initiatives in the area of corporate social responsibility can lead to making businesses more attractive and reliable partners on the domestic and international market, where good practices are highly valued (Zuzek D., Wielewska I., 2015).

In the subject literature, it is possible to find various approaches to the notion of CSR, which results from the fact that the scope of corporate social responsibility is not understood in a uniform way (Wasowska A., Pawlowski M., 2011). CSR-related considerations are the subject of work not only in the field of economics, but also in sociology, philosophy and ethics, too.

Corporate social responsibility is defined as a moral duty to the environment, both internal and external, in which each business operates (Zbiegienaciag L., 1997). It is characterized by a particular sensitivity to matters relating to the external environment, such as the social and ecological aspects thereof, as well as the capacity to maintain a balance between participants in the market and the provision of certain services for the benefit of the local community (Zemigala M., 2007). CSR means businesses taking responsibility for the effects of the decisions and actions they take with regard to the community and the environment (Wielewska I., 2014).

According to J. Korpus, it is a new direction of change in sustainable development, which respects the principles of economics, the natural environment and ethics (Korpus J., 2006).

Corporate social responsibility is also associated with an obligation on the part of business people to make decisions which are desirable in terms of the objectives and values of society as a whole (Bowen H., 1953). Today, the phenomenon is increasingly understood to take the form of actions involved in conducting economic activity in such a way that takes pro-social and pro-ecological considerations into account. Responsible business practices consist of observing ethical standards in relations with employees, competitors and business partners, as well as engaging in activities favourable to development of the local community and to protection of the natural environment (Marek S., Bialasiewicz M., 2011).

In practice, CSR also includes the following (Zuzek D., 2012b):

- 1) activities aimed at employees of the company (concerning improvements in working conditions, ensuring better levels of satisfaction and opportunities for professional development);
- 2) activities aimed at the market (on-time settlement of liabilities to suppliers and business partners, keeping to terms of

commercial agreements, improvement of the quality and safety of products, ethical advertising, cooperation with companies from the region);

- 3) activities for the benefit of the community (improvement of local infrastructure, financial or material support for local public institutions, activities to foster social integration);
- 4) activities related to the natural environment (use of environmentally-friendly products and production processes, efficient use of resources, conducting "ecological assessments" of suppliers, limiting the amount of waste and pollution generated).
- 5) Corporate social responsibility can, therefore, be understood as an obligation on the part of business people to make a contribution to sustainable socio-economic development that goes beyond the minimum set out by legal requirements or obligations of a social or environmental nature (Bernatt M., 2009). In practice, this means the balancing of benefits and losses in three areas: the economy, the community and the environment (Wielewska I., 2015).

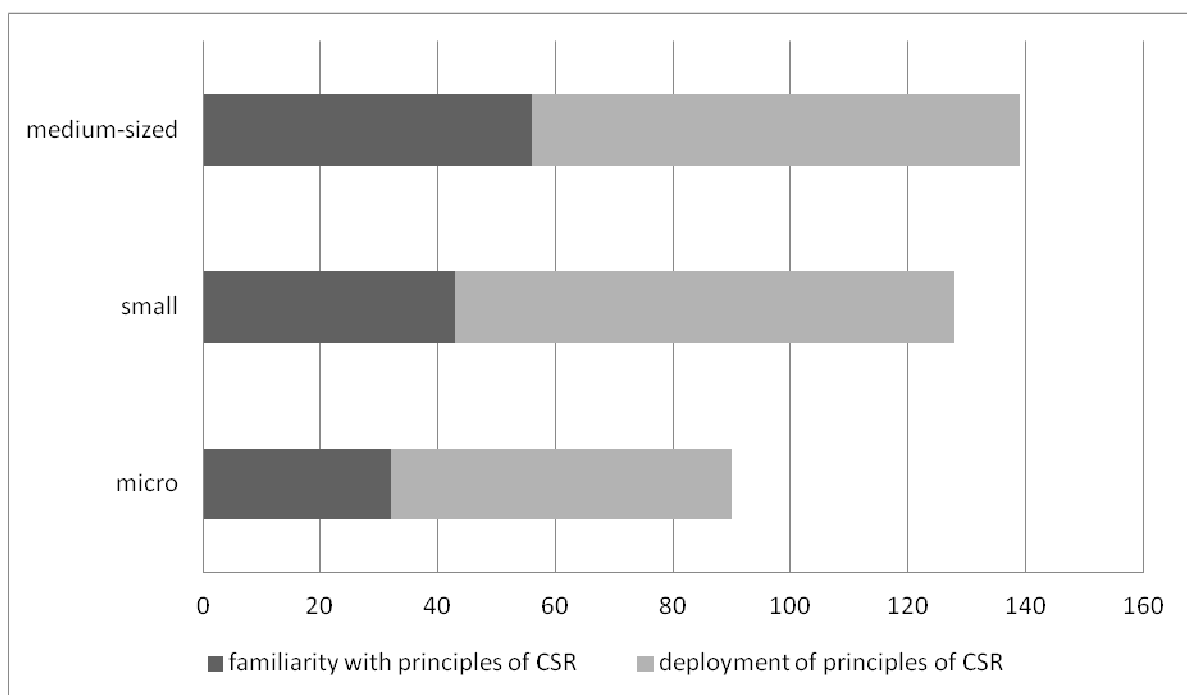
The idea of corporate social responsibility has met with both positive and negative opinions, as a result of the variety of ways in which the phenomenon is perceived by business people. Proponents of the idea point to the fact that a business is not just an economic entity focussed on generating profit, but that it also has a responsibility for its activities in the economic, social and ecological spheres, which contributes to greater stability and facilitating dialogue between different economic entities. Opponents of the idea of CSR underline that the main purpose of a company's operations is to increase profits and to pursue its economic objectives. CSR is a new, voluntary strategy which takes account of social, economic, ethical and ecological aspects of economic activity and interaction with the environment. In practice, it

most often manifests itself in activities such as social campaigns, sponsoring of cultural events, the sale of products with part of the profit earmarked to be put towards a particular social cause, the creation of ethical codes or the eco-labelling of products. The social perception of activities taken in the sphere of CSR may also be of interest (Zuzek D., 2013).

Taking both points of view into consideration, CSR is a position which represents the business community's response to the needs of the contemporary world (Wielewska I., 2014).

2. Benefits of and barriers to development of principles of corporate social responsibility in business

Corporate social responsibility is an initiative which is still relatively unknown in Poland, especially in the SME sector or in local communities. An increasing number of businesses are, however, coming to understand the significance of the concept and starting to take action to promote sustainable development. As a result of surveys conducted in the field, it can be seen that familiarity with the idea of CSR depends above all on the size of the business (Fig. 1).



Source: author's research

Fig. 1. **Familiarity with and deployment of the concept of corporate social responsibility in businesses from the SME sector (as a %)**

Among businesses from the SME sector, around half of the medium-sized enterprises confirmed that they were familiar with the principles of CSR. Around 43 % of small businesses were familiar with the notion, but only 32 % of those running micro-enterprises were able to explain what the phenomenon involves. It is also worth noting that among the businesses that say they are familiar with the concept in question around 83 % small and medium-sized enterprises deploy it within their company. However, only 58 % of micro-enterprises deploy

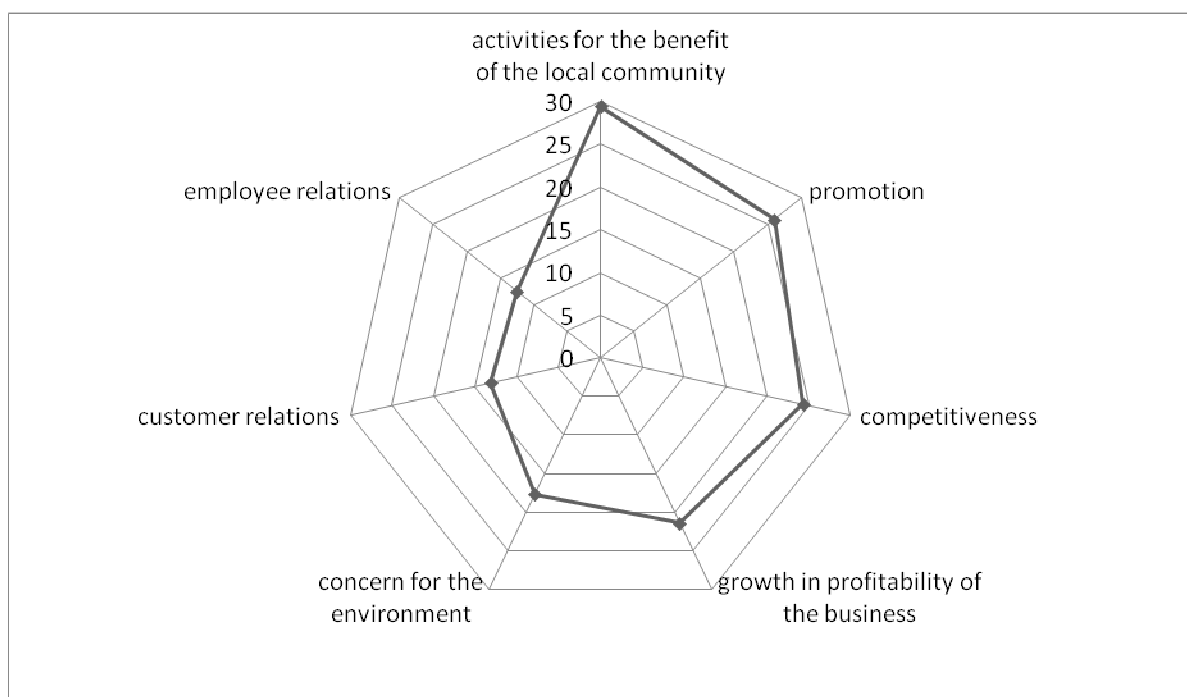
elements of CSR in the business activity they conduct. Small and medium-sized enterprises frequently apply principles related to CSR without being aware they are doing so, which means, as a result, that such activities are not a part of their business strategy and thus do not bring the same effects as if they were to be applied consciously. This approach to the issue may result from the fact that, as mentioned previously, the notion of CSR is also defined in various ways by different business people. The business people surveyed mainly understand

corporate social responsibility as activities undertaken for the benefit of the local community (around 30 %). The other most popular responses were such as: a form of promotion (26 %), competitiveness (24 %) and growth in profitability of the business (over 20 %). The least popular responses indicated by business people were relations with customers and employees (Fig. 2).

The positive influence of corporate social responsibility can be assessed not only in terms of financial results, but also and above all in terms of actions taken to improve the reputation of the business, and growth in its competitiveness, which may result in an improvement in the company's image.

Customers, who are increasingly aware of environmental threats most importantly expect products and services that are environmentally-friendly and are ready to pay more for them.

Businesses which are active in the sphere of corporate social responsibility experience benefits which can lead to an increase in revenue (45 % of responses) (Fig. 3). The benefits resulting from the deployment of principles of corporate social responsibility most frequently pointed to by respondents were associated with a change in the company's image (45 %). Nearly 40 % of the businesses surveyed also observe benefits in the form of better employee motivation and an improvement in relations with the local environment.

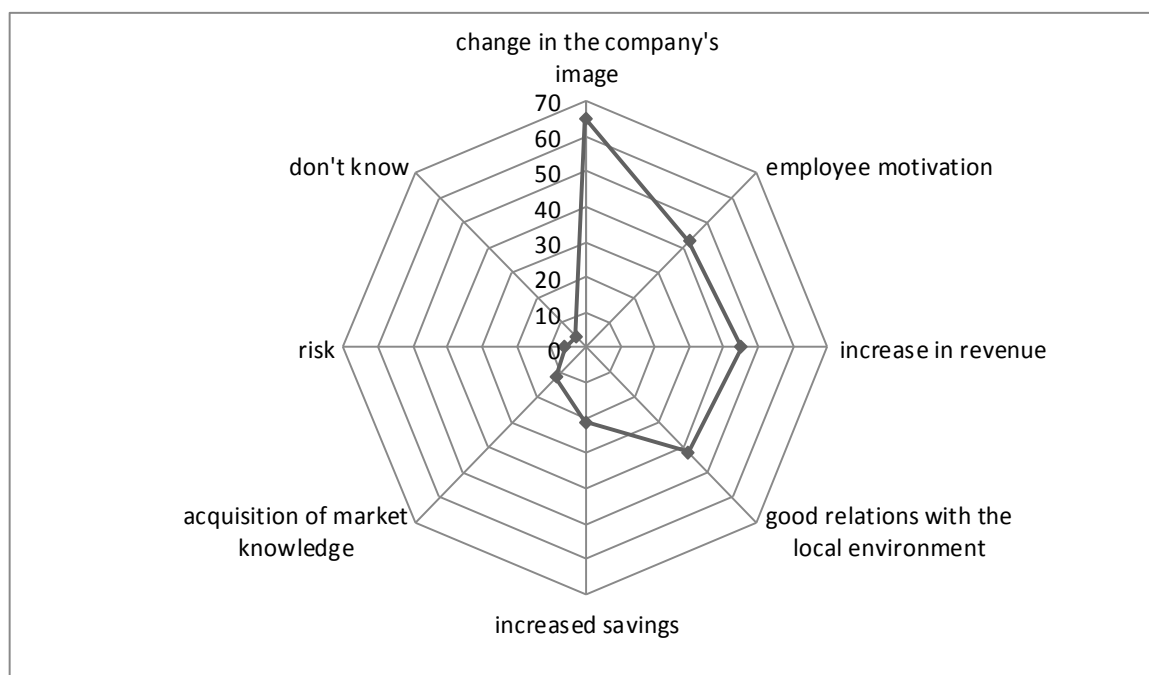


Source: author's research

Fig. 2. Definition of corporate social responsibility by business people (as a %)

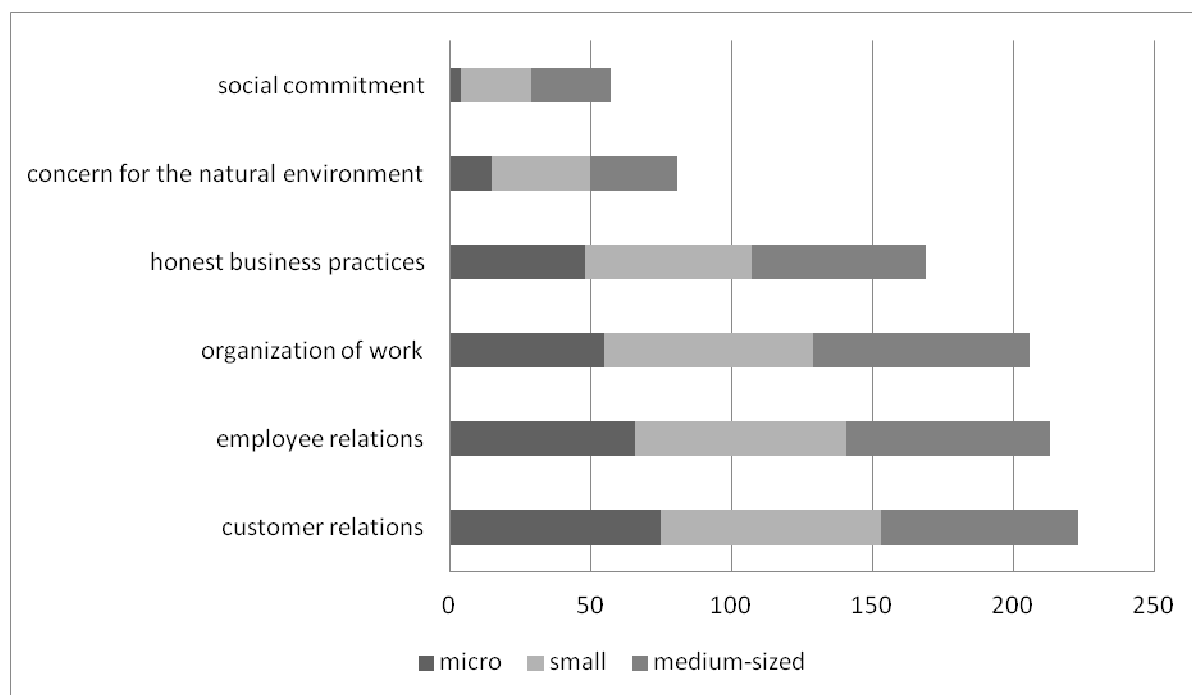
In the subject literature, the predominant point of view is that pro-environmental stances adopted by businesses, related to their ecological responsibility, have a positive influence on their competitive position (Chodynski A., 2011). Such activities are concerned with achieving environmental goals, which are the result of a

conscious approach to business management. Ecological criteria may also have an influence on local communities, which increasingly frequently expect businesses to adopt ethical modes of conduct that are beneficial to the natural environment.



Source: **author's research**

Fig. 3. Benefits observed by businesses related to application of the idea of CSR (as a %)



Source: **author's research**

Fig. 4. Ways in which CSR is perceived by business people surveyed (as a %)

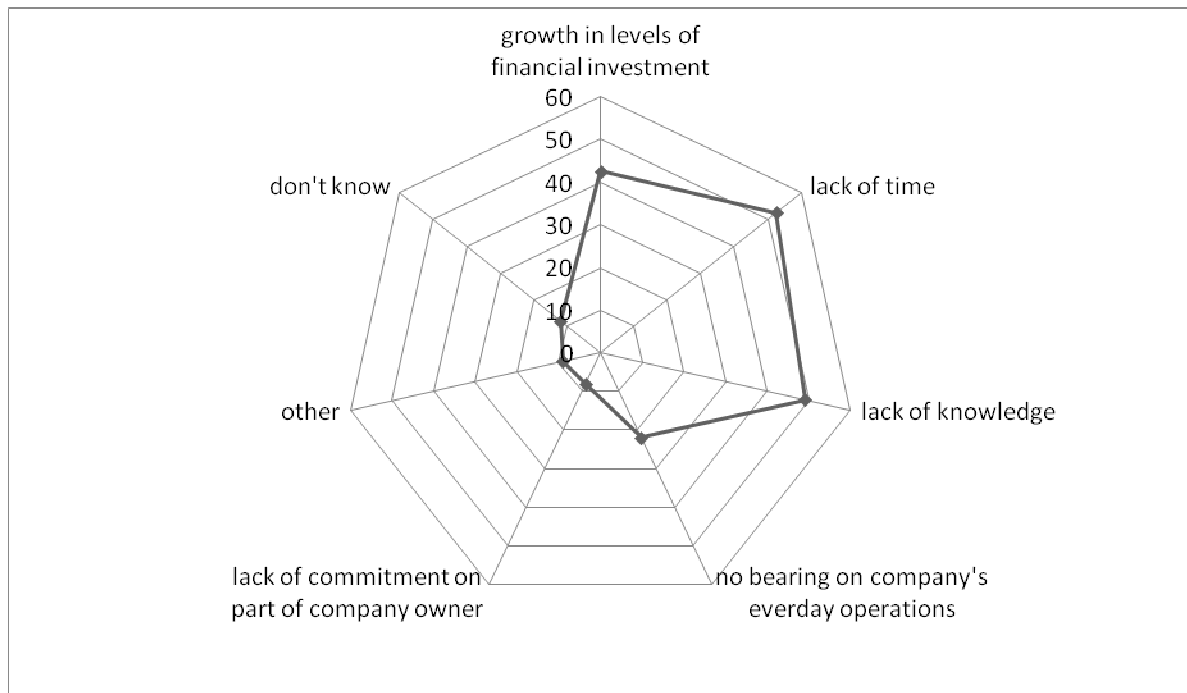
Familiarity with and level of deployment of principles of CSR in the businesses surveyed is not the only issue which those running businesses draw attention to. The way in which the phenomenon is perceived by business people is also of important significance here (Fig. 4).

Analysing the results of the surveys conducted, it can be seen that the majority of

business people treat the concept of CSR as a tool which serves to improve organization of work or to build proper relations with employees. In the opinion of the business people surveyed, there are, however, barriers to compliance with the principles of corporate social responsibility (Fig. 5). This results from the fact that business people perceive those activities as not being

directly related to the main purpose of the business, which is to generate profit. They thus

prefer to assign funds to be invested in another activity than to generate additional costs.



Source: author's research

Fig. 5. Barriers related to deployment of the principles of CSR (as a %)

The surveys conducted in the field indicate that the fundamental barriers to promoting the principles of corporate social responsibility are financial resources or an inadequate level of awareness of the phenomenon. Over 42 % of business people say they are experiencing problems related to the growing levels of financial investment involved in implementing the principles of CSR (Fig. 5).

The surveys showed that nearly half of the business people surveyed said they had a lack of knowledge about conducting socially responsible activities. Other factors singled out by respondents were barriers resulting from a lack of time to deploy such principles or the belief that they have no bearing on the company's everyday operation or on its competitive advantage.

Conclusions, proposals, recommendations

1) The dynamically changing environment in which they do business, coupled with intensifying globalization and growing social and ecological requirements are leading to increased pro-ecological awareness among

business people. Engaging in this type of activities results in the idea of corporate social responsibility being introduced by these business people. The surveys conducted in the field show that businesses are aware of the necessity of applying an environmental protection policy and introducing ecological aspects into their strategy. According to the respondents, the benefits resulting from this contribute to an improvement in the company's image. Over the longer term, they may also have an influence in terms of strengthening their competitive position.

2) The scale on which businesses are deploying the concept of CSR allows us to conclude that the scope and type of activities being engaged in depends to a large extent on the knowledge of business people in that area. The low level of participation of businesses in the deployment of the concept of CSR is above all a result of a lack of knowledge, time or appropriate financial resources. In the deployment of CSR, people running small businesses overwhelmingly associate it with

shaping the environment external to the business, though there are a few who devote attention to building relations with employees and customers.

- 3) The surveys conducted show that business people are aware of the role that they have to play in ensuring sustainable production;

however, they are not fully aware of the potential that lies therein. The effective implementation of the concept of corporate social responsibility in businesses requires the creation and application of a comprehensive activity that takes account of both its economic and social specifics.

Bibliography

Journal paper with author(s)

1. Wasowska A., Pawlowski M. (2011). Metody pomiaru społecznej odpowiedzialności biznesu-przegląd literatury (Methods for Measuring of the Corporate Social Responsibility-Literature Review) „Przegląd Organizacji”, No. 11, pp. 14-17
2. Wielewska, I. (2015). Ecological Investments as a Necessary Condition for Sustainable Development of Agribusiness Companies, Economic Science for Rural Development. Rural Development and Entrepreneurship. Proceedings of the International Scientific Conference, No 39, Latvia University of Agriculture, Jelgava 2015, 47-56.
3. Wielewska, I. (2016). Ecological Investments as an Element of Environmental Management: Case of Agribusiness Companies [in:] Journal of Agribusiness and Rural Development, No 1(39), Poznań, pp. 199-206
4. Zuzek, D. (2012a). Społeczna odpowiedzialność biznesu a zrównoważony rozwój obszarów wiejskich, (Corporate Social Responsibility and Sustainable Rural Development), Zeszyty Naukowe Małopolskiej Wyższej Szkoły Ekonomicznej, Tarnów, No. 2, pp. 197-207
5. Zuzek, D. (2012b). Koncepcja społecznej odpowiedzialności biznesu szansa konkurencyjności małych i średnich przedsiębiorstw (The Concept of Corporate Social Responsibility Chance Competitiveness of Small and Medium-sized Enterprises), Szczecin, Handel Wewnętrzny, Warszawa, Vol. I, pp. 298 – 307
6. Zuzek D., 2013, Społeczna odpowiedzialność biznesu – wyzwania dla małych i średnich przedsiębiorstw (Corporate Social Responsibility - Challenges for Small and Medium-sized Enterprises), Journal of Agribusiness and Rural Development, Poznań, 2(28), pp. 281-289
7. Zuzek, D., Wielewska, I. (2015). The Significance of Education in Promoting the Idea of Sustainable Development and Social Responsibility in Agriculture in the Pomeranian Voivodeship, Acta Scientiarum Polonorum Seria: Oeconomia 14 (4), pp. 149-157

Books

8. Bernatt, M. (2009). Społeczna odpowiedzialność biznesu. Wymiar konstytucyjny i międzynarodowy (Corporate Social Responsibility. A Constitutional Dimension and International), Wydawnictwo Naukowe WZ Uniwersytetu Warszawskiego, Warszawa, p.30
9. Bowen, H. (1953). The Social Responsibilities of the Businessman, Harper, New York, p. 6
10. Chodyński A. (2011). Odpowiedzialność ekologiczna w proaktywnym rozwoju przedsiębiorstw (Ecological Responsibility in a Proactive Business Development), Krakowskie Towarzystwo Edukacyjne – Oficyna Wydawnicza AFM, Kraków, p. 55
11. Korpus, J. (2006). Społeczna odpowiedzialność przedsiębiorstw w obszarze kształtowania środowiska pracy (Corporate Social Responsibility in the Area of Shaping the Environment), Wydawnictwo Placet, Warszawa, p. 84
12. Marek S., Białasiewicz B. (ed.). (2011). Podstawy nauki o organizacji. Przedsiębiorstwo jako organizacja gospodarcza (Basics of Science Organization. The Company as a Business Organization), PWE, Warszawa, p. 99
13. Wielewska, I. (2014). Społeczna odpowiedzialność a aspekty ekologiczne zrównoważonego rozwoju przedsiębiorstw agrobiznesu (Environmental Protection in the Opinion and Actions of Managers of Small and Medium-Sized Enterprises, [in:] Ekologiczna i społeczna odpowiedzialność MSP, Gotowska M. (ed.), Jakubczak A. (ed.), Wydawnictwa Uczelniane Uniwersytetu Technologiczno-Przyrodniczego w Bydgoszczy, p. 109-117
14. Zbiegień-Maciąg, L. (1997). Etyka w zarządzaniu (Ethics management), CiM, Warszawa, p. 48
15. Żemigala, M. (2007). Społeczna odpowiedzialność przedsiębiorstwa. Budowanie zdrowej, efektywnej organizacji (Corporate Social Responsibility. Building a Healthy, Effective Organization), Wydawnictwo Wolters Kluwer, Kraków, p. 99

INFLUENCE OF A QUALITY MANAGEMENT SYSTEM ON EXTERNAL RELATIONS: EXAMPLE OF JOINT STOCK COMPANY "LATVIA'S STATE FORESTS"

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Abstract. As entities and organisations are beginning to participate in the international trading more and more, such characteristics as quality, price and available information are being valued more frequently. Hence, such organisations and entities are aware of the need to establish an external relation department and quality management system. With the usage of the external relations, entities and organisations inform the interested parties not only about their production, goods, entity's goals and achievements, but also about the quality of the goods and services sold. Research paper aims to identify alteration in external relation process, caused by the establishment of the quality management system corresponding to the ISO 9001 standards, by using joint stock company's "Latvia's State Forests" (JSC "LVM") example.

The main task of the research is to analyse the business activity of the joint stock company "Latvia's State Forests" and the influence of a quality management system on the entity's external relations. Research methodology: analysis of documents, semi-structured interview, SWOT analysis. The results of the research reveal that the quality management system is linked with the external relations, as by establishing the quality management system, external relations are being influenced.

Key words: quality, quality management system, external relations.

JEL code: M190

Introduction

To meet the accruing client demands for goods and services of good quality, entities and organisations may introduce a quality management system that is in accordance with one of the most widely recognised quality management system standard – ISO 9001. The popularity of this standard is explicit in both Latvia and world – there are more than 1 million entities and organisations that have obtained a certificate in accordance with the ISO 9001 standard. The amount of the issued certificates in Latvia that are in accordance with ISO 9001 standard has increased from 73 certificates in 2003 to 1001 certificates issued in 2014. Since the joining to the EU, there have been more than 7531 issued certificates in Latvia alone, which are in accordance with the ISO 9001 standard (Evolution of ISO..., 2015).

As Latvia has one of the highest forest coverage per territory proportion in Europe (59 % of Latvia's territory is covered by forests), timber and sapling export is one of the main export item groups for Latvia for years. In addition, as JSC "LVM" is the largest timber and sapling exporter in Latvia, it has a significant role in export. To ensure even and continuous proportion of demand and sale of Latvia's main

export group, JSC "LVM" has implemented a quality management system in accordance with ISO 9001 standards and has obtained respective certificate in forest sapling manufacturing and sale. According to the data of the Ministry of Finance, regardless of overall decrease in Latvia's export in 2016, export of wood, timber and sapling have been evenly increasing. In addition, according to finance consultancy agency's "Prudentia" and broker's "NASDAQ OMX Riga" research, JSC "LVM" was 3rd most valuable entity in Latvia and 9th most valuable entity in Baltic (Desmitvertigakie Latvijas ..., 2016), as well as the largest public company after profit after tax in 2014 (Lursoftstatistika, 2016). Notwithstanding all the research done till now, there still aren't enough data and research made on the influence of the quality management system on entity's external relations. Thus, the research question is: "Are the external relation processes being influenced by the implementation of quality management system, which is in accordance with ISO 9001 standard?" The aim of the research paper is to identify alteration in external relations process, caused by the establishment of the quality management system corresponding to the ISO 9001 standards, by using JSC "LVM" example.

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Research results and discussion

For the determination and measurement of the quality, a complex combination of indicators – quality management system – is used. The term "quality" has been interpreted in a several ways. The interpretation depends on the context, in which the term has been issued, as well as on business sector, entity, services and products. The quality of a service or product is the benefit which customer gains from using it and it is also a security from the competitors and the path to a continuous growth. Both Forand (Forand I., 2000) and Kotler (Kotler F., 2007) refer to the "quality" as an entirety of characteristics of the item (process, product, service, entity), which determines the capability to meet the set or expected demands. Quality can be described as a degree in which the inherited characteristics meet the customers' needs and desire, as well as the set safety, ethical, social and environmental requirements (Juran M. J., 2016).

By compiling the given descriptions of the term "quality", it may be concluded that the "quality" is an entirety of characteristics of a product or service, which provides not only a particular performance of processes, but also a satisfaction of customer needs. Furthermore, quality provides the entity with protection from the competitors.

Quality management is carried out by top management, whose responsibility is to ensure the general management activities, to set a clear policy, goals and responsibilities, when planning the quality assurance and improvement. Management system can be implemented in any process and in any entity or organisation. It provides a clearly defined and documented process records, which enable entity to better control the procedures for each step of the process. Furthermore, combining the management system with the quality characteristics, a **quality management system** is created, which ensures the interaction of the

set quality components and the documentation, implementation and monitoring requirements.

The quality management system has been defined by various terms – Forand (Forand I., 2000) describes it as an organisational structure, procedures, processes, and resources for implementing quality management, but ISO 9001 standard states that the quality management system is quality management principles, which comprise explicit client-oriented actions, involvement and motivation of the top management, process approach and continuous improvement (ISO 9000 – Quality..., 2015). Quality management system is also defined as a coordinated activity complex, which is used in entity to manage and control every aspect in relation with quality (Kvalitates vadibas sistemas..., 2001) or as a complex of processes, policies and activities used in planning and implementation of the company's main business areas (What is a Quality..., 2016).

Definitions reveal that the quality management system is a set of processes, which consists of the different processes and elements, for example, of quality policy, principles, process control activities etc. The singularity of the quality management system is that it pays more attention directly to processes, resulting in the creation of products and services, rather than the final product (with the understanding of both products and services).

Furthermore, **the quality management system is on-going** and it has to be developed all the time, but on the other hand - the introduction of a quality management system is a voluntary act, which depends on the entity's strategy and objectives (Zygon Baltic Consulting, 2003). It is also laid down in the ISO 9001 standard.

The quality of products and services may be controlled in 3 ways:

- 1) by controlling quality of the finished items;
- 2) by controlling quality at all stages of the production and technology;

3) by controlling quality standards in both in own and in suppliers companies (Praude V., 2011).

Standard ISO 9001, which lays down the requirements for the quality management system, was created in 20th century and currently is the most common standard in the world. International Organisation for Standardisation (ISO) was founded in 1946 in London, England, when 65 delegates from 25 countries met to discuss the creation of ISO. In 1987, ISO published the first quality standard, which at that time had a strong influence from the military standards. Later the ISO Standard 9000: 2000 was created in a very different way – it stated that effective process management is based on the process implementation measurement. The newest ISO quality management system standard ISO 9001: 2015 was published on 23 September 2015. The new standard put greater emphasis on the performance. To achieve it, the new standard combines process approach with the risk assessment approach, as well as Plan-Do-Check-Act cycle at all levels in the organisation. By analysing mentioned standards, it can be concluded that the main differences between the new ISO standards are: there is added new or improved existing definition of a term and changed the sequence of the standards' chapters; however, all the ISO 9001 standards structure is generally the same, ensuring a uniformed implementation of standards and a smooth transition.

Standard ISO 9001, as one of the quality management system's implementation and maintenance requirements, sets the need of informing the interested parties. Furthermore, to ensure the quality of the entity's products and services all employees must be engaged.

Standard ISO 9001: 2015 Section 4 states a separate requirement: the company must determine the stakeholders, which may affect activities of the company. Stakeholders can be, for example, clients, shareholders, suppliers,

business partners, as well as legal and regulatory authorities (ISO 9001:2015-..., 2015).

Communication with stakeholders is one of the external relation department's main tasks; therefore, a company, which implements a quality management system, which is in accordance with the standard ISO 9001, has a defined task – to ensure the effective external communication and to use the information obtained so that the needs of both parties (customers, suppliers etc.) and the company's own needs would be satisfied.

In the context of the standard ISO 9001 process approach, during the first (source of inputs phase) and final stage (receivers of outputs phase) external communication is particularly important.

The impact of the internal communication on the external relations can be explained as follows: if the employees have better understanding of the business activity, aims and strategy of the entity, they can convey more precise and accurate information to the clients and stakeholders.

There is no one unified definition for the term "external relations". It has been described in many ways. In fact, for the term "external" as synonyms are being used such terms as "public", "social", "international" etc.

Whereas for the term "relation" such synonyms as "communication", "affair" (for example, "foreign affair") etc. are being used. Therefore, in several studies and articles instead of using the term "external relations", other terms such as "public relations", "international relations", "foreign affair" etc. are used. The external environment of any organisation is becoming increasingly complicated and dynamic – interest groups are becoming increasingly active, the society itself – more demanding and critical, so external relations become mandatory requirement for each and all staff members (Bariss V., 2009). Overall, it can be concluded that **external relations** is a communication

between entities, organisations or institutions, during which the information about the company, its most important objectives, activities, products and services are exchanged. In the Latvia's Registry of the Professions, it is stated that the external relations employee must have knowledge not only about the external relations' processes, but also about the quality management systems.

Active external relations departments' establishment started when Latvia joined the EU. Latvian companies and organisations put more attention to external relations, because it is a way to attract new customers, partners and investors, which in turn means that companies and entities have more opportunities for strengthening and development of their activities in the international market.

JSC "LVM" has a direct role in the sustainable development of Latvia framework as this framework sets objectives of preventing forest cover, thus contributing to the reduction of the land utilised for agriculture and not utilised for any other economic activity; afforestation; promoting the development of the forestry model, as well as conveying the information to the public and forest owners and by organising events about the sustainable forest management (Par Meza un..., 2015). In 2010, JSC "LVM" implemented a quality management system in accordance with the ISO 9001:2008 standard. In order to be able to ensure the smooth and continuous demand and sales of Latvia's main export goods, JSC "LVM" implemented the quality management system in accordance with the IO 9001:2009 standard. JSC "LVM" is the first entity that has implemented a quality management system, which is in accordance with the ISO 9001 standard, in the sector: sapling and arboretum.

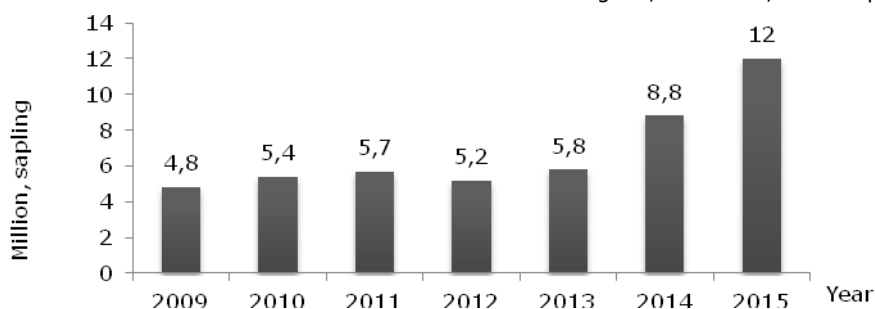
As the 70.1. sub clause of Latvia's Government Action Plan states: "To confirm the

ground rules for the amount determination of the wood cut, by ensuring JSC "LVM" a lead role in wood-pulp resource accessibility and the development of the competitiveness of the sector" (Par meza un..., 2015) and, accordingly, also in "Forestry and related sector's development ground rules for 2015.-2020" it is stated that the JSC "LVM" has a significant role in the management of Latvia's forestry, which requires ensuring and development of both quality and external relations. Despite the overall drop in Latvia's export in 2016, wood, wood materials and the sapling export continue to steadily increase. Compliance with regulatory framework offers the entity an opportunity to push their products and services on the international market, thus increasing JSC "LVM" competitiveness and the importance of the external relations in entity's business activities and development.

The implementation of the quality management system, which complies with the ISO 9001 standard is an event which binds stakeholders' attention, as well as improves the competitiveness of the company.

This may, in turn, affect the export and the work lead of the external relation department. The indicators of the research are as follows:

- changes in the volume of export of "Sapling production and sales" in relation to total exports of JSC "LVM" since the implementation of ISO 9001 standard in 2010;
- increase in the external communication activities (publications and the increase in the number of public events) since the ISO 9001 standard implementation in 2010.
- Figure 1 plots the data of the changes in the sapling amount since the implementation of the ISO 9001 standard (AS "Latvijas valsts ...", 2015).



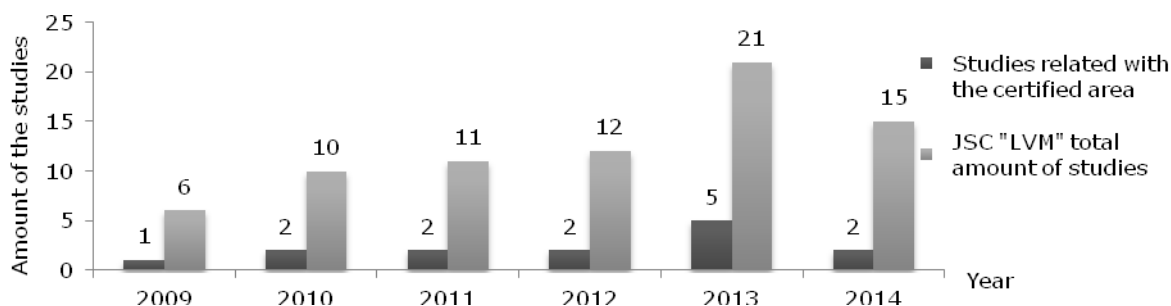
Source: author's calculations based on the results of the research, 2016

Fig. 1. Volume of the JSC "LVM" sold saplings in the foreign markets

The only decrease in the export was in 2012. It is due to the significant amount of the saplings planted in the Latvia's forests alone (33.6 million of saplings), furthermore JSC "LVM" sold part of the saplings to the local private forestry farms. Therefore, the amount of the exported saplings decreased. However, in 2013, export amount has increased and continues to increase.

In the Figure 2, it is shown that after the implementation of the ISO 9001 standard there has been a stable research amount made in the certified area.

The highest amount of the research made in the certified area was in 2013. It is due to the JSC "LVM" strategy, which sets the required amount of the studies and areas to be researched, as well as the increase is due to the repeated certification for the ISO 9001 standard. One of the requirements of the standard is entity to ensure continuous improvement and information flow to the public about the scope of the activities carried out and certified, and such studies are ensuring the execution of both two factors.



Source: author's calculations based on the results of the research, 2016

Fig. 2. The amount of studies conducted in the certified area in comparison with the total amount of the studies made by JSC "LVM"

The increase in the publications is due to the increase in the amount of the social activities, projects and campaigns organized by the entity. For example, campaign "Skabeklis" ("Oxygen"), which was organized in cooperation with "SEB bank" and for the first time conducted in 2010 – the same time as JSC "LVM" implemented the quality management system, which is in accordance with the ISO 9001 standard.

The aim of this particular campaign was to make Latvia most environmentally friendly country in Europe.

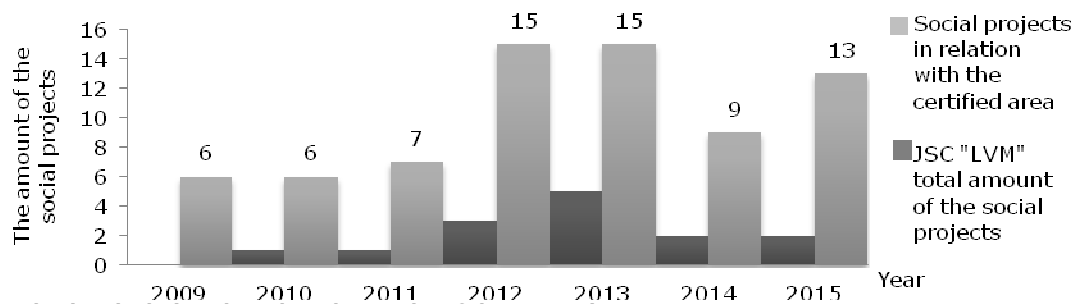
The changes in the amount of the social projects and activities conducted by JSC "LVM"

since the implementation of the quality management system, which is in accordance with the ISO 9001 standard, is shown in the Figure 3.

When comparing total amount of the social projects and events with the total amount of the publications related with areas certified in accordance with the ISO 9001 standard, the conclusion can be made: *the more entity held public activities (indirect media attraction genre: campaigns, projects, events etc.), the greater was the volume of publications.* In 2012, JSC "LVM" had the highest amount of the social activities held as it has ever had in the certified area. Accordingly, in 2012 there was also one of

the largest publication amounts. This relationship is explained by the fact that the media has a great interest in the events organized by

companies, especially by public limited liability companies.



Source: author's calculations based on the results of the research, 2016

Fig. 3. The ratio of the amount of the social projects related with the certified sapling production and sales area and the total amount of the social projects conducted by JSC "LVM"

To get more detailed information about the company's JSC "LVM" quality system and external communication process, the qualitative research approach was applied using sociological research method – semi-structured interview with the Arboretum manager and Communications Department manager.

Interviewed managers evaluated the implemented quality management system in a positive way: *"Overall, in my opinion, it pays off. The benefits of the implementation are greater than the resources we had to invest to establish and maintain it."*

Since the implementation of the quality management system, **there are changes in the external communication**: *"..if we had not gone through the process of the certification, we could afford to miss something once in a while, but now we just cannot do that. It pushes us to collaborate with the customers in a more detailed way. It is good for both the entity and the customer. By settling the system, it has made easier for us to work. It is like a trump for us."*

After the implementation of the ISO 9001, **an increase in interest shown from foreign and domestic companies, institutions, organisations** has been noticed. The evidence supporting this fact is not only the increase in the export, but also **the increase in newspaper publications** about both JSC "LVM" and its certified sector.

Feedback is provided by using the methods of measuring **customers' satisfaction**: the collection and analysis if the customer provides suggestions and comments (feedback). In addition, JSC "LVM" uses customer satisfaction survey at the customer service points where the process of the customer survey completion can be monitored, thus, ensuring not only the feedback process, but also the customer service process.

International customer information and attraction is performed mainly at the international fairs and exhibitions in Sweden and Germany (indirect media attraction genre), as well as organising customer visits and through mutual cooperation measures with Scandinavian companies. It is essential for the entity to participate in the international exhibition "SkogsElmia" as the main market for the forest sapling is the Southern-Sweden. This is where the communication department has a great role: *"..everything happens with their help. In the end – we are not representing only our sector, but all JSC "LVM"."*

It is the task of the communication department of the JSC "LVM" about the offered products and services, as well as the level of quality: *"To ensure the external communication, many tasks have to be done, for example, the collection and submission of the information on all the relevant and significant issues, actualities and issues important to the target audience, as*

well as the cooperation with the media, press release writing and web site maintenance etc."

Communication department in the relation with the ISO 9001 certified area deals with both indirect media attraction genre (participation in fairs, organising public projects, for example, campaign "Oxygen", which is one of the largest campaigns in the country in relation with forest planting etc.), and direct media attraction genre (press release preparation and submission).

The task of the JSC "LVM" communication department employees is not only to provide information about the enterprise as a whole and its activities, but also to be informed of the quality management system (this requirement is set out in the Registry of occupations), as well as to inform the public of the quality management system in the entity. The quality management system affects the company's external communication process, because all of the employees of the company are responsible for quality, moreover several of the quality management system requirements are also

External Relations employees' everyday tasks (e.g. providing feedback).

Structured interviews revealed that the spectrum of external relations work after the implementation of the ISO 9001 standard has a wide range and is related to the communication with the technology manufacturers and suppliers, direct contact with customers, direct media attraction methods, feedback and indirect media attraction genres: campaigns, projects, activities.

The implementation of the ISO 9001 standard according to quality management system and the work process of the external relations department together improve both the cooperation and communication with foreign clients: *"...in recent years, and even this year already the interest from customers is little more than what we can provide ... amount wise."*

Based on the analysis of the documents and the information obtained through the interviews, the weak and strong areas of the external relations after the ISO 9001 implementation have been summarized in SWOT analysis (Table 1).

Table 1

SWOT analysis: JSC "LVM" external relation after the implementation of the quality management system, which is in accordance with the ISO 9001 standard

Strengths	Weaknesses
<ul style="list-style-type: none"> • The expansion of the information when participating in international exhibitions and thereafter; • Interaction efficiency with customers; • Provided informative materials on certified areas in several languages; • The use of new external relations methods; • Standard's ISO 9001 certificate creates more reliance from foreign partners, customers etc. and increases the effectiveness of the communication; • Increase in the amount of research and publications made to raise the awareness in society about the certified sphere and to attract new customers. 	<ul style="list-style-type: none"> • There is no separate external communications' department; • The increase in the workload for the Communications Department employees, since they are responsible for both internal and external communication; • The size and ratio between the certified area and the overall JSC "LVM" business magnitude.
Opportunities	Threats
<ul style="list-style-type: none"> • European Union aid for afforestation, forest restoration, land afforestation and the activities associated with it (for example, support to increase the effectiveness of the process by implementing the quality management system); • New media monitoring systems (for example, "Station", "MediANA" etc.). 	<ul style="list-style-type: none"> • Media Information interpretation; • The instability of the amount of cut forests in private forest farms; • The increasing number of competitors on the international market; • Climate change and its impact on the growth of plants.

Source: author's created SWOT analysis based on the results of the research, 2016.

JSC "LVM" for their main external relation channels and instruments uses JSC "LVM" web site, press release, communication via e-mails, direct communication, by organizing client visits and by participating in the exhibitions. The

threats that have intensified after the implementation of a standard ISO 9001 in this area are – the interpretation of information about the certified area from media.

The benefits of external relations and quality management system implementation may be different – improving company's image; the communication with stakeholders, employees can develop better understanding of their own and others' obligations, the company's objectives and, as a result, may lead to an increase in demand, profit or export. Research on JSC "LVM" has proven it.

Conclusions, proposals, recommendations

- 1) The most significant changes in external relations, which have occurred after the implementation of the standard ISO 9001 and quality management system, are the increase of external communications' activities (publication, research, public activities, informative materials etc.), improvement of communication with customers, increased demand and respectively revenue growth.
- 2) The implementation of the quality management system according to the standard ISO 9001, has also affected the company's external communication process – external relations' department informs the public of its activities and certification processes, carries out media monitoring, publishing studies etc.
- 3) There is an interaction between external relation and quality management system, because:

- the employee who is responsible for external relations, in accordance with the nomenclature of the occupation registry, also needs knowledge of the quality management system;
 - one of the core requirements of the quality management system, which is in accordance with the ISO 9001 standard, is the necessity to provide the external communication – communication with clients and stakeholders;
 - external communication process is of particular significance to the quality management system approach in the first and last phase of the process, because in these stages the information obtained indicates about the customer expectations, as well as determines the further action and development areas.
- 4) Quality management system implementation allows companies and organizations to create new external communication forms.
 - 5) Implementation of the ISO 9001 standard corresponding to quality management system has affected the external relations of JSC "LVM" – it has improved communication with stakeholders on JSC "LVM" Certified sphere, increased the number of publications, as well as attracted new customers, cooperation partners and it has also increased the sapling export.

Bibliography

1. AS "Latvijas valsts meži" darbības pārskats par 2015. gadu (JSC "Latvia's State Forests" Financial Statement of 2015). (2015). Retrieved: http://www.lvm.lv/images/lvm/Par_mums/Skaitli_un_finanses/Gads_rezultats.pdf. Access: 06.04.2016.
2. Bariss V. (2009). Publiska administracija (Public Administration). Jelgava: LLU. p. 111.
3. *Desmit vertigskie Latvijas uzņēmumi (Ten Most Valuable Latvian Companies)*. (2015). Retrieved: <http://www.db.lv/foto-video/foto/desmit-vertigakie-latvijas-uznemumi-439583>. Access: 23.01.2016.
4. *Evolution of ISO 9001 certificates in Latvia*. (2015). Retrieved: [http://www.iso.org/iso/home/standards/certification/iso-survey.htm?certificate=ISO %209001&countrycode=LV#countrypick](http://www.iso.org/iso/home/standards/certification/iso-survey.htm?certificate=ISO%209001&countrycode=LV#countrypick). Access: 22.01.2016.
5. Forands I. (2000). *Stratēģija. Kvalitāte (Strategy. Quality)*. Rīga: Latvijas Izglītības fonds. p. 253.
6. *ISO 9001:2000 prasību skaidrojums (Interpretation of ISO 9001:2000 requirements)* (2003).: rokasgrāmatu sērija. Zygon Baltic Consulting; red. L. Liepa. Rīga: BIZNESA Partneri. p. 173.
7. *ISO 9000 – Quality management* (2015). Retrieved: http://www.iso.org/iso/home/standards/managementstandards/iso_9000.htm. Access: 04.03.2016.
8. *ISO 9001:2015 – Clause 4: context of the organisation* (2015). Retrieved: <http://www.imsi.com/gb/iso-9001-revision/iso-90012015-clause-4/>. Access: 01.04.2016.

9. *Joseph M Juran: Quality Management Thinker*. Retrieved: <https://mbsportal.bl.uk/taster/subjareas/busmanhist/mgmtthinkers/juran.aspx>. Access: 23.01.2016.
10. Kotlers F. (2007). *Kvalitate (Quality) Of: Kotlers F. Marketings no A līdz Z (Marketing from A to Z)*. Rīga: Apgads "Jumava", pp. 162-164.
11. *Lursoft statistika (The Statistics of Lursoft)*. (2016). Retrieved: https://www.lursoft.lv/lursoft_statistika/?&id=365. Access: 02.03.2016.
12. *Par Meža un saistīto nozaru attīstības pamatnostādēm 2015.-2020. gadam* (Forestry and Related Sector's Development Ground Rules for 2015.-2020.). (2015).: MK 2015. gada 5. oktobra rīkojums Nr.611 (Regulations No 611 issued by the Cabinet on 5th October 2015). Retrieved: <http://m.likumi.lv/doc.php?id=276929>. Access: 04.04.2016.
13. Praude V. (2011) *Marketings. Teorija un prakse: 1. grāmata (Marketing. Theory and Practice: volume 1)*, 3. izd. Rīga: Burtene. p. 521.
14. *What is a Quality Management System?* (2016). Retrieved: <http://the9000store.com/what-is-iso-9001-quality-management-system.aspx>. Access: 04.03.2016.

BARRIERS TO THE DEVELOPMENT OF POLISH SME IN THE LIGHT OF THE RESEARCH RESULTS ON INNOVATIVENESS OF THE ECONOMY AND COMPANIES

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Abstract. Innovations and the ability to create and introduce them are recognized in the modern economy as the driving forces of development in micro-, mezzo- and macro scale. This means that the innovative abilities of small and medium-sized companies in Poland determine their development, as well as competitiveness. The hitherto studies on the innovativeness of Polish economy and its SMEs indicate that for many years, only a small part of them use innovation as a measure for development. This is the result of many barriers present in both Polish economy and within these companies. They are diverse in nature. External companies' innovativeness limits include economic, social, political, legal, cultural, technological, capital and market aspects. The internal determinants of this phenomenon include available resources, effective systems of communication, innovation-oriented organizational culture and leadership, the quality of human capital and creativity, as well as the structural determinants and sociological and psychological factors. All these areas may make up for the company development barriers or opportunities. The aim of the article is to present barriers to the SMEs development in Poland in the context of their innovativeness barriers. Using data from the reports of the European Commission, Innovation Union Scoreboard, Community Innovation Survey and the papers by Polish Agency of Entrepreneurship Development and the Main Statistical Office, the author has identified the cause of low innovativeness of Polish SMEs. This diagnosis makes easier taking by the state and enterprises appropriate measures to reduce those barriers.

Key words: SME, innovation, company development, barriers.

JEL code: O31

Introduction

In the twenty-first century, innovations are considered the major factor for the development of a company. In the turbulent economy, subjected to cyclical fluctuations and surviving dynamic market changes, the ability to implement system innovations determines the success of the company and its development and competitive advantage. This rule applies not only to companies in developed states (the innovation leaders) and high technology sectors. The companies from states with low levels of innovation (e.g. Poland) - in all sectors (of high, medium and low technology) must also cope with this challenge. The innovation as a factor of development is used by all business entities, regardless of their size and branch. In the modern economy, the companies that know how to mobilize the knowledge, technology, human resources, financial resources, experience and cooperation to develop, implement and disseminate new solutions (Tidd Bessant, 2011) can cope best. The innovative activity of the company may be the result of generating innovation within the internal actions (the use of

their own R&D potential and creativity of employees), obtaining new solutions from external sources (from other companies, universities, research institutes) or through cooperation with various stakeholders of innovative processes. The use of innovation for companies' development and success is hindered by innovation barriers (Coad et al., 2014). They are formed by external and internal factors. External conditions for innovative companies include economic, social, political, legal, cultural, technological, capital and market factors. The internal determinants of this phenomenon include available resources, effective system of communication, innovation-oriented organizational culture and leadership, the quality of human capital and creativity, as well as the structural determinants and sociological and psychological factors. These conditions are often especially strong barriers, in the case of small and medium-sized enterprises, in the States of low level of innovation, placed at the end of the Innovation Union Scoreboard ranking. These States include Poland and some other post-socialist States of Central and Eastern Europe.

The importance of innovation in the micro-, mezzo- and macro scale is growing, thus the innovation policy and the policy of supporting SMEs in this area become an important part of economic policy in many Member states. As Czerniak (2013) indicates, the innovation policy is to 'increase the capacity of enterprises, individual branches of industry and the entire economy to introduce innovations and to facilitate the dissemination and transfer of innovation' (p. 30). The recognition of the barriers to businesses development related to their innovative capabilities shall ensure an appropriate orientation of innovation policy towards small and medium-sized enterprises in Poland and other Member states belonging to the modest and moderate innovators.

Research results and discussion

The purpose of this paper is to present barriers to development of small and medium-sized enterprises under the impact of barriers to innovativeness. It was recognized that in today's economy, these barriers are a fundamental limitation of the SMEs development. For this purpose, studies have been undertaken on the level of innovation of the Polish economy in comparison to EU states, covering the years 2008 to 2016. The adopted scope of analysis allows us to evaluate innovation change trends in Poland after the integration with the EU. The basis for these analyses were reports of the European Commission's Innovation Union Scoreboard (by 2010, these reports had been called European Innovation Scoreboard). The study on the changes in the synthetic index of innovation - Summary Innovation Index (SII) and its sub-indices made it possible to find strengths and weaknesses of Polish innovation. Due to the construction of SII index, which includes indices related to the activities of SMEs in the field of innovation and the results of this activity, the involvement of Polish SMEs in innovative activity and its effects may be assessed on this basis. The study identified barriers to innovation, which

small and medium-sized companies still face in Poland. The analyses conducted revealed that the Member states included in the group of modest and moderate innovators from Central and Eastern Europe have similar weaknesses of innovation, which suggests their sharing of similar barriers to innovation as in Poland.

Additionally, to illustrate the innovativeness of these companies compared to other EU Member states, the analysis of Eurostat data from the Community Innovation Survey 2012 report made for the Polish Agency for Enterprise Development PAED (Zadura-Lichota ed., 2015) was used. Conclusions from these studies made it possible to identify the causes of long-term low innovativeness of small and medium-sized companies in Poland, reveal their similarities with other EU Member states and to indicate the directions of Polish innovation policy, which could reduce these limitations.

To prepare the paper, the following information resources were used: the domestic and foreign literature, Innovation Union Scoreboard 2016 (2016) report, dedicated to the innovation of the Community Member States and Eurostat data on various aspects of innovative European companies from various sectors of the economy (Community Innovation Survey 2012, 2012 processed by PAED analysts). The research methods used in the work include the study of literature and comparative analysis.

To assess the innovativeness of the EU Member States, the European Commission applies a specific methodology (Hollanders, Tarantola, 2011, Innovation Union Scoreboard 2016, 2016), which allows to calculate the synthetic Summary Innovation Index (SII). Its components are partial indices relating to three areas of innovation. They describe the environment necessary for the innovation to occur (the so-called driving forces), the innovative activity of small and medium-sized enterprises and the results of innovative activities in different dimensions. Categories of indices in 8

dimensions of innovation are assigned to the individual components of Innovation. All in all, this makes up a set of 25 indices, which show the details of each State innovativeness. Three dimensions of innovation are described by the following topics: innovation driving forces (8 indices), enterprises' innovative activity (9 indices) and effects of innovation activity (8 indices).

The SII complex innovation index, which was created, allows dividing EU Member states into 4 groups: 'innovation leaders', 'strong innovators', 'moderate innovators' and 'modest innovators'. Given the recent study of innovation for 2016, the individual groups of states include (SII value in brackets):

- 1) innovation leaders - Sweden (0.704), Denmark (0.700), Finland (0.649), Germany (0.632) and Netherlands (0.631);
- 2) strong innovators - Ireland (0.609), Belgium (0.602), the United Kingdom (0.602), Luxembourg (0.598), Austria (0.591), France (0.568);
- 3) moderate innovators - Slovenia (0.485), Cyprus (0.451), Estonia (0.448), Malta (0.437), the Czech Republic (0.434), Italy (0.432), Portugal (0.419), Greece (0.364), Spain (0.361), Hungary (0.355), Slovakia (0.355), Poland (0.292), Lithuania (0.282), Latvia (0.281), Croatia (0.280);
- 4) modest innovators - Bulgaria (0.242), Romania (0.180).

Changes in this index for the Union and its individual Member States between the years 2008 and 2015 are presented in Table 1. The data come from the Innovation Union Scoreboard 2016 (2016).

The data in Table 1 show that Poland was classified between 2008 and 2015 in the group of 'moderate'. Every time, it occupied the lowest positions in the EU States ranking of innovation, whose number between 2008 and 2015 was changed from 25 to 28 members (e.g. in 2009, it had 23rd place amongst 27 states, and in 2015, it

was also on 23rd place amongst the 28 EU States). A comparison between the SII national summary values of innovation indices with the SII average for the EU or with SII indices for individual States allows finding out the distance that separates the Member state studied from the other members of the group.

The latest report of the European Commission's Innovation Union Scoreboard 2016 (2016) shows that in 2015, Poland reached 56.04 % of the average SII rate for the EU Member States. This allowed Poland to keep up its place among moderate innovators. In this group, the states, reaching between 50 % and 90 % of the average rate for the entire EU can be found). In 2008, this ratio was 58.19 % and in 2014, only 55.64 %. The recent 2015 score (56.04 %) may indicate a return to a growth trend. Changes in this ratio suggest that in the period under study, Poland slowly reduced not only the gap to leaders in innovation, but even to other Member states, belonging to the moderate innovators with favorable relations of their summary innovation index to its EU average. Amongst them, there are most of the Member states which entered the European Union together with Poland between 2004 and 2007 (excluding Romania, Bulgaria, Latvia and in some years Lithuania). This is also indicated by SII indices higher compared to Poland between 2008 and 2015 in such Member states as Slovenia, Estonia, the Czech Republic, Cyprus, Malta, Hungary, Slovakia and sometimes Lithuania.

At the accession, six Member states from this group, along with Poland belonged to the same post-communist block, and yet, in the period under study, they had better results than our country in terms of innovation. Despite the passage of years, this status has not improved. Poland has not been able to catch up with the technological gap even in relation to certain Member states of Central and Eastern Europe. This is evidenced by the growth rates of the summary innovation index, which in the case of

Poland in the years between 2008 and 2015 were always much lower than in other Member states, which together with Poland joined the European Union, even those at the end of innovation ranking (Table 1).

To understand the reasons for low innovativeness of Polish economy (and consequently its small and medium-sized enterprises), it was needed to analyse partial innovation indices in three areas: driving forces, innovation, entrepreneurship and innovation effects in the economy. This was carried out for 2015. That year data are similar to the values in earlier years, although they have improved. They also confirm the occurrence of the same restrictions of innovation in our economy in this period. The 2015 values of partial indices of innovation in Poland and other EU Member States are shown in Table 2.

An analysis of the recent report and the previous one of the European Commission on the innovation of the EU Members (Innovation Union Scoreboard 2016, 2016), gives the right to conclude that very good innovation indices of the innovation leaders are caused by the impact of some interrelated factors. They determine the success in innovation designing and introducing and in using it for the needs of enterprises and the economy. These include: efficient, open and effective research systems, well developed university education, perfectly developed entrepreneurial innovation (adequately supported in the framework of innovation policy) and the occurrence of well organized, multilateral links in the innovation process, resulting not only between businesses but also between businesses and institutions of science and research sector and in the area of science and research. The

world of science is closely linked with the world economy, not only by providing well qualified staff for the economy, but also by participating in the creation, transfer and diffusion of innovation. This is confirmed by the data on the innovation leaders, which describe the indices related to individual components of innovation in Table 2. If an analysis of partial indices of EU Member States innovation for each of the years from 2008 to 2015 were carried out, such a regularity would be noted. The European Commission experts indicate that the factors listed above should be considered the strengths of 'innovation leaders' and the rising rates in these areas of other 'strong innovators' States show the direction for the improvement of SII.

What constitutes a strength of innovation leaders and their followers turns out to be weaknesses of Poland and other Member States at the end of the innovation ranking. These include the 'old' and 'new' EU Member States, both post-communist states and those which have always had the capitalist system.

However, the weakest innovation performance measured by SII and partial indices have been noted in the period under study by the former Eastern block states such as Romania, Bulgaria, Latvia, Lithuania, Croatia, Poland, Slovakia, and Hungary. Only three post-communist states - Slovenia, Estonia, and the Czech Republic - had much better results. Slovenia was classified as a representative of the 'moderate innovators' (in 2014 - 'innovation followers'), and the two other states have achieved innovation results close to the EU-average that approximated them to the group of 'strong innovators' (although they belonged to the 'moderate innovators').

SII of the European Union and its Member States in 2008-2015

No	States	2008	2009	2010	2011	2012	2013	2014	2015	Growth rate (%)
1.	EU28	0.495	0.502	0.511	0.514	0.519	0.521	0.523	0.521	0.74
2.	Belgium	0.564	0.576	0.578	0.588	0.592	0.596	0.607	0.602	0.93
3.	Bulgaria	0.219	0.209	0.230	0.238	0.240	0.210	0.238	0.242	1.40
4.	Czech Republic	0.413	0.412	0.422	0.440	0.442	0.421	0.433	0.434	0.71
5.	Denmark	0.624	0.630	0.639	0.678	0.694	0.693	0.675	0.700	1.67
6.	Germany	0.624	0.636	0.654	0.655	0.667	0.661	0.655	0.632	0.16
7.	Estonia	0.416	0.441	0.469	0.468	0.505	0.490	0.479	0.448	1.06
8.	Ireland	0.584	0.596	0.617	0.619	0.627	0.601	0.607	0.609	0.58
9.	Greece	0.370	0.364	0.368	0.371	0.375	0.386	0.399	0.364	-0.21
10.	Spain	0.381	0.386	0.389	0.386	0.388	0.394	0.387	0.361	-0.76
11.	France	0.539	0.550	0.560	0.562	0.566	0.560	0.556	0.568	0.76
12.	Croatia	0.299	0.293	0.291	0.302	0.304	0.298	0.292	0.280	-0.92
13.	Italy	0.389	0.400	0.407	0.418	0.416	0.425	0.434	0.432	1.53
14.	Cyprus	0.470	0.474	0.476	0.488	0.491	0.480	0.487	0.451	-0,57
15.	Latvia	0.214	0.217	0.224	0.234	0.247	0.215	0.233	0.281	3.99
16.	Lithuania	0.239	0.238	0.252	0.256	0.268	0.275	0.288	0.282	2.39
17.	Luxembourg	0.632	0.646	0.632	0.619	0.623	0.646	0.626	0.598	-0.79
18.	Hungary	0.345	0.343	0.354	0.358	0.363	0.355	0.364	0.355	0.39
19.	Malta	0.342	0.354	0.351	0.326	0.334	0.379	0.371	0.437	3.57
20.	Netherlands	0.549	0.563	0.573	0.580	0.586	0.631	0.639	0.631	2.03
21.	Austria	0.585	0.598	0.608	0.577	0.581	0.604	0.599	0.591	0.21
22.	Poland	0.290	0.298	0.299	0.291	0.296	0.286	0.291	0.292	0.10
23.	Portugal	0.393	0.403	0.401	0.404	0.405	0.401	0.418	0.419	0.90
24.	Romania	0.246	0.255	0.264	0.263	0.261	0.228	0.223	0.180	-4.38
25.	Slovenia	0.446	0.453	0.464	0.479	0.491	0.476	0.498	0.485	1.18
25.	Slovakia	0.318	0.329	0.338	0.325	0.313	0.346	0.354	0.350	1.39
27.	Finland	0.663	0.668	0.671	0.651	0.651	0.642	0.658	0.649	-0.290
28.	Sweden	0.697	0.709	0.718	0.714	0.717	0.722	0.719	0.704	0.14
29.	United Kingdom	0.525	0.529	0.542	0.560	0.566	0.569	0.580	0.602	1.98

Source: author's developed Table based on: *Innovation Union Scoreboard 2016, European Commission, 2016*, http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_pl (access: 10.01.2017).

Component indices of innovation groups of EU Member States in 2015

No	Country/ies	Innovation driving force			Entrepreneurs activity			Result of innovative activity	
		Human resources	Research system	Finance and support	Firms investments	Linkages & Entrepreneurship	Intellectual assets	Innovators	Economics effects
1.	EU28	0.575	0.466	0.490	0.426	0.473	0.556	0.526	0.573
		Innovation leaders							
2.	Sweden	0.831	0.814	0.710	0.619	0.689	0.728	0.640	0.622
3.	Danmark	0.703	0.765	0.654	0.459	0.767	0.789	0.624	0.709
4.	Finland	0.783	0.625	0.765	0.500	0.676	0.716	0.595	0.561
5.	Netherlands	0.653	0.774	0.663	0.237	0.727	0.624	0.542	0.681
		Strong innovators							
6.	Ireland	0.816	0.582	0.363	0.300	0.593	0.426	0.773	0.777
7.	Belgium	0.622	0.768	0.502	0.492	0.814	0.487	0.565	0.561
8.	United Kingdom	0.786	0.795	0.506	0.270	0.591	0.502	0.519	0.681
9.	Luksembourg	0.431	0.771	0.372	0.136	0.544	0.720	0.704	0.742
10.	Austria	0.650	0.561	0.538	0.517	0.629	0.707	0.647	0.475
11.	France	0.657	0.678	0.566	0.363	0.505	0.488	0.663	0.578
		Moderate innovators							
12.	Slovenia	0.829	0.386	0.241	0.472	0.576	0.484	0.420	0.424
13.	Cyprus	0.662	0.392	0.278	0.153	0.454	0.403	0.621	0.485
14.	Estonia	0.554	0.340	0.727	0.555	0.456	0.426	0.422	0.323
15.	Malta	0.274	0.258	0.100	0.423	0.276	0.645	0.624	0.602
16.	Czech Republic	0.561	0.300	0.446	0.404	0.422	0.336	0.473	0.505
17.	Italy	0.407	0.398	0.279	0.277	0.418	0.505	0.577	0.456
18.	Portugal	0.591	0.453	0.471	0.260	0.378	0.385	0.513	0.332
19.	Greece	0.562	0.408	0.224	0.281	0.412	0.243	0.471	0.322
20.	Spain	0.448	0.413	0.357	0.185	0.236	0.437	0.250	0.432
21.	Hungary	0.462	0.218	0.272	0.367	0.206	0.281	0.319	0.570
22.	Slovakia	0.642	0.166	0.255	0.267	0.209	0.239	0.415	0.490
23.	Poland	0.556	0.125	0.274	0.361	0.094	0.391	0.210	0.310
24.	Lithuania	0.726	0.134	0.538	0.352	0.167	0.256	0.109	0.168
25.	Latvia	0.534	0.168	0.424	0.426	0.105	0.326	0.113	0.255
25.	Croatia	0.606	0.160	0.287	0.324	0.271	0.218	0.190	0.247
		Modest innovators							
27.	Bulgaria	0.498	0.087	0.104	0.212	0.071	0.500	0.186	0.176
28.	Romania	0.392	0.111	0.070	0.084	0.045	0.149	0.193	0.273

Source: author's developed Table based on: Innovation Union Scoreboard 2016, European Commission, 2016, http://ec.europa.eu/growth/industry/innovation/facts-figures/scoreboards_pl (access: 10.01.2017).

In the case of Poland, this could be assessed by analysing partial indices of such innovation components in which Poland performs below the EU States average:

- research systems – a small number of joint international scientific papers, a small number of scientific papers being cited, a very insignificant share of foreign doctoral students

from outside the European Union. This proves a small internationalization of Polish scientific community, the occurrence of very few open research systems which are not very effective;

- funding and support - public sector spending on research and development lower than the EU average along with little involvement of venture capital investments in innovation. It proves a poorly developed system of innovation processes capital support and a reduced funds availability for businesses from non-bank sources to spend on innovation, accepting high-risk coming from innovation;
- business investments into innovation - low spending on research and development incurred by enterprises, which reveals improper innovation financing structure in Poland (public sector spending thereon is greater than the private sector);
- very poor and undeveloped links of SMEs in the innovation processes indicated by: a low rate of internal innovation, low level of small and medium-sized innovative companies, cooperating while creating innovation and a very low rate of papers drawn up jointly by representatives of public and private sectors (the sectors of science and the economy);
- rights obtained to intellectual property - very low rates, relating to the number of patent applications, particularly patent applications in the field of social changes (challenges), and of any EU trademarks held. These poor results indicate that enterprises innovation activities undertaken in too small extent give insignificant effects in the form of inventions and trademarks that companies try to protect;
- small percentage of SMEs' innovative companies - indices that lay down the share of small and medium-sized companies, introducing product and process innovations, as well as implementing marketing and / or organizational innovation show that;
- unsatisfactory economic performance of innovative activity in the country; they are

expressed first of all by such indices as revenues from licenses and patents sold abroad, sales of new solutions for the market and for companies, the volume of exports related to knowledge-based services.

The above-mentioned poor areas of innovation related to the functioning of both the public and private sectors in the innovation processes indicate the occurrence of strong barriers to the innovation in small and medium-sized enterprises in Poland, which will be described in details further below.

To support the above considerations on the low innovativeness of Polish economy (in particular SMEs) and its reasons, the data developed by Polish Agency for Enterprise Development, dedicated to the innovative activities of domestic companies against the achievements of other EU Member States (Zadura-Lichota, 2015, pp. 11- 46) were used. In this study, the Eurostat data from an international statistical research programme of innovation, Community Innovation Survey 2012, are cited and analysed (held in all European Union Member States periodically, once every three years - the last one covered the years from 2010 to 2012).

The enterprises' involvement in innovation activities can be assessed on the basis of the share of companies carrying out such activity amongst the total number of enterprises. Between 2010 and 2012, this rate was highest in Germany (66.9 %), Luxembourg (66.1 %), Ireland (58.7 %), Italy (56.1 %), Sweden (55.9 %) and Belgium (55.6 %). At the other end of the ranking, leaders in innovation were such Member States as Romania (20.7 %), Poland (23.0 %), Bulgaria (27.4 %), Latvia (30.4 %), Hungary (32.5 %), Lithuania (34.5 %) with the lowest shares of companies, leading innovative activities. This index shows a significant gap between Poland and the most developed Member States, but even other post-communist countries. Besides the above-mentioned, Member States

from the former Eastern block, Slovakia (34 %), Croatia (37.9 %), Czech Republic (43.9 %), Slovenia (46.5 %) and Estonia (47.6 %) had also a higher percentage of innovative companies than Poland.

Polish achievements in this area can be compared with the Member States that have similar levels of economic development by setting out the relationship of GDP per capita, calculated according to the purchasing power parity and expressed in a common notional currency PPS (Purchasing Power Standard) and the share of enterprises engaged in innovation activities. In this case, Poland derogates strongly or very strongly from the achievements of other states in Central and Eastern Europe, with a similar or slightly lower level of economic development (Lithuania, Slovakia, the Czech Republic, Estonia etc.).

In Poland, in the group of medium-sized enterprises (with those employed, ranging from 50 to 249), only 35.8 % of companies undertook innovation activities, while the average index for the EU was 60.5 %. Besides Romania (26.6 % of innovative medium-sized companies), all EU Member States had higher rates compared to Poland. In the group of post-communist states, Estonia (64.3 %), Slovenia (62 %) and the Czech Republic (57.6 %) had the highest medium-sized enterprises activity in the innovation. Analysing the share of small businesses, engaged in innovation activities, it can be said that Poland obtained the worst result. Only 17.4 % of entities employing 10 to 49 people did show commitment to such activities. The average index for the whole Community in this group amounted to 45.2 %, but in the Member States belonging to the innovation leaders and the followers of the leaders, this percentage ranged between 40.5 % and 63.4 % (Zadura-Lichota, 2015, p. 15).

The data presented in the paper by PAED show a dramatically low share of small and medium-sized enterprises (dominant in the structure of the economy) that undertake

innovative activities. The analyses of other indices, i.e. the share of small and medium-sized enterprises, implementing technological innovation further confirm that the innovativeness of SMEs in Poland is very weak. Only 11 % of small and 12 % of medium-sized companies introduced a technological innovation (products and processes) between 2010 and 2012. For comparison in the same period: 51 % of small and 63 % of medium-sized German companies, and among the Member States of Central and Eastern Europe - 30 % of small and 49 % of medium-sized Czech companies did it (Zadura-Lichota, 2015, p. 17).

When analysing the total outlays per 1 company, running an innovative activity between 2010 and 2012, it can be seen that Poland had the 12th place (1 005 K Euros) amongst EU Member States, although, these values were shaped a bit differently, depending on the size of businesses. In the group of small companies, Poland had the 19th place (120 K Euros), in the group of medium-sized enterprises it had the 14th place (627 K Euro) and in the group of big companies 17th place (5 068 K Euros) (Zadura-Lichota, 2015, pp. 24-26).

At the same time, the situation of the Polish entities' external research and development was even worse (20th place among EU members) with 19 % share of this type of enterprises. This is caused by insufficient cooperation between companies engaged in innovation and research and development with various stakeholders (suppliers, customers, other businesses, government bodies, universities, research centres, consulting firms etc.). Between 2010 and 2012, only 19.6 % of small entities (showing innovation) cooperated in innovation, and in the case of medium-sized ones - 37.2 %. In consequence of insignificant innovation, the indices, describing the benefits of innovative and R&D activity (i.e the sales value of products new to the company or new to the market) are below the EU average (Zadura-Lichota, 2015,

pp. 26-31). One of the symptoms of this lack of cooperation in innovative activities with public authorities is a small percentage of companies, using public support for innovation. In 2012, 23.2 % of innovative companies benefited from this mechanism from various public sources. Only 4.6 % of entities did receive public support from local self-governments or local bodies of government administration, 8.4 % of companies from bodies of central government, 19.5 % of innovative enterprises availed themselves of EU funds, and 3.8 % of innovative entities used measures of the Framework Programme.

The Eurostat survey of Community Innovation Survey 2012 also revealed material obstacles to achieving the objectives of innovative firms indicated by European entrepreneurs. They might be associated with the failure to undertake any innovative activity, its introduction slowed or lack of results expected from this activity. Entrepreneurs from EU states invoked such causes as high costs of access to new markets, innovation by competitors, the dominant share in the competitive market, the lack of sufficient funds, lack of demand, strong price competition, lack of qualified staff, strong competition as to the quality of product, the opinion about them or their brand, high costs associated with adjustment to government and legal regulations. Polish entrepreneurs recognized as the most burdensome obstacle to achieving the objectives of innovation: strong price competition (48.6 % of respondents), strong competition in terms of product quality, opinions about them or their brand (26.1 % of respondents), lack of demand (23.5 %), high costs associated with government and legal regulations (19.5 %), lack of sufficient funds, financial resources (20.2 %), high costs of access to new markets (17.8 %), the dominant share in competitive market (17.3 %), innovation introduced by competitors (13 %) and lack of qualified personnel (9.7 %). This outcome is the resultant of the answers given by entrepreneurs, belonging to various size enterprises and there is

a reason to consider that if answers by representatives of SMEs were separated, the distribution of these results would have been somewhat different.

The study on the innovation of the Polish economy and its businesses helped to identify the weaknesses and difficulties in all areas of innovation, i.e. in terms of innovation driving forces, enterprise innovation activity and its effects for businesses and the economy. They affect to the biggest extent SMEs, holders of lesser economic potential, as many of their owners rarely show pro-innovation attitude, failing to bear in mind the fact that the former price competitive advantages are no longer sufficient in today's economy.

In contrast, other entrepreneurs in the sector who would like to use innovation to contribute to the growth and development of their companies face financial capital barriers, difficulties with access to new solutions offered by academic and research institutions (overestimated in the opinion of entrepreneurs). Then, there are cost barriers, arising from the fact that innovation processes require large expenditures. Due to the risk of failure related with research and development (R&D) or innovation tasks, these expenditures need not be returned or may bring a benefit smaller than intended. The distribution of costs and risks of innovation amongst a larger group of entities within the framework of cooperation during innovation processes would favour the reduction of such barriers. It would facilitate the access to sources of financing innovation, the knowledge, technology, or other missing individual SMEs resources. To establish cooperation during innovative and R&D activity, it would be necessary to change the mental outlook of Polish small and medium-sized enterprises, reluctant to cooperate with partners other than firms, that have little confidence in other participants of economic processes, in authorities and economic policy. It would be also necessary to change their market attitude to pro-

innovation, to reduce financial barriers and to increase the access to high risk capital.

The access to capital and resources for innovative and R&D activities is difficult due to the fact that outlays on these purposes are relatively low, and in consequence, the effects of these activities in the form of new patents, trademarks are modest. Only 23 % of all companies in Poland (17.4 % of small and 35.8 % of medium-sized enterprises) operate innovative business, and only a few of them protect their rights of ownership with the use of patents and trademarks (protection procedures and high costs thereof make up the barrier in this case). Benefits from sales of products and services new to market or new to company are recorded by few small and medium-sized enterprises. Undoubtedly, it has an impact on their growth and development.

Problems with innovation funding and reluctance of entrepreneurs in this sector to go into innovation activities (neglecting the importance of innovation for the growth and development of the company) result from the fact that the structure of innovation financing is distorted in Poland. The public sector expenditures still prevail, although the private sector share is increasing (companies spending on R&D has risen in relation to GDP) from 0.17 % in 2007 to 0.19 % in 2009 and to 0.38 % in 2013 (Nauka i technika w 2009 r., 2011, p. 85; Nauka i technika w 2015 r., 2016, p. 11).

Based on the research, it can also be noticed that the barriers to SMEs' innovation result from weakness, insufficient openness and low efficiency of Polish research systems. They are related to small internationalization of Polish science, little involvement of Polish scientists in international projects (performing tests on the need to implement solutions in industry or services), exchange of staff, knowledge and skills, limited capacity of Polish scientists to transfer knowledge and technology to our economy in order to commercialize new

solutions, limited technology offer appropriately adjusted to the needs of entrepreneurs in the SMEs sector, weak links between scientists and entrepreneurs because of stereotype partner perception by either party (Lacka 2011). In the opinion of entrepreneurs, bureaucratic barriers and the inability of scientists to act in the market (e.g. quick preparation of new solutions as commissioned by companies) do not incline to establish innovation cooperation.

Too modest, inadequately adjusted technological offer from scientists and too little supply of ready to apply new solutions within the framework of knowledge transfer and commercialization of new technologies in this sector constitute a barrier to SMEs' innovation when they do not undertake their own research and development. In consequence, the innovative potential of Polish SMEs is limited, and the potential use of technological and non-technological innovation for enterprise development is very limited.

Conclusions, proposals, recommendations

Comparative studies over Polish innovation at the background of other European Union Member States revealed large gaps in the level between Poland and developed Member States, but also to the Member States of the same, and sometimes a little lower development level (calculated on the basis of PPP). Poland has been improving its innovative indices, but it does it too slowly, not being able to catch up with the technological distance from other European Union States. This is confirmed by the country's place at the end of the annual innovation rankings.

The earlier support for innovative and R&D activity in the country in scope of the innovation policy brings positive results very slowly. Delayed undertaking of this action and the initial innovation policy errors, the neglect of the reform in science, too modest and targeted improperly entrepreneurship, functions and innovation of SMEs have resulted in the occurrence of many barriers to innovation in the Polish economy.

The study of the innovation of the Polish economy and its businesses allowed finding out barriers to creating, deployment and diffusion of SMEs innovation. They do not exhaust all the issues related to barriers to the development of

these entities in contemporary economy, but allow recognizing the weakness of Polish innovation system, which significantly reduces the innovative potential of SMEs, and in consequence weakens their development.

Bibliography

Books

1. Coad, A., Crowling, M., Nightingale, P., Pellegrino, G., Savona, M., Siepel, J., Ambler, T. (2014). *UK Innovation Survey. Innovative Firms and Growth*. London, Department of Business, Innovation & Skills.
2. Czerniak, J. (2013). *Polityka innowacyjna w Polsce. Analiza i proponowane kierunki zmian (Innovation policy in Poland. Analysis and proposed direction of change)*. Warszawa, Difin.
3. Hollanders, H., Tarantola, S. (2011). *Innovation Union Scoreboard 2010 – Methodology report, INNO Metrics 2011-2012 report*. Brussels, European Commission, DG Enterprise.
4. Lacka, I. (2011). *Współpraca technologiczna polskich instytucji naukowych i badawczych z przedsiębiorstwami jako czynnik wzrostu innowacyjności polskiej gospodarki (Technological cooperation of scientific and research institution with enterprises as a factor to increase the innovativeness of Polish economy)*. Szczecin, Wydawnictwo Uczelniane Zachodniopomorskiego Uniwersytetu Technologicznego w Szczecinie.
5. *Nauka i technika w 2009 r. (Science and technology in 2009) (2011)*. Warszawa, GUS.
6. *Nauka i technika w 2015 r. (Science and technology in 2015) (2016)*. Warszawa, GUS.
7. Tidd, J., Bessant, J. (2011). *Zarządzanie innowacjami (Managing innovation)*. Warszawa: Oficyna Wolters Kluwer business.
8. Zadura-Lichota, P. (2015). *Innowacyjna przedsiębiorczość w Polsce. Odkryty i ukryty potencjał polskiej innowacyjności (Innovative entrepreneurship in Poland. Outdoor and hidden potential of Polish innovation)*. Warszawa: PARP.

Internet sources

9. *Innovation Union Scoreboard 2016*. (2016). Brussels: European Commission. Retrieved: http://europa.eu/growth/industry/innovation/facts-figures/scoreboards_pl. Access: 10.01.2017.

INFORMATION COMMUNICATION TECHNOLOGIES AS ENABLER FOR RURAL DEVELOPMENT

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Abstract. Many researches show that there exist both – economic and digital divide among cities and rural areas that leads even to higher extent disadvantages of the population living in rural areas. A lot of research has been done in the field of Information Communication Technologies (ICT) as a tool to reduce / eliminate the differences among cities and rural areas. The goal of this paper is to show successful implementations of ICT solutions to enable rural area development. The paper is based on the extensive literature and case study review, a survey conducted among Small Business (SB) representatives in rural areas of Latvia, interviews with key stakeholders and author's own experience in working in ICT sector for 15 years. Results of the research done by the authors show that ICT can be very beneficial and powerful tool for facilitating development of rural areas, particularly in the sectors of e commerce, e health, e government services and the most important – (distant / remote) education, training, information and expertise exchange, experience sharing, communication and society engagement. Nevertheless, important are the lessons learned from the case studies what obstacles can be taken into consideration to avoid poor implementation of ICT projects and solutions that won't help to reach the desired goal.

Key words: ICT, rural areas, development, e commerce, e government.

JEL code: O1, O4

Introduction

From the numerous articles, papers, researches it is evident that there exists a huge gap of living standards among population living in cities and rural areas. The economic and digital divide leads rural population to much more disadvantaged situation than the ones living in urban areas. This is a global problem, slightly less evident in North America and Western Europe, very evident in the developing world, quite well evident in Latvia, too. These differences in living standards force the population to move to urban areas in search for opportunities of better lives.

The problem – lower living standards and less opportunities in rural areas, which leads to lower competitiveness and, therefore, willingness to leave the area for urban places becomes more significant.

The aim of this research is to look for the potential solutions to reduce the economic and digital divide among population in rural and urban areas.

The proposed hypothesis is that ICT can serve as enabler of reducing disadvantages of people living in rural areas.

Research is based on the extensive literature review, case studies, interviews with

stakeholders and a survey conducted among representatives of SB from rural areas as well author's own experience working in ICT sector for 15 years. Of course, not all well intended projects lead to success and fulfilment of the desired goals; therefore, research focuses as well on lessons learned from the case studies on what needs to be considered during the implementation of ICT projects / solutions in rural areas to enable their development.

Research provides recommendations for further activities.

Research results and discussion

Based on the literature review, it is evident that the whole world faces economic and digital divide among rural and urban areas (Firdhous M., Ghazali O., Hassan S., 2013; Hyongsoon K., Lee E., 2013; Quinn Br., 2010; Alibaygi A., Karamidehkordi M., Karamidehkordi E., 2010).

Western world, e.g. North American countries and Western Europe, face this problem to slightly less extent than the developing world as they have started to address the issue already few decades ago. A big focus on solving the problem of differences of living standards of population in rural and urban areas was devoted to delivering ICT to rural areas. One part of the initiative was to deliver and maintain proper ICT infrastructure

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Table 1

Relationship among ICT view/ use/ impact

ICT view	ICT use		
	Production	Management & control	Innovation/ Knowledge creation
Tool	Efficiency	Efficiency	Less relevant
Service	Efficiency Effectiveness	Efficiency Effectiveness (some-what)	Support innovation
Infrastructure	Efficiency Effectiveness	Efficiency Effectiveness	Help transformation
Expertise	Effectiveness	Effectiveness	Transformation

Source: Jansen A., 2014

Based on the experience from the ICT initiatives in North America and Western Europe, the following useful framework was proposed to analyse ICT policies in rural areas (Jansen A., 2014):

Table 2

Impact of some rural development initiatives

ICT view	ICT use		
	Production	Management & control	Innovation & knowledge creation activities
Distant work (tool)	Some efficiency	Some efficiency	No impact
Video conferences, IT investment (infrastructure)	Efficiency	Efficiency & some effectiveness	Negligible impact
IT services (Service)	Some efficiency, minor effectiveness impact	Efficiency, minor effectiveness impact	Some support to innovation
Telemedicine (Expertise)	Efficiency & effectiveness impact	Some efficiency, minor effectiveness impact	Help transformation

Source: Jansen A., 2014

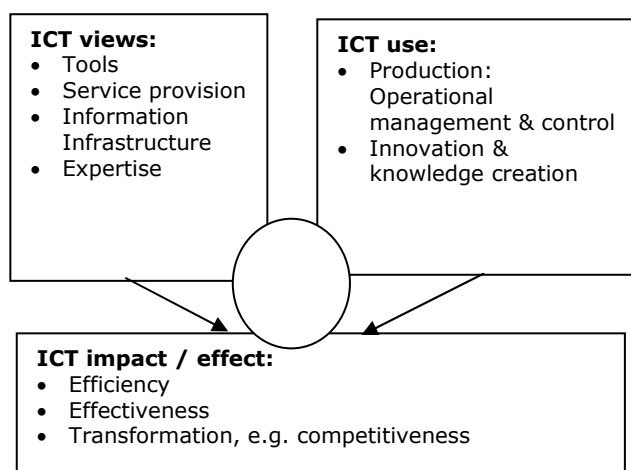
Another research paper on the subject provides a framework on necessary components to have efficient and effective ICT initiatives for rural development.

(e.g. telecommunication services, broadband etc.) and another; even more important part was to create awareness of the opportunities provided by proper ICT infrastructure to facilitate the adoption and daily use of the newly available services. The biggest focus was / is devoted to:

- trainings to increase computer and ICT literacy in general;
- better quality education that can be delivered in rural areas thanks to ICT solutions (distant/ remote learning opportunities);
- remote work opportunities;
- e government services;
- e health services;
- higher society engagement through more available communication tools / platforms;
- e commerce platforms.

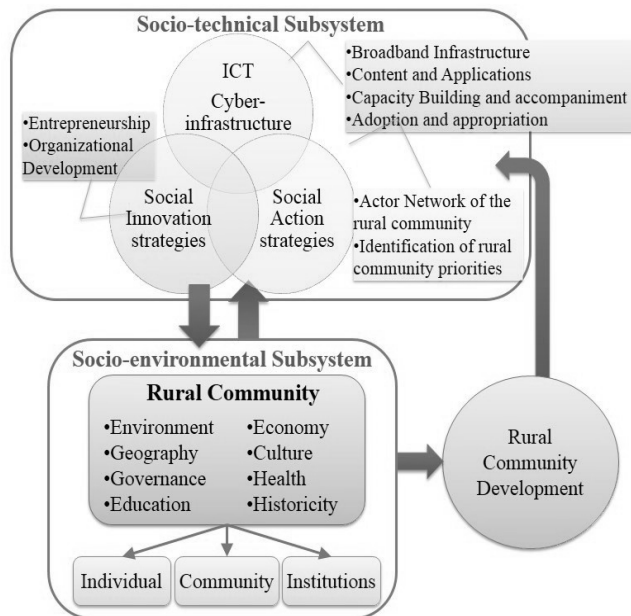
The lessons learned from the ICT orientated projects in North America and Western Europe are following:

- the significant attention should be devoted to the awareness creation of the new opportunities to ensure usage of the ICT solutions and tools;
- more focus should be addressed to encourage Small and Midsize Enterprises (SMEs) in rural areas to adopt use of ICT solutions and tools.



Source: Jansen A., 2014

Fig. 1. Framework for analysing ICT policies in rural areas



Source: Serrano-Santoyo A., Rojas-Mendizabal V., Castillo-Olea Cr., 2013

Fig. 2. The digital inclusion project as a system

Many research works are devoted to the ICT initiatives for rural development in developing world. Some of the implemented ICT projects provided great results whereas some turned out to be failing. A common characteristic of the initiatives is so called ICT 4 D type activities (ICT for development):

- establishment of Telecentres;
- solutions for SMEs development;
- phones` availability;
- e government services` kiosks;
- e health kiosks;
- e commerce platforms and promotion.

Most of the initiatives in the developing countries are funded by the government, as for the commercial sector there is no economic feasibility to invest in rural regions – less population living there, wider territories, poorer / less paying potential customers. Governments have been criticized for inefficient implementations, poor focus on bringing value/ customer service, not considering risk factors and potential obstacles (Ting C., Yi F., 2013; Hoque R., Saif M.N., AlBar M., Bao Y., 2016).

Another research paper on the topic states that it is important to have a local cooperation

(could be achieved through Internet platforms/ remote communication tools) among stakeholders from schools, universities, and companies, thus reducing demographic problems in the area in a sustainable, long-time perspective (Filler A., Kern E., Naumann St., 2014).

Chile for the past decades has emphasized the role of ICT in general economic development and especially development of rural areas. Chile's biggest focus is on education and information sharing provided by proper use of ICT tools but again starting with establishing sufficient ICT infrastructure both in urban and rural areas and promoting wider use of it and creating awareness of the potential benefits from the usage. Chile's rural SMEs key economic activities are processing of agricultural products, handicrafts and rural tourism services. Many of SMEs have not managed to consolidate sustainable businesses, due to limited access to the information for the decision making, high transaction costs to arrive to the market and their invisibility to the general public. The project initiated by the Chile government plans to develop and implement an integrated platform in website format to promote the commercialization of those products. The main goal of the project is a generation of a geo-referenced digital platform to supply the following services: diffusion, e-commerce, education and communication among SMEs (Von Bennewitz A. E., Quinones D. X., Hernandez B., Juan P., 2014).

In recent years, there has been an increased focus and awareness in India on use of ICT based approaches to promote socioeconomic development of rural areas. One of the forms how to achieve that is rural Business Process Outsourcing (BPO) as an emerging and rapidly growing business sector. Rural BPO companies have Internet enabled delivery centres in villages or semi-urban areas, where trained employees handle document and information driven tasks

such as data entry, localization etc. (Shourya R., Lakshmi V., Sankar P. B., 2012).

Besides that, India acknowledges rural ICT initiatives as an excellent tool to increase women empowerment in following aspects:

- education and training;
- communication and information exchange, experience sharing;
- better healthcare;
- work opportunities. (Soundari H., 2016).

India has implemented few ICT initiatives to increase efficiency in agricultural sector in rural areas. The pilot project united 6000 individuals registered in the project portal consisting of development practitioners, policymakers, researchers, farmers, information and communication specialists. The outcome of the project showed 4 % increase in the productivity of the agricultural sector in the pilot region. Key activities involved experience sharing, consultations on various problems, banking and finance information etc. Next stages of the initiatives are planned in the sectors such as e health, e learning, e commerce and e banking (Behera B.S., Das T.K., Jishnu K.J., Behera R.A., Behera A.C., Jena S., 2015).

China's experience from ICT initiatives in rural areas shows that the sectors that can benefit most of it are:

- agriculture;
- tourism (Hyongsoon K., Lee E., 2013).

Iran has also acknowledged the importance of ICT for the development of rural areas. Iran implemented few ICT 4 D projects in chosen rural regions. The Table below shows the outcome of the initiative stating to what extent stakeholders see the increase of effectiveness as a result of ICT initiatives.

One of the authors together with Latvian Software Copyright Protection Association (SCPA) and research centre SKDS conducted a survey in February and March 2016 among 300 SB companies. Sample group was randomly

selected; targeted SB companies were in different regions of Latvia, thus the whole country was represented. Annual turnover of those SB companies was less than EUR 600 000 per company. Below are the tables and charts showing the results of the survey.



Source: Authors` calculations based on the SKDS survey, 2016

Fig. 3 IT maturity level in SB in Latvia

From the Figure 3 it is visible that majority of SB companies in Latvia have implemented and maintained their IT just to support the basic needs but there is little place for the innovation and IT provided competitiveness enablement.

Table 5

How SB has benefited from the advanced IT set up

Business process effectiveness	80 % of advanced IT maturity level companies
Mobility	80 % of advanced IT maturity level companies
Productivity	80 % of advanced IT maturity level companies
Turnover	80 % of advanced IT maturity level companies

Source: Authors` calculations based on the SKDS survey, 2016

Table 5 shows that advanced set up of IT even in a SB size company drives efficiency and effectiveness and helps to increase competitiveness by reducing operational time and costs and widening geographical coverage, which all together leads to higher turnover.

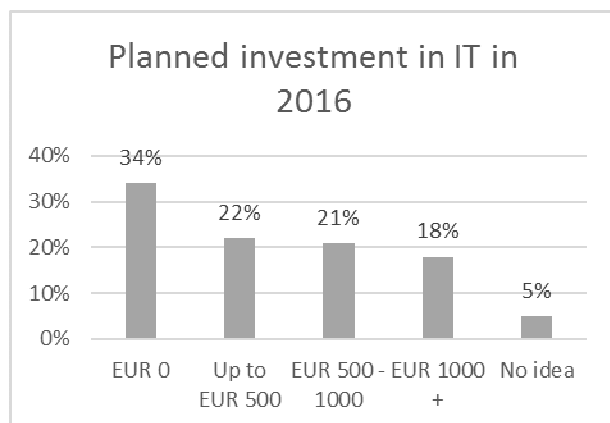
Unfortunately, despite the visible benefits that can be brought by advanced IT, companies in SB segment are not ready/ able to invest to bring their IT to the next level thus increasing performance and competitiveness of the company.

Table 3

Increase of effectiveness as a result of implemented ICT initiatives

Indicator	Agree(%)
E-Commerce	88.2
Filling leisure times of rural youth	87.1
Improving postal services	84.2
Reducing trips to urban areas	83.6
Improving employment opportunity via job searching	82.3
Increasing access to telephone	81.8
Official registrations by Internet	80.2
Reduction in rural-urban migration	78.8
Developing crop insurance	77.1
Business services	76.2
Growth in the number of community businesses	75.5
Access to improved health and hygiene information	73.2
Access to rural cooperatives information	72.5
Increasing value of agricultural sales	71.4
Access to information about agricultural markets	69.8
Access to information about agricultural inputs	67.5
Access to agricultural weather information	66.1
Awareness of events in the country	65.5
Reduction in monetary cost to obtain information and communication	65.4
Reduction in time to obtain information and communication	64.9
Access to information about agricultural input and output prices	46.1
Changes in household income	63.9

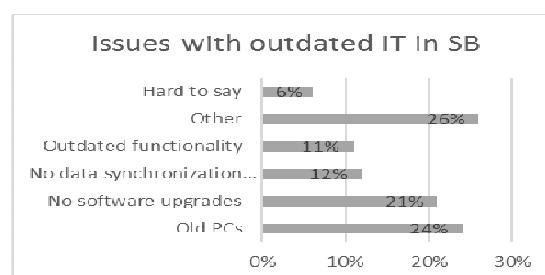
Source: Alibaygi A., Karamidehkordi M., Karamidehkordi E., 2010



Source: Authors' calculations based on the SKDS survey, 2016

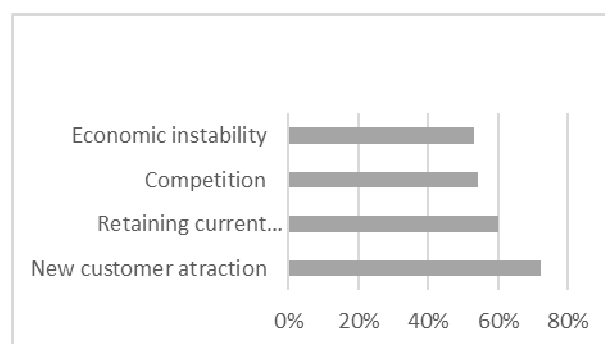
Fig. 4. SB readiness to invest in IT in 2016

It is visible from the Tables and Figures above that SB companies in Latvia struggle with the challenges that could be easier to overcome with better ICT tools. However, there is a significant obstacle – SB lack resources to invest in setting up advanced ICT infrastructure. One of the most appropriated solutions to exit the circle (no resources – no tools – less productivity – less customers – less resources) is going towards *cloud* based services – SaaS (Software as a service), IaaS (infrastructure as a service), PaaS (Platform as a service).



Source: Authors' calculations based on the SKDS survey, 2016

Fig. 5. Issues that SB companies face if they operate with out-dated IT



Source: Authors' calculations based on the SKDS survey, 2016

Fig. 6. Current major challenges for SB

Conclusions, proposals, recommendations

- 1) Proper implementation of ICT infrastructure and tools / solutions can serve as enabler of the development of rural areas, reduce the economic and digital divide and facilitate the development of SMEs.
- 2) Government support and initiatives are critical to achieve the above-mentioned enablers.
- 3) Simple implementation is not enough. Awareness, education, trainings on usability and potential benefits are, nevertheless, critical.

- 4) Implementation should start with pilot projects, implemented projects should be measured on their effectiveness and efficiency, goal achievement.

Bibliography

Journal paper with author(s)

1. Alibaygi, A., Karamidehkordi, M., Karamidehkordi, E. (2010). Effectiveness of Rural ICT Centres: A Perspective from West of Iran. *Procedia Computer Science*, No. 3, pp. 1184-1188
2. Behera, B.S., Das, T.K., Jishnu, K.J., Behera, R.A., Behera, A.C., Jena S. (2015). *E-Governance Mediated Agriculture for Sustainable Life in India*. *Procedia Computer Science*, No. 48, pp. 623 – 629
3. Filler, A., Kern, E., Naumann, St. (2014). Supporting Sustainable Development in Rural Areas by Encouraging Local Cooperation and Neighbourhood Effects Using ICT. *Proceedings from ix. International conference on applied business research*, pp. 7-13
4. Firdhous, M., Ghazali, O., Hassan, S. (2013). Cloud Computing for Rural ICT Development: Opportunities and Challenges. *2013 International Conference on Computing, Electrical and Electronics Engineering*, pp. 680-685
5. Hoque, R., Saif, M.N., AlBar, M., Bao, Y. (2016). Adoption of Information and Communication Technology for Development: A Case Study of Small and Medium Enterprises in Bangladesh. *Information Development*, 2016, Vol. 32(4), pp. 986–1000
6. Hyongsoon, K., Lee, E. (2013). Expanding ICT Infrastructure for Rural Areas in Korea. *15th International Conference on Advanced Communication Technology*, pp. 312-316
7. Jansen, A. (2014). How Can ICTs Support Rural Development. *IOS Press*, pp.130-140
8. Quinn, Br. (2010). Digital Dividend or Digital Divide? *Proceedings of the 10th European Conference on E-government*, pp. 329-338
9. Serrano-Santoyo, A., Rojas-Mendizabal, V., Castillo-Olea, Cr. (2013). Exploring New Perspectives for Digital Inclusion Projects in Rural Areas: a View from Complexity Science. *ICTD 2013*, Dec 07–10, pp. 144-146
10. Shourya, R., Lakshmi, V., Sankar, P. B. (2012). Enabling Rural BPOs Move Up the Value Chain: Secure Distribution of Office Documents. *3rd International Conference on Advances in ICT for Emerging Regions*, pp. 220-220
11. Soundari, H. (2016). Role of ICT Initiatives in Sustainable Progress of Rural Women in India. *European Journal of Sustainable Development*, 2016, No. 5, pp. 39-46
12. Ting, C., Yi, F. (2013). ICT Policy for the "Socialist New Countryside"—A Case Study of Rural Informatization in Guangdong, China. *Telecommunications Policy*, No. 37, 2013, pp. 626–638
13. Von Bennewitz, A. E., Quinones, D. X., Hernandez, B., Juan, P. (2014). "Vitrina Campesina": Contribution of ICT to Rural Development in the Maule Region, Chile. *Proceedings from ix. International conference on applied business research*, pp. 7-13

PROCESS OF SHAPING OF INSTITUTIONAL SUPPORT FOR AGRICULTURAL SECTOR IN POLAND

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Abstract. The primary objective of the study was to characterize the selected organisational units subordinate to and supervised by the Minister of Agriculture. The functioning of a total of 69 units, including 7 organisational units subordinate to the minister and 62 ones supervised by him, depends on this official. 11 ministerial bodies among them were included in the study. These units have the legal basis, such as acts, and are financed from the state budget. The analysed bodies were established to fulfil the functions of control, supervision and payment in the sphere of agriculture and rural areas. In total, the surveyed units employ 34.8 thousand people, including 2.8 thousand (7.9 %) at the central level, 18.2 thousand (52.2 %) in the provinces or regions, and 13.8 thousand (39.5 %) in the structures of the counties. The organisational units fulfil their role in the compliance with the EU legislation, especially in the sphere of activities covered by the Common Agricultural Policy.

Key words: organisational unit, control, supervision, agency.

JEL code: Q18

Introduction

Agricultural administrative services are appointed to organise, direct, manage and supervise agricultural production in the countryside and rural areas. Agricultural administration is understood as a companionship of organising or implementing institutions carrying out measures, activities and projects for the benefit of the farming community through various entities, organisational units, bodies, and institutions of a social nature. Self-governed agricultural organisations (Chambers of Agriculture) and other institutions (agricultural circles, Women Farmers' Clubs (WFC)) take part in regulatory activities, which is important when agriculture is scattered. Agricultural sector has statutory powers to direct or indirect interference in the process of agricultural production through the regulatory function of legal acts issued in the form of laws, regulations and public notices. Agricultural administration is authorised to form the institutional environment, allowing for appointment of bodies necessary to support the Office of the Minister, who is responsible for the wider sphere of agriculture. The institutional environment of agriculture is defined as a collection of governmental organisations acting for the benefit of agriculture, and using the instruments created by them, which are based on

the developed rules and procedures of the Common Agricultural Policy (Grzelak, 2009).

Problems, purpose and scope of the study

Agricultural Administration - in general - takes care of agricultural production, rural development, agricultural market and controls phytosanitary and veterinary standards. The characteristic feature of agriculture as a sector of the economy is its functioning in rural areas, covering terrains outside the administrative borders of cities. The Polish rural areas occupy more than 93.2 % of the total area of the country inhabited by over 14.8 million people, namely, 38.8 percent of the country's population. Another feature of rural areas is a large number of small farms (1.4 million with more than 1 ha), with an average surface of about 10 ha. On the other hand, the share of agriculture in GDP is low and amounts to 4.6 %.

The territorially dispersed agriculture results in the specific structure of agricultural environment, which is responsible for food safety, the turnover of agricultural products, veterinary and phytosanitary conditions of their production and living conditions of the rural population. All this means that the agricultural sector requires a sophisticated system to support the process of food production, which must be supervised at every stage of its creation. The primary objective

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of the study was to characterize the basic data about the bodies of governmental administration subject to the Minister of Agriculture. These bodies are presented in two thematic groups: the first one is agencies, which are diversified entities in terms of organisational structure; and the second one - the state control and supervision units, which are used for ensuring compliance with the laws and regulations of the European Union. The Agricultural Social Insurance Fund (ASIF), which admittedly fulfils the functions of social care and is financed from the Social Insurance Fund (SIF), was also placed in this group but then it was handed over to the supervision of the Minister of Agriculture. Under the supervision of the Minister of Agriculture there remain a lot more bodies, in particular, research and development units, agricultural schools, important from the point of view of innovation, which, however, due to the frame of this publication have been omitted. In total, the study covered 11 organisational units, which are subordinate to the Minister of Agriculture and supervised by him. The bodies with a kind of service functions, being close to rural areas and agriculture, were purposefully chosen for the study. The research conjecture was made that the process of consolidation of bodies used for supporting of agriculture would continue in this sector. The study was based on reports of the departments of the organisational units, statistical data and legal acts.

Retrospective look at formation of agricultural administration bodies

During the interwar period, the agricultural administration was represented by the Ministry of Agriculture and Agricultural Reforms, as the main state authority in the sphere of agriculture. The organisation of the Ministry was represented - outside the office of the Minister - by the three main departments, such as economic, agricultural production, veterinary and agricultural equipment. Agricultural departments at the province governor's offices and agricultural units

at the district governor's offices were subject to the Ministry in a vertical layout. Because of the modest bureaucratic apparatus, the Minister delegated a lot of powers to Chambers of Agriculture, which took a fundamental role in fulfilling the organisational functions, being a kind of support to the local administration. Chambers of Agriculture as public-law institutions of the self-governing agricultural councils, on the one hand, represented the interests of farmers, and on the other hand, they organized lower agricultural education, assessment stations of plants and animals or agricultural-chemical stations. Basically, one chamber in each province that was not represented at the national level was created. Statutes of chambers provided promotion of crop production, livestock, agricultural education, counselling, experimentation and land improvement.

After the war, the Ministry of Agriculture represented the administrative apparatus in charge of a specific branch of the national economy, related to the wider agriculture. The Ministry was particularly responsible for development of the socialized agriculture and committed to management of most of the actions in support of the state sector in agriculture - State Farming - and the cooperative sector - Cooperatives of Agricultural Production.

In 1981, the Ministry Agriculture and Food Industry was founded through the absorption of the separately functioning Ministry of Food Processing and Purchasing. Since then the Ministry significantly expanded its organisational structure by establishing a number of additional departments and their units as well as independent positions. Mechanisms of indirect influence on agricultural policy, more and more often with the use of economic instruments (grants, loans), or organisational and legal ones (laws, regulations), were of fundamental importance in managing the ministry. Already at that time, most of the bodies of agricultural environment operated, for example, in the form

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of quarantine and plant protection stations, seed control inspectorates, purchase and processing of agricultural products' inspections, or veterinary facilities etc.

Modern shape of the Ministry of Agriculture and Rural Development

The modern structure of the office of the Minister of agriculture was shaped under heavy influence of the EU legislation, particularly with regard to the Common Agricultural Policy. The process of formation began in the early 90s, and after the Polish accession to the European Union it adopted the organisational form similar to the modern structure. Since 1999, the Ministry of Agriculture has operated under its current name as the Ministry of Agriculture and Rural Development. The ministry currently has 12 departments and 6 separated offices.

One of the basic acts regulating the functioning of the organs of primates is the Law

of 1997 on government administration, which directly determines the scope of the substantive issues in the functioning of agricultural administration. This act clearly indicates the office of the Minister of Agriculture as the main body-in-chief responsible for this sector of the economy. The scope of the specific actions of the Minister in charge of agriculture is determined each time by Regulations of the Prime Minister, which state that the minister manages the following sections of the government administration, namely, the 32 Department of Agriculture, the 33 Department of Rural Development, and the 35 Department of Agricultural Markets. Compared to the powers of the previous government in 2011, it does not include the 62 Department of Fishery, which became a part of the newly established ministry (Regulation, 2015).

Table 1

Scope of activities of the Ministry of Agriculture

Department 32 - Agriculture	Department 33 - Rural Development	Department 35 - Agricultural Markets
1. Plant production and plant protection	1. Formation of the agricultural system	1. Processing and preservation of agri-food products
2. Seed production	2. Protection of agricultural land	2. Commercial quality of agri-foods
3. Animal production and animal husbandry	3. Merge and soil replacement	3. Mechanisms of regulation of agri-food markets
4. Protection of animal health	4. Drainage and water supply in rural areas	
5. Supervision over health quality of food	5. Electrification and gasification of rural areas	
6. Supervision over trading of veterinary products and feed	6. Development of entrepreneurship	
7. Chambers of Agriculture, farmers' unions and farmers' organisations	7. Social insurance for farmers	

Source: Analysis of issues arising from the Law on Government Administration, the Ministry of Agriculture and Rural Development, Warsaw, 2015

The Minister together with his co-workers is obliged to prepare the relevant laws and issue regulations and notices. The number of laws and regulations increases as they move on tracks of the market economy. One can even speak of two phases of establishing the legislation. The first phase took place just after 1989, when the

Polish law was being adapted to the west European law. The second phase took place just before the Polish accession to the EU and was based on implementation of the EU law. The Minister participates in the wider licencing procedures, concessionality of business, limitation and standardisation of agricultural

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production, agricultural markets and rural development. He or she issues administrative decisions, which have different forms. They may be licences, decisions, permits, recognitions, authorizations, registry entries etc.

2010 was an important period, when there was a separation of the revenue and expenditure of the national budget from the revenue and expenditure of budgets originating from the European funds. The role of financing instruments for supporting the community was taken over by the National Economy Bank which became the central payment operator of the EU. The Minister of Agriculture is the disposer of budgetary resources, and the parliament

determines for him or her the amount of the budget, both revenues and expenditures. Budgetary revenues are implemented by the units supervised by the Minister of Agriculture. For example, revenues consisted of payments for agrochemical services, administrative, and veterinary fees as well as registration fees for the protection of crop varieties and for administrative tasks related to their implementation. Earnings of the Agricultural Property Agency, payments from settlements with the European Commission and all sorts of charges related to functioning of agricultural markets were included in those revenues (Czyzewski, 2015).

Table 2

Budgetary revenues of the Ministry of Agriculture and Rural Development (MARD) (in million zlotys)

Departments	2011		2012		2013		2014		2015
	Plan	Implementation	Plan	Implementation	Plan	Implementation	Plan	Implementation	Plan
Department 32 – Agriculture	32.9	35.7	27.3	35.5	30.7	41.8	31.6	39.5	31.6
Department 33 – Rural Development	2159.0	2550.5	1556.4	1711.1	1851.2	1879.7	1518.1	2008.4	1489.1
Department 35 – Agricultural markets	66.4	94.9	63.5	117.4	141.4	192.2	68.8	243.3	68.4
Department 62 – Fishery	0.6	0.9	0.2	9.4	0.4	6.6	0.3	11.9	0.3
Total	2258.9	2682.0	1647.4	1873.4	2023.7	2120.3	1618.8	2303.1	1589.4

Source: Information of Supreme Chamber of Control (SCC) on audit results of the MARD budget for these years

The budgetary expenditures related mainly to ensuring the functioning of the central agricultural administration, organisational units of the Ministry, and included grants and subsidies or provisions. The impact sphere of the Minister is vast. A total of 69 organisational units is subject to the Minister of Agriculture. These

are 7 units subordinate to him and 62 organisational units supervised by him, including 3 agencies, 11 research and development units, 45 school complexes of agricultural education, and also the National Agricultural Training Centre, the Central Agricultural Library and the Polish Club of Horse Races.

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**Budgetary expenditures of the Ministry of Agriculture and Rural Development (MARD)
(in million zlotys)**

Departments	2011		2012		2013		2014		2016
	Plan	Imple- mentation	Plan	Imple- mentation	Plan	Imple- mentation	Plan	Imple- mentation	Plan
Department 32 – Agriculture	748.2	772.2	779.3	844.7	802.2	877.8	758.8	854.2	798.2
Department 33 – Rural Development	5155.7	7782.5	4381.6	7196.3	4486.0	6695.3	4338.5	5328.2	3186.4
Department 35 – Agricultural markets	524.3	636.5	572.2	462.3	410.9	420.8	431.5	442.4	450.0
Department 62 – Fishery	177.1	236.1	111.4	224.9	159.7	249.8	163.5	220.9	-
Total	6605.3	9427.3	5844.5	8728.2	5858.8	8243.7	5692.3	6845.7	4434.6

Source: Information of Supreme Chamber of Control (SCC) on audit results of the MARD budget for these years

In addition to the positions recorded in the budget, the additional grants for the Agricultural Social Insurance Fund in the amount of 18 billion zlotys have been planned, while support from the EU funds in 2016 has been set at 26.6 billion zlotys.

State organisational entities of control and supervision

The scope of competence of organisational units subordinate to and supervised by the Minister is based on the Law on Government Administration and various administrative regulations of agricultural law. There are two types of administration under this Law, a consolidated one and non-consolidated one. A consolidated administration is based on the supremacy of a provincial governor, who provides a certain fusion of management, which results in effectiveness and efficiency of carrying out tasks. It consists in the fact that under the joint authority and coordination of a provincial governor, there functions are legally entrusted to a group of institutions. In the agricultural sector this concerns, for example, the provincial inspector of plant and seed protection, the

inspector for commercial quality of agricultural products, or veterinarians.

In turn, non-consolidated administration is implemented by local bodies of government administration subordinate to the relevant ministers carrying out tasks of the government administration in the province. Non-consolidated administrative authorities operating in the province are required to agree on their action plans with a provincial governor, their activities should be in compliance with a governor's recommendations, they have to inform him annually as well as to currently clarify on their activities in the province. The central government organs are formed by acts of statutory rank, exceptionally by a law of a lower level. They operate on the basis of established statutes and tables of positions, grade, qualification requirements, and tables of wages. Organisational units subordinate to the Minister can be divided into two groups.

The first group may include the organs related to plant production, which predominates in terms of number of units, due to directing attention to large areas of agricultural land, comprising about

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50 % of the area of the country. In fact, only the veterinary inspection and animal husbandry centre are explicitly aimed at animal production. Other organs function in both spheres of agricultural activity. Specialized agricultural inspections are primarily appointed to perform control functions, being a specific way of interference in the activities of farms, by issuing administrative decisions. Besides, inspections perform opinion giving functions, they give analytical assessments and assess the role of industrial information.

The Chief Inspectorate of Plant and Seed Protection operates under the Law of 2003 on the protection of plants. The Inspectorate carries out tasks related to supervision of plant health, prevention of risks related to marketing, use of plant protection products and supervision over production, evaluation and marketing of seed. The range of activities covers phytosanitary inspection of plants, plant products and means of transport. In addition, the scope of responsibilities includes quality control and correct use of plant protection products authorised for marketing, monitoring compliance with the rules and requirements applicable in production, evaluation, storage and marketing of seed. The Inspectorate is a two-tier structure-at the headquarters and the province levels (Law, 2003).

The National Agrochemical Station has been operating since 2007 on the basis of the Law on fertilizers and fertilization. It deals with agrochemical service of agriculture, by determining conditions and procedures for marketing of plant conditioners. In addition, among the tasks of the station is prevention of threats to human and animal health that arises as a result of transportation, storage and use of fertilizers. Among the important functions of the Station is agrochemical service of agriculture, by defining how to conduct agrochemical research, including selection of research methods. It is important to create and maintain a database on

nitrogen and phosphorus in soil as well as on nitrate pollution of soils. Chemical and agricultural stations are two-tier structures, district stations function at the level of the province (Law, 2007).

The Chief Veterinary Inspectorate has been operating since 2004 under the Law on veterinary inspection. The main task of its inspection is to protect health of animals and ensure the safety of production of animal origin. The Inspectorate serves as the office of food control in relation to food of animal origin. It supervises observance of veterinary requirements in households with farmed animals. It also supervises the marketing of animals and animal by-products. It is engaged in production, trade and use of feed additives in animal nutrition and genetically modified organisms. The veterinary inspection is a three-tier structure, including the district. A specific feature is that the border veterinarians work at border crossing points (Law, 2004).

The National Animal Breeding Centre operates under the Law of 2007 on the organisation of breeding and reproduction of farm animals and regulates matters related to breeding and conservation of genetic resources, assessment of the utility and breeding value, maintenance of herd books and records as well as supervision of breeding and reproduction of farm animals. Keeping control of breeding and reproduction of farm animals is carried out in stations, breeding and insemination, which function as autonomous entities, due to the transformation of the company's treasury (Law, 2007).

The Quality Inspection of Agricultural Food Products is authorized to conduct supervision over the quality of trade in addition to checking the conditions of storage and transport of agricultural food products. It supervises the certification bodies in organic farming, and ensures further supervision over the protection of regional and traditional products. It works with organisational units performing the functions of

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the paying agencies in implementation of the CAP. The Inspection is a two-tier structure, besides the headquarters as the central organ of government, provincial inspectors also operate there as organs of consolidated administration (Law, 2000).

Organisational units of Minister of Agriculture functioning as agencies

Agencies are heterogeneous units in terms of organisation and law. Thus, there is no statutory definition of the agency. Units called agencies can operate in the form of joint-stock companies of the State Treasury, budgetary units, budgetary enterprises or state legal entities. In agriculture, such agencies operate under the acts and generally hold a significant level of independence. They enjoy judicial independence and are not subject in this regard to commands of the chief official bodies. In the sphere of agriculture they operate in, basically there are four main agencies - besides the three well-known agencies - for Restructuring and Modernisation of Agriculture, Agricultural Market Agency and Agricultural Property Agency –the Centre for Cultivar Testing was established, which since 2011 has become an executive agency with sixteen local branches.

Two agencies - for Restructuring and Modernisation of Agriculture and Agricultural Market Agency - are paying agencies, which means that among some of their most important tasks the two agencies are working with implementation of means co-financed by payments from the budget of the European Union. From its early inception (1994), the primary tasks of the Agency for Restructuring and Modernisation of Agriculture consist of providing support for development of agricultural production, improvement of the agrarian structure, development of infrastructure, support for processing of agri-food products, and care for environment and nature protection. While the subsequent tasks include encouraging the development of agricultural producer groups, organic farming, development of rural areas and

promoting the development of local communities in the form of the Leader of the year.

The Agency for Restructuring and Modernisation of Agriculture implements its payment functions in two areas. The first area is connected with direct payments (Pillar I of the CAP) and is offered to all farmers with agricultural farms over 1 ha, with the proviso that beneficiaries comply with the standards and cross-compliance requirements. The second area of impact is related to the rural development programmes (Pillar II of the CAP), and access to financial support is obtained by beneficiaries, who submit an application and meet the criteria set out in the action. The agency responsible for the implementation of its tasks is equipped with administrative competence of different nature. These powers are executed with the use of administrative decisions. Depending on the type of task, the competences to issue decisions were granted to the Head of the Agency, the Director of the Regional Branch as well as to the Manager of the District Office. The Agency grants the area payments and support for measures under the Rural Development Programme by a decision. In all other cases, implementation of the tasks is foreseen by agreements between the Agency and the beneficiary (Law, 2008).

The Agricultural Market Agency was established in 1990, and its formation was a reaction to the negative symptoms of marketization of food industry, involving the withdrawal of state purchase prices and centrally determined retail prices. The agency from the very beginning pursued an intervention agricultural policy of the state aimed at stabilization of the agricultural products' market and protection of farmers' incomes. The important tasks of the agency include accumulation of reserves of agricultural products and agri-food products. The agricultural market policy was implemented by commercial instruments used as a guarantee of loans taken for the purchase of agricultural products,

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subsidies for storage, exports and imports as well as support for consumption of goods for children at schools (Law, 2004).

The Agricultural Property Agency is a state legal entity, which is responsible for the use of property and other material rights to the State Treasury. In turn, the task arising from the Law on formation of agricultural system (2003) makes the agency seek for improvement of the area structure of family farms, restructuring and privatisation of property of the State Treasury and administering of property resources intended for agricultural purposes. According to the Law of 2003, the agency had the right of pre-emption of agricultural property, which concerned the sales contracts or right to acquire called the right of redemption. The agency also carries out the tasks specified in the provisions on compensations for property left outside the country (rebate fund). In connection with the possibility of acquisition of land by foreigners starting May 1, 2016, they prepared a new law on formation of agricultural system, which, however, will continue to be processed (Law, 2003).

The Main Research Centre of Varieties of Cultivated Plants is a state organisational unit responsible for official testing of varieties. Its statutory tasks are to conduct the national register of varieties, keep the book of exclusive rights to varieties, give consent to trade in seed material, create research methodologies and evaluate economic value. The central hub consists of 16 local branches of the experimental stations for evaluation of varieties. They include sections of research and experiments, finance and accounting, and business administration. In 2011, there was a change of the legal form, and the Centre as well as stations and the executive agency were established (Law, 2010).

Another problem is functioning of advisory institutions that do not fit in the scheme of the agency.

The Agricultural Advisory Centre contributes towards improving the level of agricultural incomes, increase of market competitiveness of farms, promotion of sustainable development of rural areas as well as raising the level of professional skills of farmers and other rural inhabitants. The Centre's specificity lies in the fact that it does not exercise supervisory functions or control over agricultural advisory centres, as these are subject to the Office of the Marshal, not the Province Governor. The Advisory Centre only develops and implements homogeneous methods of centres' operation in terms of tasks executed by them. The agricultural advisory centres' dependence on the Ministry is expressed through budgetary subsidies set at the central level (Law, 2004).

Evaluation of organisational units subordinate to and supervised by the Minister of Agriculture

A characteristic feature of organisational units subordinate to and supervised by the minister responsible for agriculture, was giving them shape, while the European integration was deepening it. In the pre-accession period, the primary goal was to move away from administrative functions, which were used in the past, towards adopting the role of substance authorities, aimed at fulfilling tasks arising from the European legislation. Apart from the two agencies, which became the paying units, most of the bodies existed in the past. Generally, the changes involved, besides the name changes and combining of some units, mainly on the introduction of the European laws, which obliged all the Member States, to the statutes. Of 11 analysed organisational units, the following 5 are existing departments that are funded from the budget: Department 32 - Agriculture; 4 within the Department 33 - Rural Development; and 2 of Department 35 - Agricultural Markets. In total, these units employ 34.8 thou employees, including 2.8 thou people (7.9 %) at the central level, 18.2 thou (52.2 %) in the provinces or

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regions, and 13.8 thou (39.5 %) in the district structures. Only three units, namely the Agency for Restructuring and Modernisation of Agriculture, the Agricultural Advisory Centre and the district veterinary inspectorates employ people in the counties. In addition, this institution employs veterinarians at the border crossing points (118 people). Organisational structures of units have been shaped so as to meet the functions of control and supervision over the

tasks entrusted to the body section. They may issue decisions, resolutions or recommendations, and they also have substantive laboratories and trained staff, who verify their knowledge on the basis of the education system. In terms of location, most of the units are located in the capital, only two of them are outside the city limits, including the Agricultural Advisory Centre in Brwinow and the Chief Research Centre for Cultivar in Slupia Wielka.

Table 4

Total number of employees in organisational units of MARD (2014)

Organisational units	Year of establishment	Previous founding body	Number of employees				
			Total	Head-quarters	Province or region	County	Other
Department 32 – Agriculture							
Chief Inspectorate of Plant and Seed Protection	2002	Plant Protection and Seed Inspection	2152	66	2086		
Main Research Centre of Varieties of Cultivated Plants	1966	Experimental Stations of evaluation of plant varieties	596	96	500		
Chief Veterinary Inspectorate	2004	Veterinary Medicine Centres	5901	110	1757	3916	118-frontier doctors
National Agrochemical Station	2004	Regional Agrochemical Station	535	11	524		
National Animal Breeding Centre	2001	Central Station of Animal Breeding	93	42	51		
Department 33 – Rural Development							
Agency for Restructuring and Modernisation of Agriculture	1994	Newly established	10943	1073	3791	6079	
Agricultural Property Agency	1991	Agricultural Property Agency of the State Treasury	1883	189	1694		
Agricultural Social Insurance Fund	1990	Newly established	6138	241	5897		
Agricultural Advisory Centre	2005	National Advisory Centre for Agriculture and Rural Development	4755	185	815	3755	
Department 35 – Agricultural markets							
Agricultural Market Agency	1990	Newly established	1158	536	622		
Chief Quality Inspection of Agricultural Food Products	2003	Inspectorate of Purchasing and Processing of Agricultural Products and Central Inspectorate for Standardization	647	220	427		

Source: Data of organisational units

The Agency for Restructuring and Modernisation of Agriculture was the largest unit, employing about 10.9 thousand people (31.3 %) of all the specialists of organs under research. 96 % of people among them were with higher education. These were the professional groups

heavily dominated by women (62 %), generally characterised by over 10 years of work experience (48 %). The Chief Veterinary Inspectorate employed a large group of people (5.9 thou), which, besides veterinarians (2.2 thou), employed a relatively large number of

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biologists and microbiologists (1.3 thou), and lawyers (0.5 thou), which is probably due to the specifics of work. Other organisational units present similar standards and criteria as for the level of education, period of employment and work experience.

Concluding Remarks

The Common Agricultural Policy was the first and for many years the only one fully integrated Community policy. It clearly showed that its objectives were subject to strict regulation; therefore the necessity of implementing fully the EU law by the Member States occurred.

The policy emphasis is placed on quality and not quantity, therefore, standards concerning quality of agricultural production and the control mechanisms of plant and animal health were introduced. Successive reforms imposed on farmers' responsibility for protecting rural areas and their biodiversity. Manufacturers are obliged to prudent use of natural resources, soil, air and water. These tasks resulted in practical actions, such as crop diversification, planting, maintenance of permanent grassland and less intensive livestock production. Farmers are also encouraged to pursue organic farming. In addition, actions have been taken to protect and promote traditional and regional food products.

The European Union neither specified which organisational units should be established, nor

determined the number of them. It also did not specify how to name them or shape their organisational structures. The primary directive was that the EU legislation would be fully reflected in practical functioning of agriculture and in rural areas. In Poland, it was practically based on units and bodies which have a long tradition, giving them a modern content. Only in a few cases smaller units were combined, and new powers were given to them.

It is difficult to determine the further evolution of organisational units subordinate to and controlled by the Minister of Agriculture. Among several activities, the draft of the Law on the State Inspectorate of Food Safety and Veterinary Office could be regarded as the first attempt aimed to consolidate the Quality Inspection of Agricultural Food Products, the Veterinary Inspection, the State Inspectorate of Plant and Seed Protection and the State Sanitary Inspection. The aim of the draft law was to create a single organisational unit, which should focus on full supervision of the food chain, "from farm to fork". Another idea is to merge the two paying agencies (the Agricultural Market Agency and Agency for Restructuring and Modernisation of Agriculture) into one Agency for Rural Development. In the new political situation, it seems that in the near future organisational units will be subject to a profound conversion involving their consolidation.

Literature

1. Czyżewski A., 2015. Opinion on the Section Concerning Agriculture of the Budget Act for 2015, Office of Research and Documentation of the Senate.
2. Grzelak A., 2009. Effectiveness of Links of Farms, Economic Annals of Kuyavian-Pomeranian Higher School, No. 2.
3. Regulation of the Prime Minister of 17 November 2015 on the Detailed Scope of Activities of the Minister of Agriculture and Rural Development.
4. Law of 29 June 2007 on Organisation of Breeding and Reproduction of Farm Animals.
5. Law of 10 July on Fertilizers and Fertilization.
6. Law of 18 December 2003 on Protection of Plants.
7. Law of 29 January 2004 on Veterinary Inspection.
8. Law of 21 December 2000 on Commercial Quality of Agri-food Products.
9. Law of 9 May 2008 on Agency for Restructuring and Modernisation of Agriculture.
10. Law of 11 March 2004 on Agricultural Market Agency and Organisation of Some Agricultural Markets.
11. Law of 22 October 2004 on Agricultural Advisory Units.
12. Law of 25 November 2010 on Main Research Centre of Varieties of Cultivated Plants.
13. Law of 11 April 2003 on Formation of Agricultural System.

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THE IMPORTANCE OF LAND CONSOLIDATION IN POLAND FOR THE PROCESSES OF SHAPING AGRARIAN STRUCTURE

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Abstract. The paper presents the problematic of the merge and exchange processes of land under the following programmes of agricultural land consolidation. By consolidating of land, there was activity for better creation of rural space in order to achieve comprehensive improvement of conditions for farming. According to the Act (1982) there were taken activities to shape the structure of the area, the rational design of land distribution, adjust the boundaries of the property to the system of water management facilities, construction of roads and terrain.

After the Polish accession to the EU, there was created a possibility of co-financing of agricultural land consolidation under the three successive EU programmes. The volume of these actions was defined by the level of support, thus in 2004-2006 there were 31 projects realized for the amount of 15.1 million EUR, and in 2007-2013 another 109 consolidation projects were completed - for a total amount of 93.9 million EUR. In the current financial perspective, the indicative budget of the RDP foresees 139.0 million EUR for land consolidation, including 88.4 million EUR from EAFRD means.

The analysis of changes of the number of agricultural parcels, which were recorded between agricultural censuses of 2002 and 2010, shows that consolidation of farms was noticed during that time. In 2010, the total number of agricultural parcels dropped from 2,916.3 thousand in 2002 to 2264.6 thousand (22.3 %). The biggest decrease of farms was noticed in the group of holdings with one parcel (44.5 %) and holdings with 2-3 parcels (28.1 %). In the group of holdings having 6-9 parcels, their number increased by 26.8 % and in the group of 10 or more parcels we noticed the increase of 94.4 %

Key words: land consolidation, program of rural development, agricultural parcel, union fund.

JEL code: Q15

Introduction

The development of rural areas through land consolidation took place in many countries in Europe. Land consolidation projects were carried out mainly in Germany, the Netherlands, France, Belgium, Luxembourg, Austria, Switzerland as well as Finland, Norway and Sweden. The reason behind the demand for land consolidation was similar in all countries and it was the need to adjust unfavourable division of land and promote the appropriate use of the property, without changing the ownership status. Depending on the country, there were some differences in the objectives and procedures of land consolidation, e.g. in each country procedure development was under the influence of historical trends, culture, tradition and law. A joint initiative to consolidate lands in different countries aimed at adopting well-proven solutions and functions developed in Europe in the process of land consolidation (Sabates-Wheeler, 2002).

Land consolidation is not regulated by one European act, but it is based on the legislation of

individual countries. The general objective of land consolidation is to improve production factors through land exchange in order to obtain the shape that meets the users' needs. Apart from the actual function of land exchange, the aim of consolidation is to improve road networks, enable the drainage of agricultural wasteland, improve landscape architecture as well as to protect the environment or manage rural areas in a more effective way. The procedure of land consolidation involves making administrative decisions and in most countries they are made by administrative bodies. The owners of lands in the area of consolidation usually form relevant associations which, depending on the country, have a weaker or stronger position in the process of projects' implementation. Such associations have strong legislative power, for instance in France, Germany and the Netherlands, where they can participate in valuation, planning and realization of the project (Pasakomis, Maliene, 2010).

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Land consolidation in all countries is one of the most fundamental management and agricultural devices, which comprehensively improves the organization of agricultural production area. It aims at converting the arrangement of fragmented, excessively long or arranged in a chequered pattern lands into possibly large and regular plots. The necessity to perform land consolidation is indicated by detailed analyses of parameters determining the need to consolidate lands that are carried out during the development of management and agricultural plans. Comprehensive land consolidation is regarded as the activity closely related to post-consolidation management processes. In accordance with the principle of equivalence, the participants of land consolidation or exchange receive lands of the equal estimated value in exchange for their previously owned areas (Vitikainen, 2004).

The performance of land consolidation works was regulated in accordance with the Act from 1982 on land consolidation and exchange. The purpose of land consolidation was the creation of more favourable management conditions in agriculture through the improvement of the area structure of farms, rational land expanse configuration, adjustment of property borders to the system of water melioration tools, construction of roads as well as terrain adjustment (The Act, 1982). The Polish accession to the European Union created the possibility to co-finance agricultural land consolidation within the framework of three consecutive EU programmes, including: 1. in the Sectoral Operational Programme "Restructuring and Modernisation of the Food Sector and Rural Development 2004–2006", priority "The Sustainable Development of Rural Areas", measure "Land consolidation"; 2. in the Rural Development Programme for the years 2007 – 2013, measure "Improving and developing infrastructure related to the development and adaptation of agriculture and forestry", scheme I

"Land consolidation" as well as in the RDP (Rural Development Programme) 2014 – 2020 in the measure "Investments in tangible assets", sub-measure "Land consolidation". The financial support for land consolidation was aimed at facilitating plots' exchange on arable land and establishment of economically viable holdings. The support could have been awarded solely for covering legal and administrative expenses related to land consolidation in the amount up to one hundred percent of the costs actually incurred.

The fundamental purpose of the research was to identify and compare actions between three indicated programming periods as well as to confront the obtained results with the data from the Agricultural Census in 2002 and 2010. The authors assumed that Poland belongs to the countries that are characterized with the highest level of land fragmentation on account of historical determinants of the conducted agricultural reforms, traditions resulting from inheritance and succession, socio-economic policy as well as other factors. Therefore the main hypothesis of the research is that agriculture bears specific economic costs, which impede competitiveness on the common European agricultural market. The studies related to the whole country were based on the rural development programmes, reporting data of the ARMA (the Agency for Restructuring and Modernisation of Agriculture), results from the Central Statistical Office (GUS) as well as other documents.

Consolidation of lands in the Sectoral Operational Programme 2004–2006

The Sectoral Operational Programme entitled "Restructuring and Modernisation of the Food Sector and Rural Development" defined the strategy and directions of actions in the scope of agricultural and rural development. The land consolidation measure was conducted on the areas characterized by considerable land fragmentation. Therefore, the support in the

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scope of consolidation procedure was mainly aimed at improving land expanse within individual agricultural holdings. As a result of the decrease in the number of agricultural parcels in holdings, the improvement in the management effectiveness was expected by reducing the costs of transport and facilitating mechanization of field crops. Moreover, within the project of consolidation, the works were conducted in the scope of post-consolidation land use, taking into account the requirements of natural environment protection. Financial support provided within this measure was supposed to lead to the improvement of the area structure in agricultural holdings, the reduction in the number of parcels in individual holdings, division of equivalent lands for farmers within a short distance from the seat of the farm or to delineation and arrangement of functional access roads to lands adjusted to the currently used agricultural machinery (ARMA Regulation, 2004).

Activities in the scope of land consolidation were part of the obligations of people delegated to Marshal's Offices. However, the beneficiaries were district starosts, who were responsible for the preparation of the whole complicated procedure of inducing farmers to agree to begin consolidation works. Consolidation works could have been initiated at the request of the owners of agricultural holdings, located in the designed area of consolidation and whose total area exceeded half of the designed consolidation area. Consolidation procedures could have also been initiated ex officio in some cases, after the prior opinion obtained from the solectwo¹ council as well as socio-professional farmers' organizations acting on the area of a given village.

According to the data of ex-post evaluation of the Sectoral Operational Programme 2004 – 2006, consolidation procedures were not undertaken in four provinces, that is, in the

Kuyavian-Pomeranian province, the Warmia-Masuria province, the Wielkopolska province as well as in the West Pomeranian province due to the lack of interest from potential beneficiaries. 45 applications came from starosts, from which 32 applications (71.1 %) were approved for realization in twelve provinces. On average, 154 agricultural holdings participated in one project. In the country, there were few projects but they were extensive in terms of the number of farmers participating in the project. The area under the process of consolidation within all realized projects was 20.4 thousand hectares of agricultural land. It was specified in the Programme that as a result of the initiation of projects in the scope of land consolidation, agrarian structure will be improved on the area of over 42.0 thousand hectares and this indicator was realized at the level of 49 %. The areas covered with land consolidation were situated in one or several villages or in their parts. These lands created a new area of consolidation. If there was a need to change the location of the lands constituting parts of agricultural holdings, for the rational land arrangement, it took place by mutual exchange. Such an exchange could be made at the joint request of the owners of these lands, and in the case of the lands owned by the Treasury Agricultural Property Stock – with the consent of the Agricultural Property Agency. The exchange could also cover lands with buildings (Ex-post evaluation, 2009).

In the Sectoral Operational Programme 2004 – 2006, the amount of 21.2 million euro was earmarked for agricultural land consolidation, including 17.0 million euro from the EU financial support and 4.3 million euro from the national support. In general, 31 projects were implemented as part of the measure for which the EU aid amounted to 16.5 million euro, which constituted 77.8 % of the EU financial means disbursed for the implementation of this measure. Considerable decline in the euro resulted in the failure to reach the full rate, which

¹ Solectwo - an administrative unit in Poland, a subdivision of a gmina; it is usually one village, but sometimes large villages may be divided into several solectwos, while in other cases one solectwo may consist of several villages (translator's note).

had an impact on the actual amount of financial means in PLN earmarked for this measure. Moreover, it was difficult to implement all projects within three years as consolidation works are characterized by a long period of projects' realization and it resulted in the need to extend the programme until 2008.

The issues related to land consolidation in the RDP 2007 – 2013

In the Council Regulation (EC) from 2005, it was stated that in order to ensure the sustainable development of rural areas, it is necessary to focus on the limited number of fundamental aims related mainly to the competitiveness of the agricultural sector and diversification of activities in rural areas. Particular support should be provided for the methods of land management leading to the application of appropriate methods of land use, which will be in line with the need to preserve the natural environment and landscape as well as the need to protect and improve natural resources. Further issues included biological diversity, the management of the Natura 2000 site, the protection of water and soil as well as mitigation of climate change. Agricultural land consolidation was identified as part of the measure "Infrastructure related to the development and adaptation of agriculture and forestry". Financial support was provided for the operations related to the access to farm and forest land, land consolidation and improvement, energy supply as well as water management (Council Regulation (EC), 2005).

Under the Rural Development Programme for 2007 – 2013, projects were realized in the scope of consolidation works and post-consolidation land use. The support was provided under the measure "Improving and developing infrastructure related to the development and adaptation of agriculture and forestry through land consolidation" and its aim was to improve the area structure of individual agricultural holdings. It was expected that as a result of reducing the number of plots, the improvement

in the management effectiveness can be achieved by reducing transport costs and facilitating the mechanization of field crops. In turn, post-consolidation works provided each plot with the access to technical infrastructure facilities. Post-consolidation works involved the construction of essential access roads to agricultural areas constituting the property of gminas as well as the improvement of technical parameters of melioration devices (ARMA Regulation, 2008).

Land consolidation processes play a vital role in the arrangement of rural areas as they make the functioning in the economic, social and environmental spheres more effective. Rural areas still have unclear and complicated legal situation. In many cases, agricultural parcels do not have direct access to a road. Apart from roads, also the melioration system was neglected, left without conservation and not adjusted to the realities of land farming. Defective spatial structure of a farm was also a certain obstacle to obtaining financial support in the form of direct payments for agricultural areas. In principle, the number of owners and property right should not be changed in the process of land consolidation. However, the process of consolidation changes the arrangement of land borders. Each participant of the consolidation received lands of the equal estimated value in exchange for the lands possessed before consolidation. The decision about the approval of the land consolidation project constituted the legal title to reveal the new state of the property in the land and mortgage register.

The measure in question was implemented under two schemes: scheme I – Land consolidation; and scheme II – Management of agricultural water resources. The measure under scheme I aimed at improving the area structure of agricultural holdings through consolidation works, delineation and construction of functional network of access roads to agricultural and forest

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lands as well as access ways to farm buildings and allocation of necessary lands for technical and social infrastructure within the scope of consolidation works. It was expected that 346 projects will be initiated with the average number of 70 agricultural holdings involved in one project. The total area of lands under the consolidation process was supposed to amount to 207 thousand hectares, whereas the average area of a farm subject to consolidation – about 8 hectares. In reality, the number of the realized consolidation projects was considerably lower compared to the assumptions.

The largest number of consolidation works, out of 109 issued decisions, were performed on the area of the Lublin province – 39 (35.8 %), the Podlasie province – 13 (11.9 %), the Lower Silesia province – 11 (10.1 %) and the Silesia province – 9 (8.2 %). These four provinces absorbed 70.4 % (64,8 million EUR) of the means earmarked for this aim.

The characteristics of ARMA Regulation from 2016 in the issue of land consolidation

The Regulation of the Minister of Agriculture is based on the EU and national legislation. In accordance with the EU legislation, the measure related to investments in fixed assets includes tangible or intangible investments, which improve the overall performance of the farm and concern infrastructure related to the development, modernization and adaptation of agriculture and forestry, including the access to farm and forest land, land consolidation and improvement as well as the supply and saving of energy and water.

In the new RDP 2014 – 2020, the operations like "Land consolidation" are part of the sub-measure "The support for investments related to the development, modernization and adaptation of agriculture and forestry". The objective of the sub-measure is to support the improvement of agricultural holdings' area structure in order to maintain and increase the competitiveness of the Polish agricultural sector. It is expected that this operation will facilitate the management of

agricultural production and will reduce the costs borne by agricultural holdings. Moreover, it should have the impact on the rational use of agricultural land resources through the adaptation of land expanses and existing infrastructure to the needs of agriculture. The process of land consolidation can be initiated at the request of the majority of owners of holdings, located on the designed area of consolidation or upon the request of the owners of lands, whose total area exceeds half of the area for consolidation (ARMA Regulation, 2015).

According to the provisions of the programme, the amount of support has been set at the level of 100 % of eligible costs and the maximum amount of money has been determined for the consolidation project and post-consolidation land use for 1 ha of lands covered with the consolidation process. The maximum levels of aid have been diversified for provinces in the mountainous and lowland regions. Controls in respect of refundable costs cover, in particular, verification of the reasonableness of the costs proposed. Costs are evaluated using the appropriate evaluation system, such as reference costs, a comparison of different offers or an evaluation committee. Under the act from 1982 on land consolidation and exchange, consolidation works are coordinated and implemented by a province self-government with organizational units established for the realization of such tasks in the form of the Regional Offices of Surveying and Agricultural Land (ARMA Regulation, 2016).

Land consolidation processes have been categorized as undertakings that can have a potentially significant impact on the environment. Therefore, preference shall be given to operations, which will have a positive influence on the environment, resulting from decisions about environmental conditions, as well as operations affecting the improvement of landscape values that are regarded as ecological, aesthetic and cultural values of the given region.

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In addition, such operations will be supported that will have a direct impact on the improvement of water relations in the scope of water retention. Separation of necessary lands for the purposes related to water relations improvement in the scope of water retention will also have the positive influence on natural water relations. Moreover, support will be provided for such measures that will aim at the allocation of lands for the local public benefit.

On account of the huge significance of the agrarian structure reconstruction in the relatively small area and within a short period of time, there was a need to secure the interests of all the parties involved. Therefore, the regulation includes the rules related to the provisions of the agreement in the scope of the rights and obligations of the parties, adopted safeguarding procedures of the proper performance of the obligation by the beneficiary as well as general conditions of financial means payment. The beneficiaries of the financial support specified in the regulation are starosts being the authorities carrying out and implementing the procedure of consolidation as well as post-consolidation land management processes (ARMA Regulation, 2015).

In accordance with the principle of providing financial support that is divided between the EU and member states, the current contribution of the EAFRD (the European Agricultural Fund for Rural Development) has been reduced to 63.6 %, which requires greater involvement of the State Treasury in the amount of 36.4 %. In the current financial perspective for the years 2014 – 2020, the amount of 139.0 million euro has been earmarked for the operations related to agricultural land consolidation, including the contribution from the EAFRD at the level of 88.4 million euro.

The characteristics of agricultural farms according to the number of plots and area groups of agricultural land

Historically, first consolidation processes were undertaken already in the 19th century, mainly in

the territory of the former Prussian sector. That is why the largest agricultural parcels in Poland are still located in the areas of Western provinces. After Poland regained its independence, one of the first laws was the Act from 1923 on land consolidation. At that time, farmers already wanted to possess huge and well-organized farms consisting of the smallest possible number of plots. Nowadays, consolidation is performed with particular consideration given to the improvement of farming conditions in agriculture (The Act, 1982). Since 2011, post-consolidation management has been involved in the consolidation process, including for instance construction and reconstruction of roads or the correction of drainage ditches' networks together with the improvement of their parameters. The idea of agricultural land consolidation aimed at the reduction in the number of parcels in the holding by joining the plots of one farm into bigger areas. During the previous period, the division of agricultural holdings among numerous heirs resulted in the arrangement of farms in a checkerboard pattern, which should disappear following the consolidation process. Thus, the improvement in the shape of plots should take place as well as the creation of more favourable conditions for mechanical field works. Moreover, consolidation works aimed at adjusting the boundaries of parcels to water courses, whereas roads width was adjusted to modern agricultural machinery.

When analysing the number of parcels in the agricultural holding, the definition of an agricultural parcel should be specified in the first place. According to the Central Statistical Office, the definition of an agricultural parcel provided in the Act from 26 January 2007 on payments in the framework of direct support system – "an agricultural parcel shall mean a continuous area of land, on which a single crop group with the area not smaller than 0.1 ha is cultivated by a single farmer" shall be used for census

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operations, and according to the ARMA, it shall be used to calculate area payments. In the case when a lot of various crops are cultivated in relatively small areas, the number of parcels increases. In this context, the analysis of the number of plots should be performed in individual groups of holdings. A good example of agricultural land consolidation are the results of the agricultural census from 2002, carried out just before the Polish accession to the European Union, in relation to the agricultural census from 2010, which covered the operations related to the realization of financial support for these measures and, in particular, the implementation of the principles and rules of the Common Agricultural Policy. In the context of restructuring and modernization of agricultural holdings, a favourable tendency towards the reduction in the number of farms was observed, at the same time with the process of land concentration, that is, the increase in their areas. In this sense, the positive result was the increase in the average area per one holding. Farmers aiming at extending their areas decided to intensify the process of specialization, which enabled them to obtain additional value and increase income. On the other hand, in some farms the extensification of production took place that aimed at the development of organic farms. These changes resulted from the redefinition of the objective of carrying out an agricultural activity, which consisted in maintaining lands in good agricultural condition without the need to realize production function, however, with the preservation of requirements concerning the natural environment protection. At a national scale, we can observe two tendencies in the scope of the average area of agricultural holdings according to area groups. One of them consisted in the tendency of farmers to increase the area of small (1-5 ha) and medium (5-10 ha) farms, but also those larger ones (10-20 ha). On the other hand, however, the number of large agricultural holdings started to decrease. The largest

decrease related to the holdings of 50 and more ha (of about 50.6 %). This phenomenon should be associated with the regulatory function of the Act on the Formation of the Agricultural System (2003), followed by the Act from 2011, in which the maximum area of one holding was determined at 300 ha.

It is considered an unfavourable phenomenon in the Polish agriculture that there are a lot of parcels within one agricultural holding. It is frequently associated with a problem that plots lie too far apart and far from the farms' headquarters. It follows from the data presented in the Agricultural Census from 2002 and 2010 that in the period under consideration, the number of small holdings of the size up to 1 ha decreased from 960.1 thousand to 702.0 thousand (of 26.9 %). However, the number of agricultural holdings with the area over 1 ha fell from 1956.1 thousand in 2010 to 1562.6 thousand in 2002. The Agricultural Census data indicate that out of 1562.6 thousand agricultural holdings with the area over 1 ha, only 201.9 thousand (12.9 %) units had a continuous area consisting of one parcel of agricultural land. It was the decrease equal to the results of the census from 2002, when such a situation related to 487.7 thousand of farms (24.9 %). As many as 504.3 thousand of agricultural holdings (32.3 %) had 2-3 parcels (previously 38.5 %), 334.7 thousand (21.4 %) had 4-5 parcels (in the previous census 18.5 %) and 297.5 thousand of farms (19.0 %) had 6-9 parcels (previously 12.2 %). 224.1 thousand farms (14.3 %) had ten and more parcels with agricultural lands in the area of the holding which, in comparison with the previous census, indicated the increase in the number of parcels and fragmentation of land expanse (previously 5.9 %). When taking this phenomenon into consideration within the framework of area groups, we can observe the process of the rise in the number of parcels that was reported in the period between agricultural censuses in 2002 and 2010.

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When interpreting the issue of the rise in the number of plots in one agricultural holding, it can be indicated that following the purchase of land, it did not undergo the consolidation process because of high costs of such an undertaking. Farmers were satisfied with the sole fact that the area of a farm was larger and they left the procedures related to land integration within a holding to be carried out later. In the regions, where the operations associated with agricultural land consolidation were performed within the framework of the Rural Development Programme, farmers were willing to participate in such undertakings. This level of interest was not shared by the areas, which were not financed from the EU funds. The previous programmes of land consolidation related only to the selected towns and, therefore, they were not practises of a common character.

When analysing the above data in terms of the number of agricultural parcels in individual provinces, we can conclude that agricultural holdings have undergone the process of a huge consolidation as a result of establishing a smaller number of units realizing the production on the same area of agricultural land. The overall number of agricultural parcels fell in the period between the censuses from 2916.3 thousand in 2002 to 2264.6 thousand in 2010 (of 22.3 %). There was considerably the largest number of agricultural holdings with one parcel (decrease of 44.5 %) and holdings with 2-3 parcels (decrease of 28.1 %). It means that there was a significant decrease in the number of farms under 1 ha, whose owners decided to finish the production or leave only the parcel near home. Agricultural holdings under 1 ha were excluded from direct payments. In the group of holdings having 6-9 parcels, their number increased by 26.8 %. However, the largest increase in the number of plots was reported in the group with 10 or more plots (of 94.4 %), which is reflected in the process of land concentration. The process of increasing the area of farms without regulating

the formal status of plots means that new and previous owners of the land accept the transfer of land.

When analysing the problem in terms of the number and structure of agricultural holdings in 2010, it is worth emphasizing two extreme phenomena, that is, the number of farms, which are characterized with possessing land expanse concentrated on one parcel as well as on holdings with 10 or more parcels. The largest number of holdings with one parcel were in the Malopolska province – 93.4 thousand (13.7 %), the Podkarpackie province – 71.6 thousand (10.5 %), the Lublin province 63.5 thousand (9.3 %) as well as the Mazovia province – 62.8 thousand (9.2 %). At the same time, they are provinces with the largest agrarian fragmentation; and frequently one parcel is, in fact, a small agricultural holding. In turn, on a national scale the largest number of farms, consisting of 10 and more parcels, was in the Mazovia province – 34.8 thousand (15.3 %), the Lublin province – 32.0 thousand (14.0 %) and the Małopolska province – 30.9 thousand (13.5 %). The evaluation of the above data indicates the need of specific concentration of the problem of land consolidation, which should have been conducted mainly in the Lublin, Malopolska, Mazovia und Podkarpackie province.

Conclusions

Rural development through land consolidation occurred in numerous European countries. Land consolidation resulted from similar needs in all countries, that is, from the need to adjust unfavourable land division and promote the appropriate shape of the agricultural property regarded as a uniform and compact unit. The fundamental rule was not to make any changes of the ownership status and when such a situation took place, changes were introduced on the basis of the principle of equivalence. In the EU, depending on the country, there were differences in the aims and procedures of land consolidation. The costs and ways of financing

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the consolidation were also different. Procedures were usually developed under the influence of historical trends, culture, tradition and law in each of the country.

Authors' research let to formulate the following conclusions:

- 1) In Poland, the consolidation process took place under the influence of the Act from 1982 as amended. Land consolidation consisted in the subdivision of new plots with a shape different from the original ones. Land consolidation was aimed at reducing the number of small and fragmented plots constituting an agricultural holding as well as at increasing their average size. Consolidation projects also involved works in the scope of managing post-consolidation lands that particularly consisted in the construction of functional access roads to agricultural areas as well as the performance of tasks affecting the regulation of water relations on the area of consolidation.
- 2) The study has shown that the process of land consolidation was completed in only a few villages due to high costs and the need to

obtain consent from most farmers. In the process of land consolidation and exchange, we are only at the beginning of the project leading to regulate this problem. The size of consolidation works should be considered through the prism of the number of villages (42.8 thousand) or communes (40.3 thousand), which are appropriate areas to carry out land consolidation.

- 3) In the past, agrarian changes in our country consisted in adopting the land reform (1944), as a result of which large landed properties were parcelled out. What is more, Poland belonged to the group of South-Eastern European countries, which opposed to the process of establishing agricultural production cooperatives. Therefore, in Poland the process of land consolidation had a different character and socio-economic conditions compared to other countries which resulted in the fragmented agriculture and the establishment of a large number of agricultural parcels. In this process, the appropriate land expanse can be achieved through land consolidation and exchange.

Bibliography

1. Ewaluacja ex post Planu Rozwoju Obszarów Wiejskich 2004–2006 – Raport Koncowy, 2009, (Evaluation Ex Post of Rural Development Plan 2004-2006 – Final report), IERiGZ, IRWiR, Warszawa.
2. Pasakomis G., Maliene V., 2010, Towards Sustainable Rural Development in Central and Eastern Europe: Applying Land consolidation, Taren Use Policy, Tom 27.
3. Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 8 września 2004 r. w sprawie Uzupełnienia Sektorowego Programu Operacyjnego „Restrukturyzacja i modernizacja sektora żywnościowego oraz rozwój obszarów wiejskich 2004-2006”, 2004, (Regulation of the Minister of Agriculture and Rural Development on 8 September 2004 on Complement to the Sectoral Operational Programme "Restructuring and Modernization of Food Sector and Rural Development 2004-2006), Ministerstwo Rolnictwa i Obszarów Wiejskich, Warszawa
4. Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 24 kwietnia 2008 r. w sprawie szczegółowych warunków i trybu przyznawania pomocy finansowej w ramach działania „Poprawianie i rozwijanie infrastruktury związanej z rozwojem i dostosowywaniem rolnictwa i leśnictwa przez scalanie gruntów” objętego Programem Rozwoju Obszarów Wiejskich na lata 2007–2013, 2008, (Regulation of the Minister of Agriculture and Rural Development on 24 April 2008 on detailed conditions and procedures for granting financial assistance under the measure "Improving and Developing Infrastructure Related to the Development and Adaptation of Agriculture and Forestry by Merging Land" under the Rural Development Programme for the years 2007 -2013), Ministerstwo Rolnictwa i Obszarów Wiejskich, Warszawa
5. Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 10.12.2015 r. w sprawie szczegółowych warunków i trybu przyznawania, wypłaty oraz zwrotu pomocy finansowej na operacje typu „Scalanie gruntów” w ramach poddziałania „Wsparcie na inwestycje związane z rozwojem, modernizacją i dostosowywaniem rolnictwa i leśnictwa” objętego Programem Rozwoju Obszarów Wiejskich na lata 2014-2020, 2015, (Regulation of the Minister of Agriculture and Rural Development on 10.12.2015 on detailed conditions and procedures for granting, payment and reimbursement of financial aid for operations of "Land Consolidation" within sub-activity "Support for Investments Related to the Development, Modernization and Adaptation of Agriculture and Forestry" under the Rural Development Programme 2014-2020), Ministerstwo Rolnictwa i Obszarów Wiejskich, Warszawa
6. Sabates-Wheeler R., 2002. Consolidation Initiatives after Land Reform: Responses to Multiple Dimensions of Land Fragmentation in Eastern European Agriculture, Journal of International Development

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7. Vitikainen A., 2004. Rural Development by Land Consolidation is Used in Several Countries in the Continent of Europe, An Overview of Land Consolidation in Europe, The Finnish Society of Surveying Sciences, No
8. Ustawa z dnia 20 lutego 2015 r. o wspieraniu rozwoju obszarow wiejskich z udzialem srodkow Europejskiego Funduszu Rolnego na rzecz Rozwoju Obszarow Wiejskich w ramach Programu Rozwoju Obszarow Wiejskich na lata 2014–2020, 2015, (The Act of 20 February 2015 on Support for Rural Development with the Participation of the European Agricultural Fund for Rural Development within the Framework of the Rural Development Programme 2014-2020), Ministerstwo Rolnictwa i Obszarow Wiejskich, Warszawa
9. Ustawa z dnia 26 marca 1982 r. o scalaniu i wymianie gruntow, 1982, (The Act of 26 March 1982 about Consolidation and Exchange of Land.), Ministerstwo Rolnictwa i Obszarow Wiejskich, Warszawa

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SOCIAL ECONOMY IN LATVIA: THE CASE OF CHARITY SHOPS

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Abstract. Social economy is a third sector among economies which develops slowly in Latvia. There is still lack of specific corresponding regulations, incomprehension within society and businesses about the core idea and functioning of social enterprises, lack of wider social recognition of this form of economic activity. Thus, the aim of the paper is to analyse experience of charity organization "Otra Elpa", which is the pioneer of social entrepreneurship in Latvia in terms of managing charity shops. The case study methodology was employed to answer two research questions: what factors influence development of charity shops, and what initiatives and projects have been supported by donations and charity. The data allows concluding that a lack of corresponding normative regulations hinders development of new social enterprises. There is a need for wider communication and explanatory work with businesses, municipalities, policy makers, and wider society. Donations collected in charity shops are used to support social projects in all regions of Latvia which aim to solve social problems at both national and local levels concerning socially vulnerable groups.

Key words: social economy, social entrepreneurship, charity, charity shops.

JEL code: L31

Introduction

Social economy is a new sector of economy evolving in Latvia, which is facing a number of challenges, for example, lack of specific corresponding regulations, incomprehension within society and businesses about the core idea and functioning of social enterprises, lack of wider social recognition of this form of economic activity. Thus, social economy is developing slowly.

The aim of the paper is to analyse experience of charity organization "Otra Elpa" ("Second Breath"), which is the pioneer of social entrepreneurship in Latvia and currently runs three charity shops (Otra Elpa). In order to reach the aim, the authors set following tasks: (1) to discuss theoretically the role of charity shops in social economy; (2) to investigate the experience of charity organization "Otra Elpa" employing case study methodology; (3) to identify factors affecting development of charity shops as a form of social economy in Latvia; (4) to study what types of social activities and projects are supported via charity. The authors seek to answer two research questions: (1) what factors influence development of charity shops; (2) what initiatives and projects have been supported by donations and charity? To answer these questions, the authors used case study methodology.

The role of charity shops in social economy

Social economy is defined as a third sector among economies between the private and public sectors, which is based on democratic values, and seeks to improve social, economic and environmental conditions in a given society (Lukjanska R., Cirule I., 2014). It includes organizations such as foundations, **cooperatives, non-profit organizations, social enterprises and charities**; social economy becomes more significant in Europe (Monzon Campos J.M., Chaves Avila R., 2012). It is because social economy promotes fulfilment of societal aims and has potential to create common wealth by producing goods and delivering services (Lukjanska R., Cirule I., 2014). In this paper, the authors focus on charity shops as a form of social entrepreneurship in social economy. Social entrepreneurship offers innovative solutions to social problems; income is planned to ensure entrepreneurial activities and reinvest in future development.

The role of social entrepreneurship is related to addressing problems of socially vulnerable groups, which are deeply rooted in and caused by traditional market economy (Dobele L., 2014). Solutions that social entrepreneurship seeks to offer can be reached by mobilizing and involving people from vulnerable groups in businesses (first off all offering employment opportunities), improving society's ability to ensure social

support, fostering economic growth and revitalizing surrounding. Charity shops allow from the one hand side to help those who are in need by donating and volunteering, and from other side – provides opportunity to earn some money for charity purpose. Operation costs normally are low; staff members often are volunteers or earn their salaries by working in the shops.

It is widely accepted that there are different methodologies and challenges to measure impact of social economy. There are differences among countries (Liger Q., Stefan M., Britton J., 2016). According to the Ministry of Welfare, in Latvia there is no precious statistics on social economy and social entrepreneurship, which leads to difficulties assess its wider impact.

Research methodology

The case study methodology (Yin R.K., 2003) was used in the research. The "Otra Elpa" as a case for the analysis was chosen for several reasons:

- it is the first charity shop chain in Latvia performing in compliance with understanding and core idea of social entrepreneurship;
- the organization is socially recognizable and sound cooperation partner among charity organizations;
- the operation of the organization is transparent, well communicated to public, and with well established and clear practices for selecting charity projects;
- the founder of the organization was involved in working group at national level coordinated by the Ministry of Welfare, which aimed to develop corresponding legal regulations for social entrepreneurship in Latvia.

In order to ensure methodological triangulation (Denzin N.K., 1978), data were obtained from various sources: literature review, statistics, semi-structured face-to-face and telephone interviews with representatives of charity organization "Otra Elpa" and the Ministry of Welfare of the Republic of Latvia, and the

authors' observations. One of the shops in Riga was visited and the authors were introduced with everyday work and premises.

Research results and discussion

The first charity shop of the organization "Otra Elpa" was established in 2009 as an innovative solution for already existing charity fund in order to attract resources for social projects. As economic crisis in 2009 exposed its peak, traditional sources for charity ran out and operation of the fund was under the threat. Private businesses experienced crisis, unemployment rates increased, and donation flow dramatically fell down. The idea of charity shop came from foreign experience where charity shops were already well established practice in social entrepreneurship: many nongovernmental organizations and charity funds ran their own shops. To introduce this social innovation in Latvia was a brave step and a challenge as it required from implementers a lot of explanatory work and discussions with public authorities. Even later, in 2012, it was investigated that social entrepreneurship was not defined in legislation and did not have specific regulations (Lesinska A., Litvins G., Pipike R., Simanska I., Kupics O., Busevica K., 2012).

Currently, the fund runs three shops – two in Riga and one in Liepaja. 15 people in total are employed, but the shops have agreements with volunteers whose involvement was crucial in the beginning of social entrepreneurship. The "Otra Elpa" cooperates with "Apeirons" – organization of disabled people, which offers volunteering in the shops to unemployed disabled people as opportunity to obtain some skills useful for a labour market. Analysis of the "Otra Elpa" activities shows that the fund addresses social problems of vulnerable groups.

The data show that during the period of last five years there is increase in amount of financial donations comprising 11 thousand of EUR per year on average (Table 1).

Table 1

Financial donations in 2009-2016, EUR

Year	Total sum of donations per year	Change over previous year	Change over 2009
2009*	658	x	x
2010*	658	x	x
2011*	658	x	x
2012	11 511	+10 853	+10 853
2013	15 285	+3 774	+14 627
2014	7 705	-7 580	+7 047
2015	8 096	+391	+7 438
2016	15 369	+7 273	+14 711

*average for 2009-2011 (total sum divided per year)

Source: author's calculations based on data available at <http://www.otraelpa.lv/>

Stability of donations has been explained by popularity and trustworthiness of the organization. Also in material donations there is a significant increase during the last five years (Table 2), which is approximately 60.5 thousand of EUR per year.

Most of the items brought directly to the shops are clothes and footwear, which constitute the biggest share of income after they are sold (Figure 1). This amount significantly increases each year. Among other items, first of all books and magazines should be mentioned.

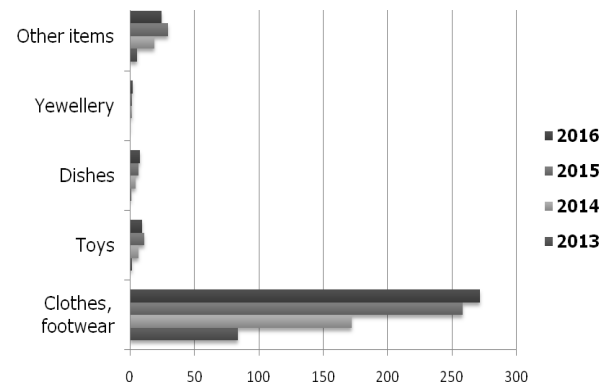
Table 2

Material donations in 2009-2016, EUR

Year	Total sum of donations per year	Change over previous year	Change over 2009
2009*	12 332	x	x
2010*	12 332	x	x
2011*	12 332	x	x
2012	26 613	+14 281	+14 281
2013	91 762	+65 149	+79 430
2014	202 662	+110 900	+190 330
2015	305 982	+103 320	+293 650
2016	314 885	+8 903	+302 553

*average for 2009-2011 (total sum divided per year)

Source: author's calculations based on data available at <http://www.otraelpa.lv/>



Source: author's calculations based on data available at <http://www.otraelpa.lv/>

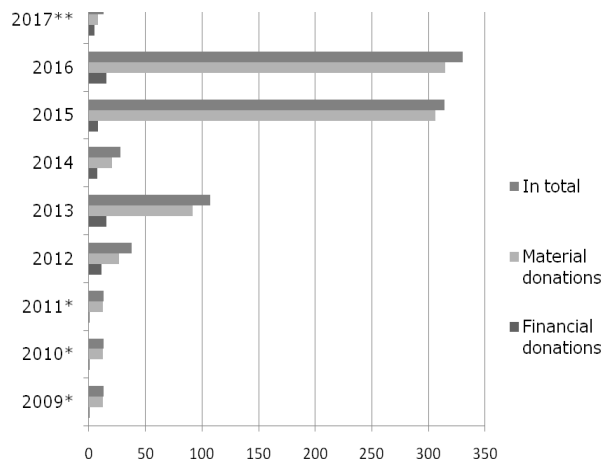
Fig. 1. Material donations in 2013-2016, thousand of EUR

After collecting and sorting material donations, the best (clean, qualitative, not worn-out and not damaged) items are sold in the shops. As shop's personnel do not provide cleaning and repairing services, they ask to donate items of good quality only. However, many items (mainly clothes and footwear) brought by people to the shops cannot be sold as their quality is not satisfactory anymore. Still, many of these things have been used, for example, as raw material for crafts or delivered to animal shelters. Keeping quality and cleanness standards is important in order to attract customers and maintain trustworthiness of cooperation partners. Shop assistants admitted that their everyday work involves also some elements of societal education: they explain and teach the culture of donation providing information on how donations are used, what quality of items is acceptable, how and where to donate, what initiatives and projects have been supported.

Sometimes people donate very valuable items (e.g. jewellery, antiques, fur, porcelain, and historical coins), which are not sold at regular basis but in organized auctions.

To summarize up, it is obvious from the Figure 2 that total amount of donations both financial and material has significantly increased during last couple of years.

Table 3



*average in 2009-2011

**in January 2017

Source: author's calculations based on data available at <http://www.otraelpa.lv/>

Fig. 2. **Material and financial donations in 2009-2017, thousands of EUR**

The organization has cooperation with a number of Latvian designers who create original art objects, clothes, accessories and other items of recycled materials. All works are sold in the charity shops for higher prices than donated items. 30 % of income is devoted to the shop.

The shops have established a very successful practice how to make donation more personally responsible by increasing involvement in decision making. Each customer and benefactor in the shop is offered to vote for a particular social project he or she would like to be supported by money that shop takes. On the basis of their own experience, to avoid situations when people should choose, for example, between helping animals or children, the shops offer voting for similar initiatives.

Even though the shops are in Riga and Liepaja (city in Kurzeme region), their supported target groups and social projects cover all regions of Latvia (Table 3).

Number of supported social projects in Latvia*in 2009-2016

Target groups/projects	2009-2011	2012	2013	2014	2015	2016	In total
Excellent students	N-3						3
Children with disabilities	R-2 N-3	Z-1 R-2	N-3 R-2	N-1 R-1	L-1 N-1 R-1	N-1 V-1	20
Legal support for NGOs	R-1 K-1						2
Prisons; people released from prison persons	R-1		R-1	R-1			3
Culture and public activities for children	R-1 K-1	N-1 K-3	N-4 R-1 L-1 Z-1 K-3	R-1 V-1 K-1 N-1	K-1	K-1	22
Sport activities	K-1	N-1	N-1		N-1	K-1	5
Musical activities, purchase of music instruments	K-1	K-1 N-1		K-1			4
Healthy life style	K-1	K-1		N-1			3
Environmental project		Z-1					1
Victims of violence		R-1	K-2	R-1			4
Learning projects		R-1N-1	N-2L-1			R-1	6
Social centres and shelters		V-1K-1	K-1	R-2	L-1		6
Innovative projects		K-1					1
Seniors			N-1	R-1	K-1		3
Children without parents			Z-1 V-1 K-1			V-1	4
Victims of Zolitude (in Riga) tragedy			N-1				1
Parishes			K-1			R-2	3
Soup-kitchens			K-1	K-1	R-1		3
Refuges						R-1	1
Projects in total	16	18	30	14	8	9	97

*N-national level, R-Riga, Z-Zemgale region, L-Latgale region, K-Kurzeme region, V-Vidzeme region

Source: author's calculations based on data available at <http://www.otraelpa.lv/>

Project ideas are proposed by organizations and submitted for a competition once in two months. Competitions are announced on the website. The fund chooses three projects and proposes them for voting – customers in the shops collectively choose an initiative.

Great part of the projects and initiatives are of national level, but many of them focus on local needs in regions, municipalities and non-governmental organizations. Most frequently, people support projects of national level and initiatives in Riga as well as Kurzeme region (mostly because the shops are in Riga and Liepaja); however, at least 4 to 5 projects have been supported also in other regions.

Analysis reveals that supported projects and target groups reflect social problems which society faces and that have not been addressed adequately by the state or municipal institutions. People most frequently vote for supporting children with health problems, sport activities and cultural events for children.

The data show that the number of social projects supported by the "Otra Elpa" is decreasing recent years; however, the financial support for a single project becomes bigger (Table 4). This is intentional strategic decision of the organization.

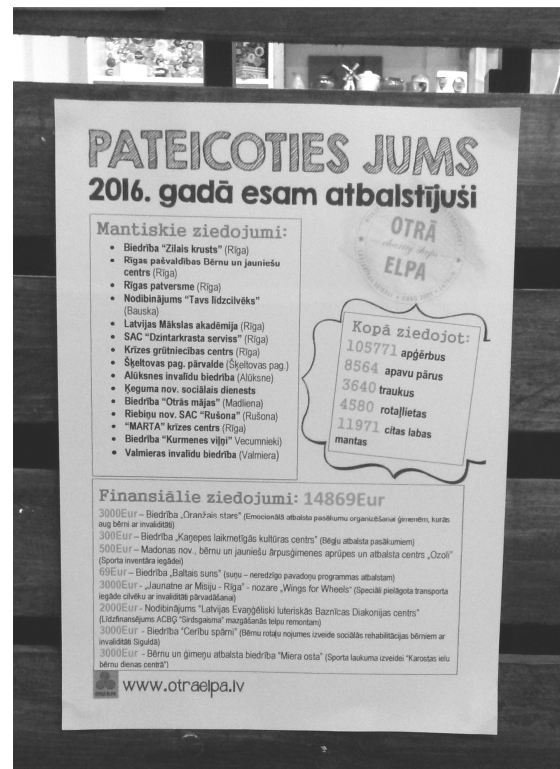
Table 4

Amount of resources allocated for social initiatives in 2009 - January 2017, EUR

Year	Allocated resources for all initiatives in total, EUR	Average resources for one initiative, EUR
2009 -2011	1974	123
2012	11511	640
2013	15285	510
2014	7705	550
2015	8096	1012
2016	15369	1708
2017 Jan	5000	2500
2009 -2017 Jan	64940	669

Source: author's calculations based on data available at <http://www.otraelpa.lv/>

For the transparency purpose and in order to get feedback as well as work for a future cooperation, it is important to communicate with benefactors about social projects supported by the fund. There is an information desk in the shops informing people about their contributions and supported projects (Figure 3).



Source: author's photo

Fig. 3. Information desk in the shop for benefactors and customers about their supported activities in 2016

As the fund "Otra Elpa" was a pioneer organization establishing charity shops in Latvia, it was involved in the work group under the Ministry of Welfare, which aimed to elaborate a national law on social entrepreneurship. During the interviews, it was acknowledged that the process was long, members of the working group often changed and social entrepreneurs as well as other social partners put much effort in explaining characteristics of their business. The law is almost elaborated; the Ministry of Welfare leads the pilot project testing intending legal norms during 2017. The fund suggests that social entrepreneurs should be released paying 21 % of VAT because they invest in social issues

addressing problems, which actually should be solved by the state or municipal institutions.

Conclusions

- 1) Social economy has development potential in Latvia. Unfortunately, there is no common understanding about this economy sector in wider society. However, policy initiatives and discussions in recent years have improved the situation.
- 2) Elaboration of normative regulations has been long and time-consuming process; therefore, businesses comprising elements of social entrepreneurship are temporizing towards future development and are not confident in tax policy and criteria endowing them legal rights of social entrepreneurship.
- 3) The aim of social enterprise such as charity shop is to be involved in solving social problems by creating invaluable contribution; however, there are difficulties in Latvia to recognize social enterprises and to measure their contributions, as there is no appropriate statistics. This leads to necessity for auditing potential businesses which meet criteria of social enterprise.
- 4) The profit of social enterprise always is reinvested in order to reach social aims. The Ministry of Welfare emphasizes the fund "Otra Elpa" as a case of good practice where flow of financial and material donations is well documented and transparent; the organization informs wider society about their achievements and aims.
- 5) Social entrepreneurship in Latvia currently is regulated by the traditional business rules, which often makes difficulties to adapt, for example, to bookkeeping requirements and system of annual reporting to the state authorities. It is expected that new coming law will solve a number challenges; however, there is a risk that the final version of the law will be still burdensome.

Bibliography

1. Denzin, N. K. (1978). *Sociological Methods: A Sourcebook*. New York: McGraw-Hill.
2. Dobeles, L. (2014). *Socialas uzņēmējdarbības iespējas Latvijā* (Social entrepreneurship opportunities in Latvia). Riga: Drukātava. pp. 470.
3. Liger, Q., Stefan, M., Britton, J. (2016). Social Economy. Brussel: European Union. p.123. Retrieved: <http://www.europarl.europa.eu/studies>. Access: 12.01.2017
4. Lukjanska, R., Cirule, I. (2014). Socialas uzņēmējdarbības pamatnostādnes, labas prakses apkopojums un ieteikumi Latvijas pasvaldībām (Guidelines for social entrepreneurship, summary of best practices, and recommendations for Latvian municipalities). Socialas Inovācijas Centrs. p.24.
5. Monzon Campos, J.M., Chaves Avila, R. (2012). The Social Economy in the European Union. Brussels: European Union, European Economic and Social Committee. p.118.
6. Yin, R.K. (2003). *Case Study Research: Design and Methods* (3rd ed.). Thousand Oaks, CA: SAGE Publications.
7. Lesinska, A., Litvins, G., Pipike, R., Simanska, I., Kupics, O., Busevica, K. (2012). *Latvija cēla uz sociālo uzņēmējdarbību* (Latvia on a way to social entrepreneurship). Riga: Providus, Pilsoniska Alianse. p.104.
8. *Otra Elpa (Second Breath)*. Retrieved: <http://www.otraelpa.lv/>. Access: 12.01.2017

EU FUNDING FOR THE DEVELOPMENT OF WATER MANAGEMENT INFRASTRUCTURE IN LATVIA

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Abstract. Water is one of the most important resources not only for individual consumption but also for all the industries of the national economy. For this reason, the development of water management infrastructure is an essential matter in any country's government policy. Funding from the European Union (EU) Funds is available for water management infrastructure in Latvia and other EU Member States. The research aim is to assess the development of water management infrastructure in Latvia in the programming period 2007-2013 and give recommendations for the next programming period's activities. The specific research tasks to achieve the aim are as follows: 1) to analyse the amounts of funding from the EU Funds for Latvia and support instruments for the development of water management infrastructure in the programming period 2007-2013; 2) to assess the contribution of the EU Funds to the water management infrastructure in Zemgale region in order to identify opportunities for its enhancement in the period 2014-2020. The research found that funding from the EU Funds, including that for the development of water management infrastructure, was spent unequally across the regions, as a considerably greater proportion of the funding was invested in Riga region, compared with the other regions. Funding from the European Regional Development Fund (ERDF) and the Cohesion Fund (CF), depending on the size of a populated area, is available for the development of water management infrastructure. After assessing the situation in Zemgale region, proposals were developed for responsible institutions distributing funding from the EU Funds for regional infrastructure projects in the period 2014-2020.

Key words: EU Funds, water management, infrastructure, regions.

JEL code: H54; O18

Introduction

Water is one of the most important natural resources. Water is necessary not only for individual consumption but also for all the industries of the national economy, beginning with agriculture through to energy production. It has been estimated that in the temperate zone every urban resident consumes on average 200-220 litres of water per day; yet, to meet all the needs of an individual, including the production of food and other goods as well as services, the consumption of water exceeds 320 litres per capita per day (Klavins, Nikodemus, Seglins et al., 2010). The United Nations Organisation (UN) declared in 2002: "Water is a constrained natural resource and a common good, which is the basis for life and health". According to the UN data, 1.1 billion people have no sufficient access to water and 2.4 billion people live in insanitary conditions (General Comment, 2002). Many countries have introduced water saving programmes (Klavins, Zaloksnis, 2010). According to the World Health Organisation's data, 1.6 million deaths are annually associated with the diseases caused by

insufficiently clean drinking water or the lack of the water (Bartram, Lewis, Lenton et al., 2005; Barry, 2007). A new concept – "the water footprint" – has been developed in the world to measure fresh water resources on the planet (Hoekstra, 2013; 2016).

There are large disparities in the availability of clean water among the EU Member States; it is affected not only by the availability of water itself but also climatic conditions and industrial and agricultural burdens. In the period 2001-2013, the availability of clean water increased by 26 % in Cyprus and 25 % in Malta, whereas it decreased by 77 % in Lithuania and 46 % in Slovakia (Energy, Transport and Environment, 2015). The state of Latvia's rivers has been evaluated as the fifth best in the EU. In Latvia, water streams and reservoirs form a single hydrological network and are an important biodiversity factor (Latvijas ilgtspējīgas attīstības..., 2010). Water quality is one of the most important aspects of any water supply system. Poor quality water can harm human health and also negatively affect household

appliances and water management infrastructure. Water management is important in the whole world (Shiklomanov, Rodda, 2004; Loizou, Koutroulis, 2016). In Latvia, it became very urgent after the accession to the EU as well as after the 2009 administrative and territorial reform (Zakis, Ernsteins, 2008). Water management infrastructure networks are classified into three categories: water supply; sewage drainage and rainwater drainage. Today, the water management system is much more complicated (Bell, 2012; Marchis, Fontanazza, Freni et al., 2014). Water management infrastructure involves both the production of drinking water and the supply of it to consumers as well as the collection and purification of sewage (Avritzer, Carnevali, Ghasemieh et al., 2015; Arregui, Cabrera, Cobacho et al., 2006). In the modern world, the management of water resources has to be a priority for governments (Heathcote, 2009). Many world countries exhaust their natural resources and, consequently, water becomes more scarce (Bouwer, 2000). The managers of water resources should focus on climate change (Khouri, 2006), water pollution, the growing population and migration, as the number of water extraction sites decrease (Biswas, 2004; Rodrigues, Nilson, Holanda, 2015).

In accordance with Section 15 of the Law on Local Governments (1994), local governments have to organise for residents the provision of utilities, including water supply and sewerage, irrespective of the ownership of the residential property. According to the National Development Plan of Latvia for 2014-2020 (2012), the availability of water-related services is one of the tasks of the government's economic policy related to government expenditure priorities.

The creation of any infrastructure is expensive, and it is difficult for Latvia to do it without financial assistance from the EU Funds. Accordingly, the **research object** is funding from the EU Funds for the creation and improvement

of water management infrastructure. The **research aim** is to assess the development of water management infrastructure in Latvia in the programming period 2007-2013 and give recommendations for the next programming period's activities. The specific **research tasks** to achieve the aim are as follows: 1) to analyse the amounts of funding from the EU Funds for Latvia and support instruments for the development of water management infrastructure in the programming period 2007-2013; 2) to assess the contribution of the EU Funds to the water management infrastructure in Zemgale region in order to identify opportunities for its enhancement in the period 2014-2020.

Research hypothesis: funding from the EU Funds for the development of water management infrastructure in Zemgale region in the programming period 2007-2013 was used efficiently.

Research methods applied: the monographic, descriptive and analysis methods, statistical analysis and a questionnaire survey.

The research employed research papers on economic development, assessment of the effects of funding from the EU Funds in the field of environmental economics, information provided by the Environmental Protection and Regional Development Ministry (EPRD) (2014a; b; s.a.) and the Ministry of Finance (2007; 2014; s.a.) of the Republic of Latvia, legal documents passed by the Cabinet of Ministers (2007; 2008) and information available on the website www.esfondi.lv. In accordance with the Regional Development Law (2002), there are five planning regions in Latvia: Kurzeme, Latgale, Riga, Vidzeme and Zemgale. However, Latvia's administrative division is as follows: 9 cities of national significance (with a population of more than 25000) and 110 municipalities (LR Administratīvo teritoriju..., 2008). This means that the research performs an assessment at two territorial levels: regional and municipal.

Novelty and topicality of the research. An examination of the situation in Zemgale region in the programming period 2007-2013 will provide more complete information about the amounts of and returns from investments in the water management infrastructure and the development of water management services and contribute to drawing up proposals for the programming period 2014-2020.

Research results and discussion

1. Funding from the EU Funds for Latvia and support instruments for the development of water management infrastructure

There were two EU Funds (the ERDF and the CF) available to Latvia in the programming period 2007-2013, the funding of which was intended for the development of water management infrastructure. According to the National Strategic Reference Framework for 2007-2013 (Finansu ministrija, 2007), EUR 4.53 billion were allocated for Latvia for implementing the Cohesion Policy targets by means of the EU Funds. The ERDF appropriation for Latvia in the programming period 2007-2013 equalled EUR 2.40 billion or 53.1 % of the total funding from the EU Funds, followed by the CF appropriation at EUR 1.54 billion or 34 % of the total.

The key principle of the EU's Cohesion Policy is to reduce disparities among various regions and the backwardness of less developed regions, mainly focusing on public infrastructure improvement and entrepreneurship promotion. The EU Funds make a positive effect on Latvia's economy. In 2011, funding attracted from the EU

Funds effectively assisted Latvia in coping with the global financial crisis. An assessment of the effect of the EU Funds reveals that since 2011 the positive annual effect of the Cohesion policy on gross domestic product (GDP) growth has been, on average, 1.4 %. Funding from the EU Funds mainly contributed to the domestic market. The projects funded by the EU Funds resulted in, on average, a 1.7 % increase rate in the average real wage and salary per year, causing a positive effect on private consumption, on average, at 1.2 % (Finansu ministrija, 2014).

An important indicator is the amount of funding from the EU Funds for the regions. A regression analysis revealed that there was a very strong relationship (0.99 for 2013; 0.98 for 2014; 0.98 for 2015) between the amount of funding invested in a region and GDP growth in the region, which became stronger from year to year. An increase in funding from the ERDF, the ESF and the CF for a region by EUR one million led to an increase in GDP per capita by: 1) EUR 20.75 in 2013; 2) EUR 28.15 in 2014; 3) EUR 52.64 in 2015.

In the programming period 2007-2013, the greatest amount of funding from the EU Funds, EUR 1.99 billion or 44 % of the total, was received by Riga region. The greatest number of all the projects implemented in Latvia in the programming period 2007-2013, 3856 or 54 % of the total, was implemented in Riga region, while the smallest amount of funding, EUR 0.49 billion, was received by Vidzeme region (Table 1).

Table 1

Funding from the EU Funds for and the number of projects implemented in Latvia in the programming period 2007-2013 as of 9 September 2015, EUR, %

Region	Funding disbursed		Number of projects		Avg per project thou. EUR	Devi-ation from avg %
	bln. EUR	%	number	%		
Kurzeme	0.840	19	977	14	860.5	+ 26
Latgale	0.597	13	672	9	888.4	+ 29
Riga	1.999	44	3856	54	518.5	-21
Vidzeme	0.488	11	875	12	557.8	-12
Zemgale	0.573	13	770	11	744.4	+ 15
Total:	4.498	100	7150	100	629.1	x

Source: authors' calculations based on ES fondi (s.a.)

According to the available data, 13 % of funding from the EU Funds in the programming period 2007-2013 were allocated for water management. Of the total CF appropriation for Latvia, more than EUR 427 million or 28 % were allocated for water management improvement, and the ERDF appropriation for water management in Latvia comprised approximately EUR 100 million or 6 % of the total. Financial assistance for environmental and service improvement was available under six activities. Two activities were established to attract funding for the development of water management infrastructure; under the activities, projects could be submitted on both a fully and a partially competitive basis (Noteikumi par darbības programmas..., 2007; 2008):

- activity 3.4.1.1. "Development of water management infrastructure in areas with a population of less than 2000";
- activity 3.5.1.1. "Development of water management infrastructure in agglomerations with a population of more than 2000".

The key purpose of activity 3.4.1.1 was the improvement of water supply, sewage collection and sewage purification quality and the expansion of availability of water management services through ensuring a high-quality living environment, reducing environmental pollution and water reservoir eutrophication and promoting the rational use of water resources and energy (Noteikumi par darbības programmas "Infrastruktūra...", 2008). The beneficiaries of funding were providers of public water management services that provided their services in the project's territory. The activities supported the production of quality drinking water, water supply and the protection of water resources, the reduction of environmental pollution from sewage and the provision of availability of related services. The maximum reimbursement rate for eligible costs per project was 85 % for ERDF funding and 15 % for national government

funding. Activity 3.4.1.1 had seven project submission rounds in the period 2008-2013.

Activity 3.5.1.1 focused on water management services - the improvement of water supply, sewage collection and sewage purification quality and the expansion of availability of water management services through ensuring a high-quality living environment, reducing environmental pollution and water reservoir eutrophication and promoting the rational use of water resources and energy (Noteikumi par darbības programmas..., 2007). The activity had six project submission rounds in the period 2008-2015.

The data on funding from the EU Funds for the development of water management infrastructure are summarised in Table 2.

Table 2

Funding from the ERDF and the CF absorbed under activities 3.4.1.1 and 3.5.1.1 in Latvia in 2007-2013 as of 1 April 2016

Territory	National funding, mln. EUR	ERDF or CF, mln. EUR	Total, mln. EUR	Num-ber of projects	Avg per project, mln. EUR
Activity 3.4.1.1					
Latvia	202	128	330	419	0.78
Zemgale	34	22	56	81	0.69
Activity 3.5.1.1					
Latvia	710	442	1152	117	9.84
Zemgale	105	69	174	21	8.31

Source: authors' calculations based on ES fondi (s.a.)

Funding from the ERDF allocated under activity 3.4.1.1 (Table 2) totalled EUR 143.4 million, of which approximately EUR 128.32 million were absorbed until 1 April 2016. Of the total number of projects, 81 were intended for the improvement of water management infrastructure in Zemgale region at a total cost of EUR 56.04 million; of the total cost, funding from the ERDF comprised EUR 22.8 million or 40.68 % of the total. The total cost per project was, on average, EUR 0.78 million; the projects implemented in Zemgale region, on average, were smaller in size, at EUR 0.69 million.

Under activity 3.4.1.1, according to the EPDM data as of 9 September 2015, the amount

of funding absorbed in Vidzeme region was the greatest, at EUR 37.37 million, of which the ERDF funding comprised EUR 32.14 million or 86 % of the total; the amount of funding absorbed in Riga region was the smallest, at EUR 25.32 million, of which the ERDF funding comprised EUR 22 million or 87 % of the total; the amounts of funding absorbed in the regions of Kurzeme, Latgale and Zemgale ranged from EUR 26.10 million to EUR 28.5 million, of which the ERDF funding accounted for 85-86 % of the total.

Funding from the CF allocated under activity 3.5.1.1 amounted to EUR 444.9 million (Table 2), of which approximately EUR 442.16 million were absorbed until 1 April 2016. Of the total number of projects, 21 were intended for the improvement of water management infrastructure in Zemgale region at a total cost of EUR 105.46 million; of the total cost, funding from the CF comprised EUR 69.2 million or 65.6 % of the total. The total cost per project was EUR 9.84 million, while in Zemgale region it was EUR 8.31 million.

Under activity 3.5.1.1, according to the EPDM data as of 9 September 2015, the amount of funding absorbed in Riga region equalled EUR 182.66 million, of which EUR 162.20 million or 89 % of the total came from the CF; the smallest amounts of funding were absorbed in the regions of Latgale and Zemgale, EUR 65.78 million and EUR 75.30 million, respectively, of which 90 % and 89 % of the total were received from the CF; similar amounts were absorbed in the regions of Vidzeme and Kurzeme, EUR 81.10 million and EUR 77.26 million, respectively, of which 88-89 % came from the CF.

An analysis of the distribution of funding allocated under activities 3.4.1.1 and 3.5.1.1 by region in the programming period 2007-2013 shows that 29.72 % of the total available funding was allocated to Riga region, 16.92 % to Vidzeme region, 14.98 % to Kurzeme region and 14.49 % to Zemgale region, while the smallest amount was allocated to Latgale region, which

indicates that no equal EU financial assistance opportunities were created for regional development and the improvement of water management infrastructure in all the regions of the country.

2. Assessment of the contribution of the EU Funds to the water management infrastructure in Zemgale region

Several methods were employed in assessing the efficiency of funding from the EU Funds for the development of water management infrastructure: 1) a questionnaire survey; 2) statistical analysis for the amounts of funding from the EU Funds disbursed under activities 3.4.1.1 and 3.5.1.1 in Zemgale region's municipalities.

A questionnaire survey was conducted from February to March 2016. The questionnaire was sent to individuals, business entities and institutions in Zemgale region. The purpose of the survey was to assess the development of water management infrastructure in Zemgale region in the programming period 2007-2013 and to draw up proposals for the next programming period's activities. In total, 164 questionnaires were received back.

A general analysis of the data showed that most of the respondents (58 %) resided in apartments, while the others lived in private houses. An analysis of the users of water management services in Zemgale region revealed that most of them, 66 %, used centralised sewerage services and 58 % used centralised water supply services. Part of the respondents had a private water well and a private sewage purification system.

An analysis of the data on information available to the respondents about available funding from the EU Funds for the development of water management infrastructure allows concluding that the Funds have considerably contributed to the water management infrastructure. Of the respondents, 59 % replied that a water management project had been implemented in their place of residence; such

projects made water management services more available for 45 %, while 56 % stressed that the water management services became of higher quality (cleaner water, less environmental pollution etc.). However, 37 % of the respondents had no opinion about the availability of services and 26 % had no opinion about the quality of the services, which indicated that the public were not aware of the water management projects implemented in their place of residence and the related improvements.

When asked: "Is the amount of funding allocated for water management projects in the period 2007-2013 sufficient?", 58 % had no opinion about the funding from the EU Funds for water management projects, which indicated the insufficient participation of the public in the implementation of the projects funded by the EU Funds and in benefiting from it. That is why 55 % of the respondents had no opinion on the effectiveness of water management projects funded by the EU Funds. Of the respondents, 44 % believed that the project implemented in their place of residence was effective.

An analysis of the respondents' opinions about the idea that the size of co-funding has to depend on the number of registered residents in a territory, most of them – 43 % – believed that the size of co-funding did not have to be fixed based on the population size.

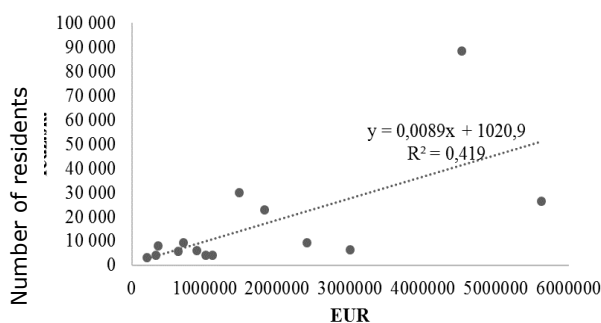
Most of the respondents (62 %) believed that all the costs, including those arising from constructing a central sewerage or water supply system and those arising from making a connection from a residential house to the main pipeline system, have to be included in the project's costs.

Although the opinion that such projects have to cover the cost of making a connection from a residential house to the main pipeline system is popular among the respondents, this increases the project's costs and decreases the number of beneficiaries of investments made by the EU Funds in the development of water management

infrastructure, as per capita project costs increase, which reduces the possibility to construct a longer main pipeline system in order that a greater number of residents can have access to the water management system.

The analysis of the amounts of funding absorbed in Zemgale region's municipalities in the programming period 2007-2013 under activity 3.4.1.1 in 2014 took into consideration: 1) the number of residents at the beginning of the year (CSB, 2016a); 2) the territorial development index (VRAA, 2016); 3) the number of market sector economically active statistical units (CSB, 2016b).

A regression analysis showed a causal relationship between the dependent and the independent variable. An increase in the amount of absorbed funding from the EU Funds for the water management infrastructure by one unit led to an increase in the number of residents by 0.008 units. The relationship between the amount of absorbed funding and the number of residents was medium strong (Fig. 1).

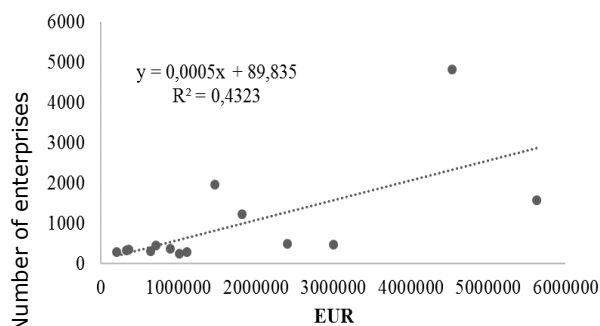


Source: authors' calculations based on CSB, 2016a; ES fondi, s.a.

Fig. 1. Relationship between the amount of absorbed funding for the water management infrastructure under activity 3.4.1.1 and the number of residents in Zemgale region in the programming period 2007-2013

An increase in the amount of absorbed funding from the EU Funds for the water management infrastructure by one unit resulted in an increase in the territorial development index by $8E^{-08}$ units. The relationship between the amount of absorbed funding and the territorial development index was weak (authors' calculations based on VRAA, 2016; ES fondi).

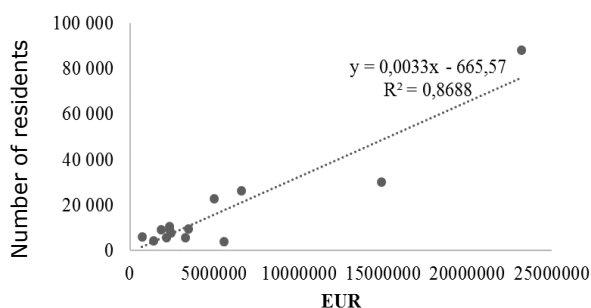
An increase in the amount of absorbed funding from the EU Funds for the water management infrastructure by one unit led to an increase in the number of enterprises by 0.008 units. The relationship between the amount of absorbed funding and the number of enterprises was also medium strong (Fig. 2).



Source: authors' calculations based on CSB, 2016b; ES fondi, s.a.

Fig. 2. Relationship between the amount of absorbed funding for the water management infrastructure under activity 3.4.1.1 and the number of enterprises in Zemgale region in the programming period 2007-2013

The analysis of the amounts of funding absorbed in Zemgale region's municipalities in the programming period 2007-2013 under activity 3.5.1.1 in 2014 took into consideration the following indicators: 1) the number of residents at the beginning of the year (CSB, 2016a); 2) the territorial development index (VRAA, 2016); 3) the number of market sector economically active statistical units (CSB, 2016b).

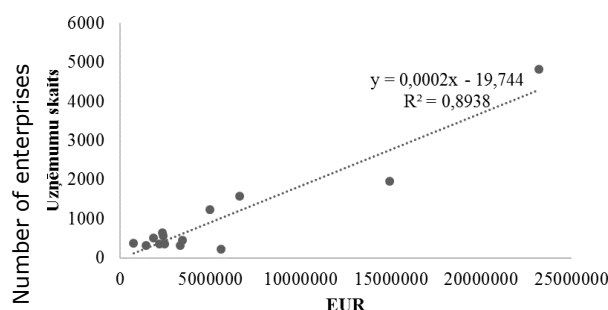


Source: authors' calculations based on CSB, 2016a; ES fondi, s.a.

Fig. 3. Relationship between the amount of absorbed funding for the water management infrastructure under activity 3.5.1.1 and the number of residents in Zemgale region in the programming period 2007-2013

An increase in the amount of absorbed funding for the water management infrastructure by one unit led to an increase in the number of residents by 0.003 units (Figure 3). The relationship between the amount of absorbed funding and the number of residents was very strong.

An increase in the amount of absorbed funding for the water management infrastructure by one unit led to an increase in the number of enterprises by 0.0002 units (Figure 4). The relationship between the amount of absorbed funding and the number of enterprises was also very strong.



Source: authors' calculations based on CSB, 2016b; ES fondi, s.a.

Fig. 4. Relationship between the amount of absorbed funding for the water management infrastructure under activity 3.5.1.1 and the number of enterprises in Zemgale region in the programming period 2007-2013

There was a very weak relationship between the amount of absorbed funding and the territorial development index value, which allowed concluding that investments in the water management infrastructure did not increase the value of the territorial development index (author's calculations based on VRAA, 2016; ES fondi).

The ERDF and CF investments in the water management infrastructure were partially effective, as there was a strong or medium strong correlation between the amount of absorbed funding and the numbers of residents and enterprises in Zemgale region. Undoubtedly, funding from the EU Funds and national co-funding for the water management infrastructure in Zemgale region: 1) enhanced the quality of

services; 2) reduced environmental pollution from non-purified sewage; 3) increased the availability of the services; 4) increased opportunities for the region to attract residents and enterprises; 5) improved the overall economic situation in the region.

However, the projects funded by the EU Funds for the purpose of improving the water management infrastructure in Zemgale region involved too high costs if measured per unit and did not result in the expected value-added because: 1) the funding was spent, yet, the number of connections to the water management system was insufficient; 2) enterprises were established at a low rate, as the investment costs had to be recovered; 3) in remote municipalities, the number of residents continued decreasing owing to urbanisation.

3. Proposals for raising the efficiency of use of funding from the EU Funds for the development of water management infrastructure in Latvia

In the programming period 2014-2020, EUR 4.418 billion are available to Latvia under the Cohesion Policy, of which EUR 623.05 million or 14 % of the total are intended for environmental protection and efficient resource use. Financial assistance is available for the reconstruction and expansion of sewage collection networks as well as the construction of connections to the water management system, the development of waste recycling and regeneration infrastructure, flood risk reduction, the preservation of biodiversity etc., of which EUR 142 million or 23 % of the total are allocated for the development of water management infrastructure, which is about four times less than in the programming period 2007-2013.

Both population agglomerations and the regions have to be categorised to provide equal opportunities for all the regions to receive funding for their water management infrastructure. Like in the programming period 2007-2013, funding has to be allocated for two activities: 1) financial assistance for

agglomerations with a population of less than 10 000; 2) financial assistance for agglomerations with a population of more than 10 000. Funding for agglomerations with a population more than 100 000 (Riga and Daugavpils) has to be earmarked and allocated on a partially competitive basis, as the two agglomerations show greater deviations from the indicators of cities with smaller populations.

The second categorisation has to be done at regional level – each region has to be assigned a score according to several indicators: 1) a ratio of the land area of regions/municipalities (industrial or residential) having an appropriate water management infrastructure to the land area with no appropriate water management infrastructure, in accordance with the EU directive. The highest score is assigned to a territory having an inappropriate water management infrastructure; 2) agglomerations that had not complied with the EU directive regarding the sewage purification standards until 31 December 2015. Agglomerations that have not complied with the EU directive are divided into groups by number of residents, and the highest score is assigned to a territory that has the highest population burden and produces the greatest environmental pollution; 3) the number of residents who will benefit from the improved water management infrastructure. Municipalities are grouped by number of residents who will have the improved water management infrastructure; 4) the number of enterprises that will benefit from the improved water management infrastructure. Municipalities are divided into groups by number of enterprises that will benefit from the improved water management infrastructure. The highest score is assigned to a territory having the greatest number of enterprises; 5) the average investment made using funding from the EU Funds per new job. Any project has to specify how many new jobs will be created in the place where funding from the EU Funds is invested in

water management. The highest score is assigned to a territory having the lowest cost per new job; 6) the average investment made using funding from the EU Funds per new connection to the water management system. Any project has to specify how many new connections to the water management system will be made on average and how many residents/enterprises will have access to the services. The highest score may be assigned to a territory having the lowest cost per new connection; 7) the average investment made in water management services by using funding from the EU Funds per new enterprise. Any project has to specify how many new enterprises will be established in the territory where the water management infrastructure is going to be reconstructed. The highest score is assigned to a territory having the lowest cost per new enterprise; 8) the territorial development index. Any project submitter has to specify the municipality's territorial development index. The highest score is assigned to a territory having the lowest territorial development index value.

Scores are assigned to projects after the criteria have been assessed, and funding is allocated for the projects having the highest score.

Conclusions, proposals, recommendations

- 1) The purpose of the EU Funds is to reduce regional disparities. In Latvia, however, 44 % of the total EU funding was disbursed in Riga region where 54 % of the total projects were implemented, while the other regions received 9-14 % of the total EU funding.
- 2) The development of water management infrastructure in Latvia is impossible without financial assistance from the EU Funds. In the

programming period 2007-2013, the following sources of funding were available for this purpose:

- 3) ERDF funding in the amount of EUR 330 million for areas with a population of less than 2000. There were implemented 419 projects with an average budget of EUR 0.78 million;
- 4) CF funding in the amount of EUR 330 1.1 billion for areas with a population of more than 2000. There were implemented 117 projects with an average budget of EUR 9.84 million;
- 5) The whole amount of ERDF and CF funding for the development of water management infrastructure was unequally distributed across the regions, as 30 % was received by Riga region, while the other regions received only 13-17 % of the total amount.
- 6) Zemgale region received 17 % of the total amount of ERDF funding and 15 % of the total amount of CF funding. The survey revealed that the EU Funds considerably contributed to the water management infrastructure; yet, the public was insufficiently informed about the water management projects. A regression analysis revealed an effect of funding from the EU Funds for water management on the numbers of residents and enterprises in Latvia's regions, while no association was identified between the funding and the territorial development index.
- 7) To foster the development of the regions in future, the responsible institutions, when redistributing funding from the EU Funds, have to allocate a certain amount of funding for each region through two activities according to the agglomeration size and a special project evaluation method.

Bibliography

1. Arregui, F.J., Cabrera, E., Cobacho, R. and Garcia – Serra, J., (2006). Reducing Apparent Losses Caused by Meters Inaccuracies. *Water Practice & Technology*, 1(4), doi: 10.2166/WPT. 2006093.
2. Avritzer, A., Carnevali, L., H. Ghasemieh, H. (2015). Survivability Evaluation of Gas, Water and Electricity Infrastructures. *Electronic notes in theoretical computer science*, The Elsevier, Science Direct 310 5 – 25, doi: 10.1016/j.entcs. 2014.12.010.
3. Barry, J.A., (2007). WATERGY: Energy and Water Efficiency in Municipal Water Supply and Wastewater Treatment Cost-Effective Savings of Water and Energy, pp. 1-44.

4. Bartram, J., & Lewis, K. Lenton, R. Wright, A., et al. (2005). Focusing on Improved Water and Sanitation for Health. *The Lancet*. 365 (9461), pp. 810–812. DOI: 10.1016/S0140-6736(05)17991-4.
5. Bell, S., (2012). Urban Water Systems in Transition Emergence Complex. *Organ.*, 14 (1), pp. 44–57.
6. Biswas, A.K., (2004). Integrated Water Resources Management: a Reassessment Water Int., 29 (2), pp. 248–256.
7. Bouwer, H., (2000). Integrated Water Management: Emerging Issues and Challenges Agric. *Water Manag.*, 45, pp. 217–228.
8. Central Statistical Bureau (CSB) (2016a). ISG01. Platība, iedzīvotāju blīvums un pastāvīgo iedzīvotāju skaits reģionos, republikas pilsetās un novados gada sākuma (*Area, Population Density and Resident Population by Statistical Region, City and County*). Retrieved: http://data.csb.gov.lv/pxweb/lv/Sociala/Sociala__ikgad__iedz__iedzskaitis/IS0010.px/?rxid=cdcb978c-22b0-416a-aacc-aa650d3e2ce0 Access: 10.12.2016.
9. Central Statistical Bureau (CSB) (2016b). SRG0111. Ekonomiski aktīvi uzņēmumi statistiskajos reģionos, republikas pilsetās un novados (*Economically active enterprises in statistical regions, cities under state jurisdiction and counties*). Retrieved: http://data.csb.gov.lv/pxweb/lv/uzreg/uzreg__ikgad__01__skaitis/SR00111.px/?rxid=073f5e9f Access: 10.12.2016.
10. Energy, Transport and Environment Indicators – 2015 edition. Eurostat Retrieved: Retrieved: <http://ec.europa.eu/eurostat/documents/3217494/7052812/KS-DK-15-001-LIDZ-N.pdf/eb9dc93d-8abe-4049-a901-1c7958005f5b> Access: 01.12.2016.
11. ES fondi: www.esfondi.lv (*EU Funds*). (s.a.). Retrieved: <http://esfondi.lv/2007.-2013.g.-planosanas-periods> Access: 11.01.2016.
12. Fondi un investīcijas (*Funds and Investments*) (s.a.). VARAM. Retrieved: http://varam.gov.lv/lat/fondi/Esp07_13/?doc=13667 Access: 14.01.2016.
13. General Comment No. 15, E/C.12/2002/11 (2002) United Nations Economic and Social Council. Retrieved: [http://www.unhchr.ch/tbs/doc.nsf/0/a5458d1d1bbd713fc1256cc400389e94/\\$FILE/G0340229.pdf](http://www.unhchr.ch/tbs/doc.nsf/0/a5458d1d1bbd713fc1256cc400389e94/$FILE/G0340229.pdf) Access: 12.02.2016.
14. Heathcote, I. W., (2009). *Integrated Watershed Management: Principles and Practice*. s.l.: John Wiley & Sons
15. Hoekstra, Y. A., (2013). Sustainable, Efficient, and Equitable Water Use: the Three Pillars under Wise Freshwater Allocation. *Wiley interdisciplinary reviews. Water*: 1(1), pp. 31–40, DOI: 10.1002/wat.2.1000.
16. Hoekstra, Y. A., (2016). A Critique on the Water – Scarcity Weighted Water Footprint in LCA. *Elsevier, Ecological Indicators*: (66), pp. 564–573, DOI: 10.1016/j.ecolind.2016.02.026.
17. Khouri, G., (2006). *Integrated Water Cycle Management: "An Australian Perspective"*. s.l.: European Water Publications.
18. Loizou, K., Koutroulis, E., (2016). Water Level Sensing: State of the Art Review and Performance Evaluation of a Low-cost Measurement System. *Elsevier, Measurement*: (89), pp. 204 – 2014. DOI:10.1016/j.measurement.2016.04.019.
19. Klavins, M., Nikodemus, O., Seglins, V., Meleciš, V., Virčavs, M., Aboltina, K. (2010). Vides zinātne (*Environmental Science*): *LU Akademiskais apgads*, p. 598.
20. Klavins, M., Zaloksnis, J. (2010). Vide un ilgtspējīga attīstība (*Environment and Sustainable Development*): *Latvijas Universitātes Akademiskais apgads*.
21. Komunālo notekudenu un notekudenu dunu apsaimniekošana Latvija (*Communal Sewage and Sludge Management in Latvia*). (2014a). VARAM. Retrieved: http://www.varam.gov.lv/lat/publ/publikacijas/vides_aizsardzibas_joma/?doc=11643 Access: 16.03.2016.
22. Latvijas ilgtspējīgas attīstības stratēģija līdz 2030. gadam (*Sustainable Development Strategy of Latvia until 2030*) (2010): LR Saeima. Retrieved: polsis.mk.gov.lv/LoadAtt/file16857.pdf Access: 26.02.2016.
23. LR Finanšu ministrija (*Ministry of Finance of the Republic of Latvia*) (s.a.) Finanšu ministrija. Retrieved: <http://www.esfondi.lv/jaunumi/fm:-es-fondi-ir-veicinajusi-latvijas-tautsaimniecibas-izaugsmi?print=1> Access: 11.12.2016.
24. LR Finanšu ministrija (*Ministry of Finance of the Republic of Latvia*). (2007). Valsts stratēģiskais ietvardokuments 2007. – 2013. gada periodam (*National Strategic Reference Framework for 2007-2013*), Rīga, Retrieved: http://www.esfondi.lv/upload/04kohezijas_politikas_nakotne/VSID_2009.pdf Access: 08.02.2016.
25. LR Finanšu ministrija (*Ministry of Finance of the Republic of Latvia*). (2014). ES fondi ir veicinājuši Latvijas tautsaimniecības izaugsmi (*The EU Funds Contributed to Economic Growth*), Rīga, Retrieved: http://www.fm.gov.lv/lv/aktualitates/jaunumi/es_fondi/48285-fm-es-fondi-ir-veicinajusi-latvijas-tautsaimniecibas-atlabšanu Access: 06.12.2016.
26. LR likums Par Pasvaldībām (*Law of Local Governments of the Republic of Latvia*). (1994). Retrieved: <http://likumi.lv/doc.php?id=57255> Access: 02.12.2016.
27. LR Reģionālās attīstības likums (*Regional Development Law of the Republic of Latvia*). (2002). "Latvijas Vestnesis", 53 (2628), 09.04.2002., "Zinotājs", 9, 09.05.2002.
28. LR Administratīvo teritoriju un apdzīvoto vietu likums (*Law On Administrative Territories and Populated Areas of the Republic of Latvia*). (2008). "Latvijas Vestnesis", 202 (3986), 30.12.2008., "Zinotājs", 3, 12.02.2009.
29. Marchis, de M., Fontanazza, M.C., Freni, G., Messina, A., Milici, B., Napoli, E., Notaro, V., Puleo, V. (2014). Energy Recovery in Water Distribution Networks. Implementation of Pumps as Turbine in a Dynamic Numerical Model. *Procedia Engineering*: (70), pp. 439 – 448, DOI: 10.1016/j.proeng.2014.02.049.
30. Nacionālais attīstības plans no 2014. līdz 2020. gadam (*National Development Plan for 2014-2020*). (2012). Retrieved: <http://www.pkc.gov.lv/nap2020/par-nap2020> Access: 22.01.2016.

31. Noteikumi par darbības programmas "Infrastruktūra un pakalpojumi" papildinājuma 3.5.1.1. aktivitāti "Udenssaimniecības infrastruktūras attīstība aglomerācijas ar cilvēku ekvivalentu, lielāku par 2000" (*Regulation regarding Operation Programme "Infrastructure and Services" activity 3.5.1.1 "Development of Water Management Infrastructure in Agglomerations with a Population more than 2000"*). (2007). MK 2007. gada 4. decembra noteikumi Nr. 836. Retrieved: <http://likumi.lv/doc.php?id=168377>. Access: 06.05.2016.
32. Noteikumi par darbības programmas "Infrastruktūra un pakalpojumi" papildinājuma 3.4.1.1. aktivitāti "Udenssaimniecības infrastruktūras attīstība apdzīvotās vietās ar iedzīvotāju skaitu līdz 2000" (*Regulation regarding Operation Programme "Infrastructure and Services" activity 3.4.1.1 "Development of Water Management Infrastructure in Agglomerations with a Population less than 2000"*). (2008). MK 2008. gada 28. jūlija noteikumi Nr. 606. Retrieved: <http://likumi.lv/ta/id/180167-noteikumi-par-darbibas-programmas-infrastruktura-un-pakalpojumi-papildinajuma-3-4-1-1-aktivitati-udenssaimniecibas-infrastrukturu> Access: 11.05.2016.
33. Respondentu aptauja (*Survey of Residents*). (2016). Unpublished materials.
34. Rodrigues, P.L., Nilson, F., Holanda, F. (2015). Recycling of Water Treatment Plant Waste for Production of Soil-Cement Bricks. *Materials Science*, (8), pp. 197–202, DOI:10.1016/j.protcy.2016.01.071
35. Shiklomanov, I.A., Rodda, J.C. (2004). World Water Resources at the Beginning of the Twenty-first Century. *Cambridge, UK: Cambridge University Press*. p. 449.
36. Novadu teritorijas attīstības līmeņa indeksi pēc 2015. gada datiem (*Municipality Territorial Development Index 2015*). (2016). VRAA. Retrieved: http://www.vraa.gov.lv/lv/analitiska_darbiba/attistibas_indekss/ Access: 26.02.2016.
37. Zakis, G., Ernsteins, R., (2008). Premise of Optimal Water Management in Latvia, Institute of Environmental Science and Management, *University of Latvia, section B*, Vol. 62 pp. 55 – 62. DOI:10.2478/v10046-008-00005-2
38. Zinojums par vides investīcijām (*Report on Environmental Investment*). (2014b). VARAM. Retrieved: http://varam.gov.lv/lat/publ/publikacijas/investiciju_joma/ Access: 12.03.2016.

SOCIO-ECONOMIC DEVELOPMENT IN POLAND'S WARSAW METROPOLITAN AREA AND THE REST OF MAZOWIECKIE VOIVODESHIP

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Abstract. The peripheral character of areas located outside urban centres makes it possible to preserve traditional landscapes and their rural character. On the other hand, territorial units of rural administrative status surrounding urban centres (such as Warsaw, Poland's capital), usually lose their rural character as a result of intensive development. The analysis of the differences in socio-economic development of semi-urban and rural gminas in Mazowieckie Voivodeship (Poland) using Hellwig's measure proves that rural gminas in the Warsaw Metropolitan Area are better developed than semi-urban ones in the other parts of the region.

Key words: rural areas, semi-urban areas, socio-economic development, Hellwig's measure.

JEL code: R51

Introduction

One of sixteen regions in Poland, Mazowieckie Voivodeship is located in the central-eastern part of the country. In the centre of the voivodeship, is Warsaw, Poland's capital. The region is diversified in terms of development conditions, such as road and rail accessibility, quality of infrastructure, investment attractiveness and the quality of social capital (Stanny, 2013; Wojewodzka-Wiewiorska 2014). The peripheral character of the outer part of the voivodeship enables the preservation of traditional landscapes and rural gminas (communes, municipalities, LAU 2); (Banski, Stola, 2002; Courtney, Errington, 2000). WMA is characterized not only by preferable arrangement of the road infrastructure and free spaces investment, but also by high natural values (Drejska, Chrznowska, Pomianek, 2014). A mismatch between the types of administrative territorial units and their functional type is very characteristic for the Warsaw Metropolitan Area (Gieranczyk, Kluba, 2008). The large share of urbanized areas in relation to the formal status of an administrative unit is visible in the majority of rural gminas surrounding Warsaw from the west. This is the result of intensive development, which leads to the loss of their rural character (Potencjaly i wyzwania..., 2014).

The aim of the paper is to uncover the differences in socio-economic development of semi-urban and rural gminas in Mazowieckie

Voivodeship (Poland), and to identify clusters of gminas with similar levels of development. The study includes all semi-urban (51) and (228) rural gminas in Mazowieckie Voivodeship (NUTS 2) in Poland (Table 1). The data of 2014 used to construct socio-economic development indexes come from the Local Data Bank of the Central Statistical Office in Poland (CSO LDB).

Table 1

Units accepted in the research

Group of gminas	Gminas - LAU 2		
	rural	semi-urban	total
Warsaw Metropolitan Area (WMA)	36	19	55
The rest of Mazowieckie Voivodeship (non- WMA)	192	32	224
Total	228	51	279

Source: author's calculations based on the Local Data Bank, Central Statistical Office in Poland

Considering the data availability at the LAU-2 level and their correlation, a set of 14 variables was prepared (Table 2).

The multidimensional character of rural development justifies the use of multivariate analysis methods, including taxonomic ones. Hellwig's synthetic measure of development (SM_i) groups information from a set of diagnostic features and assigns a single (aggregate) measure to an analysed objects using values from 0 to 1 under the assumption that in doing so, a lower value SM_i determines a higher level of the occurrence under analysis (Hellwig Z., 1968).

Diagnostic variables applied in the research

Symbol	Diagnostic variable
Society	
X ₁	Population density (population per 1 square kilometre)
X ₂	Change of inhabitants number per 1000 population
X ₃	Proportion of councillors with university degrees
X ₄	Proportion of councillors with high professional qualifications
X ₅	Foundations, associations and social organisations per 10000 population
Economy	
X ₆	National economy entities registered in REGON per 10,000 population
X ₇	Proportion of public entities in all entities registered in REGON
X ₈	Gmina's own-sources revenues per capita
X ₉	Proportion of registered unemployed in the working-age population
X ₁₀	Demographic dependency ratio (population of post-working age per 100 population of working age)
Infrastructure	
X ₁₁	Proportion of population with a water supply connection
X ₁₂	Proportion of population with a waste water disposal connection
X ₁₃	Gmina's property investment expenditures per capita
X ₁₄	Proportion of children aged 3-5 participating in preschool education

Source: author's calculation

The formula for determining this measure is as follows (Pomianek, Chrzanowska, 2016).

- 1) Normalization of diagnostic variables (x_{ij}),
- 2) Making all variables homogenous by transferring them into stimulants.
- 3) Construction the object with the best (highest) value of diagnostic variables (pattern)

$$z_{0j} = \max_i \{z_{ij}\} \quad (1)$$

where: z_{ij} –normalized values which have been observed in the (whole) data set;

- 4) Calculating the Euclidean distance (d_i) of each object from the constructed pattern.

$$d_i = \sqrt{\frac{1}{m} \sum_{j=1}^m (z_{ij} - z_{0j})^2} \quad (2)$$

where $i=1, \dots, n$ - the number of objects $j=1, \dots, m$ - number of variables, z_{ij} - normalized value of the variable j for the object i , z_{0j} - normalized value of the variable j of the pattern

- 5) Normalization of Hellwig measure was carried out by the following formula:

$$z_i = 1 - \frac{d_i}{d_0} \quad (3)$$

where: d_0 - value determined by the formula:

$$d_0 = \max_i \{d_i\} \quad (4)$$

The Hellwig's method was used to provide 4 rankings of semi-urban and rural communes in Poland. In each of them, communes were divided into following development classes.

Two parameters: arithmetic mean and standard deviation were used in classification of communes by their level of development. Following classes were defined:

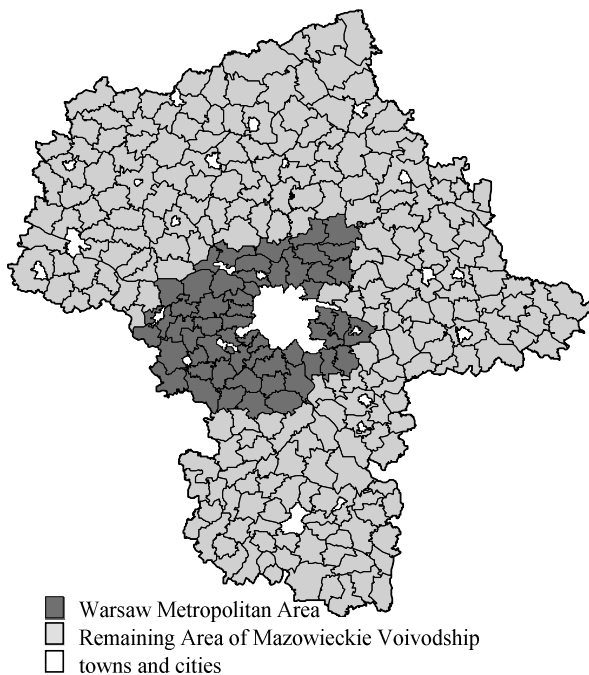
- Class 1 (very high level of development)
 $d_i \geq \bar{d}_i + s_{d_i}$,
- Class 2 (high level of development)
 $\bar{d}_i + s_{d_i} > d_i \geq \bar{d}_i + \frac{1}{2}s_{d_i}$,
- Class 3 (medium level of development)
 $\bar{d}_i + \frac{1}{2}s_{d_i} > d_i \geq \bar{d}_i - \frac{1}{2}s_{d_i}$,
- Class 4 (low level of development)
 $\bar{d}_i - \frac{1}{2}s_{d_i} > d_i \geq \bar{d}_i - s_{d_i}$,
- Class 5 (very low level of development)
 $d_i < \bar{d}_i - s_{d_i}$,

where:

d_i – value of synthetic measure calculated by Helliwig's method,
 \bar{d}_i – arithmetic mean of d_i ,

s_{d_i} – standard deviation of d_i .

The gminas were divided into two types: rural and semi-urban (urban-rural), and grouped into two areas (Figure 1).



Source: author's calculations based on the Local Data Bank, Central Statistical Office in Poland

Fig. 1. Mazowieckie Voivodeship including Warsaw Metropolitan Area in 2015

The first group is the Warsaw Metropolitan Area, consisting of 55 gminas (36 rural and 19 semi-urban), located around Warsaw. The second group includes 224 gminas (192 rural and 32 semi-urban), covering the remainder of the Voivodeship.

The following hypothesis was formulated: rural gminas in the Warsaw Metropolitan Area are more developed than semi-urban ones elsewhere in the voivodeship.

Research results

There were no gminas in the Warsaw Metropolitan Area in two lower classes (4 and 5). Moreover, there were no semi-urban gminas in

the very low development level class. Moreover, as Table 3 shows, 41,7 % of WMA rural gminas were in the very high development level class (class 1), and 19,4 % in the high development level (class 2). Together they account for more than 60 % of the highly developed gminas among the WMA rural gminas. On the other hand, analysis of the semi-urban gminas reveals that only 15,6 % of the units are in the very high development class and another 12,5 % fall into the high level class. This is more than twice lower (28,1 %) than the percentages for the WMA rural gminas.

The results (Table 4) show that an average proportion of population using the gmina water supply was higher in the non-WMA gminas than in the other spatial group. The WMA was highly differentiated: In Kampinos and Lesznów, the proportion was 100 %, while in Teresin it was 97 %. The lowest proportion was observed in Jabłonna, where only 13 % of the population used water supply connections. However, the suiTable investments are in progress. The situation was similar in the case of access to a wastewater disposal connection. The gminas' property investment expenditures were the highest in rural gminas of the first class (1217.79 PLN in WMA and 1142.09 in non-WMA). The WMA gminas were clearly superior in terms of the proportion of children aged 3-5 participating in pre-school education. Nonetheless, the preschool infrastructure needs to be improved in rural areas, especially in peripheral ones.

Table 3

Structure of development classes determined by Hellwig's method

Groups of gminas	Development classes										Total
	1 st Class		2 nd Class		3 rd Class		4 th Class		5 th Class		
	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	number of gminas	% of gminas in the group	
WMA											
Rural	15	41.7	7	19.4	14	38.9	0	0.0	0	0.0	36
Semi-urban	14	73.7	3	15.8	2	10.5	0	0.0	0	0.0	19
Total	29	52.7	10	18.2	16	29.1	0	0.0	0	0.0	55
non-WMA											
Rural	1	0.5	5	2.6	95	49.5	71	37.0	20	10.4	192
Semi-urban	5	15.6	4	12.5	21	65.6	2	6.3	0	0.0	32
Total	6	2.7	9	4.0	116	51.8	73	32.6	20	8.9	224
Total											
Rural	16	7.0	12	5.3	109	47.8	71	31.1	20	8.8	228
Semi-urban	19	37.3	7	13.7	23	45.1	2	3.9	0	0.0	51
Total	35	12.5	19	6.8	132	47.3	73	26.2	20	7.2	279

Source: author's calculations based on the Local Data Bank, Central Statistical Office in Poland

Table 4

Average values of the infrastructural component's variables

Groups of gminas	1 st Class		2 nd Class		4 th Class		5 th Class	
	rural	semi-urban	rural	semi-urban	rural	semi-urban	rural	semi-urban
Proportion of population with water supply connection								
WMA	82	86	87	91	-	-	-	-
non-WMA	92	93	91	90	84	70	68	-
Proportion of population with wastewater disposal connection								
WMA	53.1	61.3	25.2	52.8	-	-	-	-
non-WMA	50.5	62.4	37.0	56.4	16.6	20.6	4.9	-
Gmina's property investment expenditures per capita								
WMA	1217.79	740.62	723.29	685.07	-	-	-	-
non-WMA	1142.09	862.79	900.30	510.59	489.00	414.43	622.25	-
Proportion of children aged 3-5 participating in preschool education								
WMA	93.6	83.6	79.0	86.4	-	-	-	-
non-WMA	77.4	82.2	66.7	78.9	55.7	55.2	48.5	-

Source: author's calculations based on the Local Data Bank, Central Statistical Office in Poland

When it comes to the economic component of local development (Table 5), the number of national economic entities registered in REGON per 10000 population was higher in the WMA units, proving the greater investment attractiveness of these areas, and not only for

local entrepreneurs. On the other hand, the proportion of public entities in the total number of entities registered in REGON was growing unproportionally to the level of development. However, that was because the total number of entities was falling. WMA gminas' own-source

revenues were usually higher than in the rest of Mazowieckie Voivodeship, with one exception – Slupno, the only non-WMA gmina in Class 1, with 4163.58 PLN per capita. Metropolitan gminas were characterised by lower registered unemployed in the working-age population. However, the situation was otherwise as

concerned another development destimulus – the demographic dependency ratio. The results show that many of post-working age individuals opt to settle down in suburban areas. The rate exceeded 30 % in the following suburban gminas: Konstancin-Jeziorna, Brwinow, Blonie, Karczew, Michalowice, Raszyn and Kampinos.

Table 5

Average values of economic component's variables

Groups of gminas	1 st Class		2 nd Class		4 th Class		5 th Class	
	rural	semi-urban	rural	semi-urban	rural	semi-urban	rural	semi-urban
National economy entities registered in REGON per 10,000 population								
WMA	1556	1380	905	1004	-	-	-	-
non-WMA	1113	980	811	787	528	543	506	-
Proportion of public entities in all entities registered in REGON								
WMA	1.4	1.5	2.3	2.3	-	-	-	-
non-WMA	1.4	3.7	2.7	3.2	5.4	5.2	5.8	-
Gmina's own-source revenues per capita								
WMA	3506.32	2570.72	1716.10	2453.86	-	-	-	-
non-WMA	4163.58	2102.30	1462.44	1350.22	953.67	1141.07	810.01	-
Proportion of registered unemployed in the working-age population								
WMA	5.1	5.7	5.5	5.8	-	-	-	-
non-WMA	7.4	12.1	10.0	11.6	11.7	6.8	10.0	-
Demographic dependency ratio (population of post-working age per 100 population of working age)								
WMA	25.4	27.6	25.7	29.3	-	-	-	-
non-WMA	22.5	29.2	23.3	26.9	30.1	34.9	33.9	-

Source: author's calculations based on the Local Data Bank, Central Statistical Office in Poland

WMA gminas were more populated per 1 square kilometre. The difference between WMA and non-WMA gminas in the first class was two or even three times. Moreover, there is a tremendous gap between well-developed non-WMA gminas and the peripheral ones. The analysis shows that number of inhabitants per 1000 population, according to birth and migration rates, was positive in rural areas of the first and the second development classes (both regional groups) and in the WMA semi-urban gminas. The proportion of councillors with university degrees, high professional qualifications as well as the number of foundations, associations and social

organisations per 10000 population indicates the population is socially active. Again, there is a clear gap between the less developed gminas and those with a high or very high level of socio-economic development. Finally, there were more foundations or social organizations per 10000 population in the non-WMA gminas than in the metropolitan ones, which proves there is more social activity in the former one (Table 6).

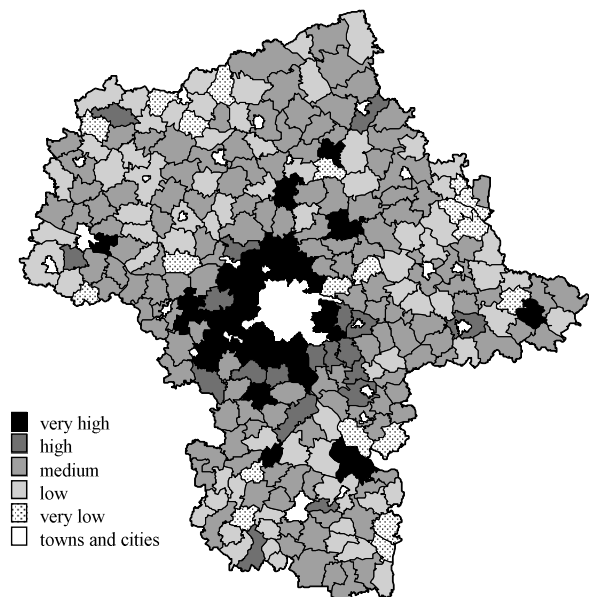
Table 7 presents the top and bottom 10 gminas in the ranking based on Hellwig's method. Di informs of matching the pattern. In the ranking of 279 gminas, the bottom 10 of the WMA group takes the last position, with 142.

Average values of social component's variables

Groups of gminas	1 st Class		2 nd Class		4 th Class		5 th Class	
	rural	semi-urban	rural	semi-urban	rural	semi-urban	rural	semi-urban
Population density (population per 1 square kilometre)								
WMA	209	354	107	124	-	-	-	-
non-WMA	95	116	108	121	44	34	38	-
Change in number of inhabitants per 1,000 population								
WMA	14.1	10.0	6.5	-1.8	-	-	-	-
non-WMA	16.1	-1.2	9.9	-1.0	-4.0	-12.1	-8.8	-
Proportion of councillors with university degrees								
WMA	46.1	57.3	35.2	26.7	-	-	-	-
non-WMA	40.0	50.7	36.6	53.3	19.6	16.7	12.5	-
Proportion of councillors with high professional qualifications								
WMA	35.2	48.7	30.5	20.0	-	-	-	-
non-WMA	40.0	35.0	33.8	46.7	10.3	13.3	5.7	-
Foundations, associations and social organisations per 10,000 population								
WMA	29	26	20	22	-	-	-	-
non-WMA	29	31	22	23	26	36	25	-

Source: author's calculations based on the Local Data Bank, Central Statistical Office in Poland

Figure 2 shows the spatial distribution of five levels of socio-economic development. Very highly and highly developed gminas concentrated around Warsaw, excluding the east part of the circle. The voivodeship's peripheral, outer gminas were characterised by a low or very low level of development. The relatively high level of social activity in these areas represents an opportunity to bolster development of these areas in the long term.



Source: author's calculations based on the Local Data Bank, Central Statistical Office in Poland

Fig. 2. Ranking of socio-economic development of rural and semi-urban gminas in Mazowieckie Voivodeship

Top and bottom 10s of the socio-economic development ranking

Top 10						Bottom 10					
WMA			non-WMA			WMA			non-WMA		
Position in ranking	Gmina	d _i	Position in ranking	Gmina	d _i	Position in ranking	Gmina	d _i	Position in ranking	Gmina	d _i
1	Lesznowola (r)	0.525	17	Slupno (r)	0.326	89	Zakroczym (s-u)	0.173	270	Rzewnie (r)	0.069
2	Piaseczno (s-u)	0.484	24	Kozienice (s-u)	0.294	93	Dąbrowka (r)	0.170	271	Nur (r)	0.068
3	Michalowice (r)	0.482	29	Pultusk (s-u)	0.271	101	Pniewy (r)	0.164	272	Lipowiec Koscielny (r)	0.066
4	Konstancin-Jeziorna (s-u)	0.426	32	Losice (s-u)	0.263	102	Baranow (r)	0.164	273	Ceranow (r)	0.066
5	Lomianki (s-u)	0.423	33	Bialobrzegi (s-u)	0.263	111	Leoncin (r)	0.158	274	Przylek (r)	0.063
6	Nadarzyn (r)	0.416	35	Rozan (s-u)	0.247	112	Brochów (r)	0.157	275	Szulborze Wielkie (r)	0.063
7	Grodzisk Mazowiecki (s-u)	0.401	36	Warka (s-u)	0.242	124	Puszcza Marianska (r)	0.149	276	Przesmyki (r)	0.058
8	Ożarów Mazowiecki (s-u)	0.399	37	Siedlce (r)	0.236	128	Chynów (r)	0.148	277	Maciejowice (r)	0.047
9	Stare Babice (r)	0.393	40	Lack (r)	0.226	140	Sochaczew (r)	0.144	278	Dzierzgowo (r)	0.023
10	Raszyn (r)	0.388	42	Szydłowiec (s-u)	0.222	142	Somianka (r)	0.144	279	Lutocin (r)	0.016

r – rural gminas, s-u – semi-urban gminas

Source: author's calculations based on the Local Data Bank, Central Statistical Office in Poland

Conclusions

- 1) The peripheral character of areas located outside urban centres makes it possible to preserve traditional landscapes and their rural character. The analysis shows that these areas usually have a low or very low level of development.
- 2) Territorial units of rural administrative status surrounding urban centres (such as Warsaw, Poland's capital), usually lose their rural character as a result of intensive development. These areas are characterised by high or very high socio-economic development.
- 3) The analysis of the differences in socio-economic development of semi-urban and rural gminas in Mazowieckie Voivodeship (Poland) using Hellwig's measure proves that

rural gminas in the Warsaw Metropolitan Area are better developed than semi-urban ones in the other parts of the region.

- 4) There were no gminas in the Warsaw Metropolitan Area in the two lower classes. This indicates the importance of WMA as a functional zone (suburban area, housing, industry, tourism, logistics, warehousing, trade). It also proves that these gminas have been attractive both for residents and investors due to their well-developed infrastructure, good accessibility and proximity to the capital.

Bibliography

Journal paper with author(s)

1. Banski, J. Stola, W. (2002). Przemiany struktury przestrzennej i funkcjonalnej obszarow wiejskich w Polsce (Transformation of Spatial and Functional Structure of Rural Areas in Poland). Wydawnictwo IGiPZ PAN, Warszawa.
2. Courtney, P. Errington, A. (2000). The Role of Small Towns in the Local Economy and Some Implications for Development Policy. *Local Economy*, Taylor and Francis Journals, vol. 15(4), November.
3. Gieranczyk, W. Kluba, M. (2008). Problemy i metody oceny kontinuum miejsko-wiejskiego w Polsce (Problems and Evaluation Methods of Urban-Rural Continuum in Poland). PTG, IGiPZ PAN, Warszawa.
4. Hellwig, Z. (1968). Zastosowanie metody taksonomicznej do typologicznego podzialu krajow ze wzgledu na poziom rozwoju i strukture kwalifikowanych kadr (The Application of the Taxonomic Method to the Typological Division of a Countries due to Their Level of Development, Resources and Structure of Qualified Personnel). *Przeglad Statystyczny*, no 4, pp. 307-328.
5. Pomianek, I. Chrzanowska, M. (2016). A Spatial Comparison of Semi-Urban and Rural Gminas in Poland in Terms of Their Level of Socio-Economic Development Using Hellwig's Method. [in:] Sroda-Murawska S., Dymitrow M. (red.), *Bulletin of Geography. Socio-economic Series*, 33, Torun: Nicolaus Copernicus University, s. 103-117. DOI: <http://dx.doi.org/10.1515/bog-2016-0028>
6. Wojewodzka-Wiewiorska, A. (2014). Dynamika rozwoju społeczno-ekonomicznego gmin wiejskich wojewodztwa mazowieckiego na tle innych typow gmin (Dynamics of the Socio-Economic Development of Rural Communes Relating to Other Types of Communes in the Masovian Voivodeship). *Journal of Agribusiness and Rural Development* 2014, no 2, pp. 213-223.

Books

7. Drejerska, N. Chrzanowska, M. Pomianek, I. (2014). *Strefa podmiejska Warszawy: wybrane zagadnienia* (Warsaw Suburban Area: Selected Issues). Wydawnictwo SGGW, Warszawa.
8. Stanny, M. (2013). *Przestrzenne zroznicowanie rozwoju obszarow wiejskich w Polsce* (Spatial Diversification of Rural Development in Poland). *Problemy Rozwoju Wsi i Rolnictwa*, IRWiR PAN, Warszawa.

Internet sources

9. Local Data Bank, Central Statistical Office in Poland, <https://bdl.stat.gov.pl/>. Access: 29.05.2016.
10. *Potencjaly i wyzwania dla Obszaru Metropolitalnego Warszawy* (Potentials and Challenges for the Warsaw Metropolitan Area) (2014), Miasto Stoleczne Warszawa, Warszawa, <http://omw.um.warszawa.pl/potencjaly-i-wyzwania-obszaru-metropolitalnego-warszawy/> Access: 15.07.2016.

REALIZATION OF AGRI-ENVIRONMENTAL PROGRAM IN WESTERN POMERANIA IN THE YEARS 2007-2013

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Abstract. This article presents the assumptions of agri-environmental program implemented in 2007-2013 on the example of West Pomeranian Province. The study presented the most important data on the number and amounts of applications for agri-environmental packages available, the number and amounts of decisions, the number of beneficiaries implementing various packages and the data on the area where the discussed packages were implemented. Available data indicate that of the 24 598 applications submitted in Western Pomerania, the package 2 - organic farming - gained the greatest interest among farmers but the package 9 - buffer zone - the least interest. The basic data used in the article were obtained from the West Pomeranian Regional Branch of ARMA and Management Information System (ARMA).

Key words: package, agri-environmental program, agriculture, organic farming, farmer.

JEL code: Q18

Introduction

At the moment of Poland's accession to the European Union, Polish agriculture largely was shaped by the Common Agricultural Policy. Currently, the Common Agricultural Policy largely pays attention to environmental protection and the preservation of biodiversity in rural areas.

The countryside and agricultural landscape of Poland are a part of Europe's particularly unique spaces owing to the natural landscape, the diversity of crops and living plant and animal species, the traditional methods of cultivation and uncontaminated soil. The enormous wealth of our agricultural landscape largely depends on maintaining extensive farming methods and the traditional landscape of Poland's countryside. This goal is achievable through implementation and realization of agri-environmental program. Implementing it in the farms ensures the maintenance of the surrounding agricultural landscape and helps to avoid the negative effects of the intensification of agricultural production.

Agri-environmental program is implemented under Axis 2 of the RDP 2007-2013 "Improving the environment and rural areas" and consists of 9 packages, which were divided into 49 variants.

The main objective of agri-environmental program is to improve the natural environment and rural areas, in particular (Rural Development Programme for 2007-2013):

- restoring the values or the maintenance of valuable habitats for agriculture and the preservation of biodiversity in rural areas;
- promoting sustainable management system;
- appropriate use of soil and water protection;
- protection of endangered local breeds of farm animals and local crop varieties.

The recipient may be a natural person, legal person or organizational unit without legal personality, engaged in farming in the production of plant or animal.

Applicants can apply for agri-environment payment if (Step-by-step..., 2011):

- are agricultural producers;
- are the holders of spontaneous or dependent farm located in the territory of Poland, with an area of agricultural land not less than 1 ha,
- implement agri-environmental business plan for a period of 5 years;
- keep a record of agri-environmental activities;
- retain the existence of the farm and maintain permanent grasslands and landscape elements not used for agricultural purposes, creating wildlife refuges as specified in the agri-environmental plan;
- observe the basic requirements on the whole farm;
- comply with other requirements arising from the various agri-environmental packages.

Farmers are required to use farming practices that are more than mere good agricultural

practices used on the farm. The program applies to common values and constantly enables to protect nature; therefore it is worthwhile to participate in it. The maintaining of traditional farming can save a lot of valuable habitats of high natural and landscape values, which were created over many years of use by humans (Gotkiewicz, Mickiewicz, Koszykowska, 2009, p. 545). In Europe, nature and landscape in rural areas are perceived as increasing value and thus is our pride showcase.

The perception of the agricultural landscape in recent years undergoes a significant evolution, mainly due to the global effort to slow down biodiversity loss. Agricultural areas are increasingly being regarded not only as a place of food production, but also as areas of conservation of genetic, species and ecosystem diversity, thus because of the pressure agricultural technology is particularly vulnerable to adverse effects (Fisher, Lindenmayer, 2007, pp. 265–280).

Threats to biodiversity in agricultural landscapes of Poland markedly deepened after the accession of our country to the European Union and adoption of the dominant model of agriculture in the Member States. Chmielewski and Wegorek (Chmielewski, Węgorek 2003, p. 203-210) as the main adverse factors have mentioned as follows:

- increasing surface area of farms and therefore increase in the surface area of fields and agricultural monocultures and the elimination or reduction of natural ecosystems and semi-natural systems, which are characterized by richness of species and ecosystem diversity;
- increasing chemicalization of agriculture, having an extremely negative impact on flora and vegetation segetal, companion crops, and edaphon, or soil fauna and numerous groups of species, representing both the level of herbivores and entomophagous;
- the use of heavy farm equipment, degrading the soil and destroying its biological life;

- collapse of pastoralism due to closed farming and thus - abandoning the use of meadows and pastures, causing the extinction of meadow and pasture with their specific flora, fauna and the world of mushrooms;
- cultivation of a few, carefully selected varieties of crops, leading to the gradual impoverishment of their gene pools.

The primary objective of this study was to present the objectives of agri-environmental program for 2007-2013 and its implementation in Western Pomerania.

For research, the author used materials from the Agency for Restructuring and Modernisation of Agriculture in Warsaw (mainly from the Regional Branch in Szczecin and Management Information System).

Characteristics of West Pomeranian Province

West Province is located in the north-western Poland, on the Baltic Sea and Szczecin Lagoon. The area of West Pomeranian Province is 22892.5 km² (7.3 % of the total area of the country), which is the fifth largest region of the country in terms of size and population (1 18 861 inhabitants).

In the west area of the province, it borders with Germany - the federal states of Mecklenburg-Western Pomerania and Brandenburg. The northern border of the province is the coastline of the Baltic Sea, which extends from Swinoujście in the west to the village of Wicko Sea in the east. From the south, the province borders on the Lubuskie and Wielkopolskie and to the east—with the province of Pomerania. The capital of the province is the city of Szczecin with a population of 408 172 (CSO data as at 31.12.2013.). The second largest city in terms of population is Koszalin (109 170 inhabitants - as of 31.12.2013.) (Szatkowska-Conon, 2014).

Administratively, the area of the province is divided into 18 land districts, 3 cities with district rights (Szczecin, Koszalin, Swinoujście), and 114

municipalities (including 11 urban, 50 rural-urban and 53 rural). Municipal Law obtain 63 localities.

The main branch of the economy in Western Pomerania is agriculture and the food industry. Important industrial branches are also wood industry, metal, chemical, shipbuilding and the production of electricity. Of great importance for the region are four commercial seaports: Szczecin, Swinoujscie, Kolobrzeg, and Police and several smaller ports and harbours that are also located on the territory (Report on the state... 2013, p. 6).

In 2013, the total area of farms in West Pomerania province amounted to 891.2 thousand ha. Individual holdings held 670.5 thousand ha, which accounted to 75.2 % of the total area of farms in Western Pomerania. The area of agricultural land of farms in Western Pomerania amounted to 836.8 thousand ha.

The overall agricultural area was dominated by sown area, whose share was 71.9 % (602.0 thou. ha). Permanent meadows occupied 13.2 % of the arable land (110.1 thou. ha) and permanent pastures - 4.4 % (36.7 thou. ha). Land left fallow accounted for 5.9 % (49.6 thou. ha) of the total agricultural land area. The share of permanent crops was 3.1 % (26.0 thou. ha); the area of orchards accounted for 2.5 % (21.0 thou. ha) of the total area of arable land and the area of home gardens was 0.1 % (0.7 thou. ha) of the total agricultural land area (Agriculture in Western Pomerania... 2014, p. 25).

The West Pomeranian region has exceptional natural value and economic value, because in this area there are:

- primeval forests: Goleniowska, Beech, Sand, Barlinek, Wkrzańska and Drawska;
- protected areas: Wolin National Park and Drawa National Park; 7 landscape parks; 116 nature reserves.

In scope of European network Natura 2000, within the province there were established 66 special areas of conservation of habitats and 23

special bird protection areas, thus aiming to preserve certain types of natural habitats and species that are considered rare and endangered (Szatkowska-Conon, 2014).

Certainly, energy is important aspect for the future development of the region, in particular renewable energy sources. Voivodeship is the national leader in the production of wind energy. In a seaside lane and in the direct vicinity of his reign, there are the best wind conditions in Poland. The share of renewable energy of the region in the total electricity production of Poland is twice higher than the average in the country (Strategic Program Economy, 2013, p. 12).

Agri-environmental program in Western Pomerania

In 2007-2013, agricultural producers had the opportunity to participate in 9 agri-environmental packages. There were the following types of packages available:

- PACKAGE 1. Sustainable farming;
- PACKAGE 2. Organic farming;
- PACKAGE 3. Extensive permanent grassland;
- PACKAGE 4. Protection of endangered bird species and natural habitats outside Natura 2000 areas;
- PACKAGE 5. Protection of endangered bird species and natural habitats in Natura 2000 areas;
- PACKAGE 8. Protection of soil and water;
- PACKAGE 9. Buffer zones.

In total, in Western Pomerania there were accepted 24 598 applications, of which 23 836 applications received a positive decision (Table 1). Most proposals have been adopted in 2013, more than 5.7 % of all applications filed in the country. The amount of aid requested by farmers in the western region amounted to 708 774 454.43 PLN, of which 643 138 189 PLN was the amount of aid paid.

Table 1

Number and amount of applications and the number and amount of decisions issued under Measure "Agri-environmental program" in Western Pomerania during the implementation of the RDP 2007-2013 *

	Number of applications submitted		The requested amount of aid (PLN)	
	Province. West Pomeranian	Country	Province. West Pomeranian	Country
Campaign 2008	1 045	21 726	19 330 081.61	184 398 869.67
Campaign 2009	1 660	37 395	37 351 207.53	369 178 936.35
Campaign 2010	3 457	65 667	96 296 588.70	776 474 990.97
Campaign 2011	4 952	88 692	147 273 664.19	1 123 815 758.60
Campaign 2012	6 623	116 247	198 605 274.59	1 508 141 270.43
Campaign 2013	6 861	120 315	209 917 637.81	1 649 118 172.64
	The number of decisions issued		The amount of the issued decisions (PLN)	
	Province. West Pomeranian	Country	Province. West Pomeranian	Country
Campaign 2008	977	20 557	17 813 129.50	169 193 889.94
Campaign 2009	1 622	36 406	35 500 149.18	345 929 746.22
Campaign 2010	3 329	63 668	88 399 113.94	727 429 596.71
Campaign 2011	4 810	86 358	139 486 086.75	1 074 893 875.23
Campaign 2012	6 480	113 691	190 010 596.16	1 439 189 853.22
Campaign 2013	6 618	117 156	189 742 243.40	1 528 454 620.27

* new findings and conclusions for the continuation of RDP 2007-2013

Source: Management Information System ARMA (data as of 31.10.2014)

In the country during the analysed period, according to the data from the West Pomeranian Regional Branch of ARMA (Table 2), the most frequently chosen package concerned the protection of soil and water (package of 8). In the province of West Pomerania, farmers' interest was focused on farming aspects (package 2). This means that farmers were willing to convert their farms to organic farms, and participation in agri-environmental program provides applying for a subsidy per hectare of organic production, which ranges from 260 PLN/ha to 1800 PLN/ ha, depending on the variant of the agri-environmental choice. In addition, farmers' growing knowledge and awareness of management, which is as part of the package 2, made them to choose this package that provided opportunity to apply for agri-environment payments in the area of the province investigated.

Table 2

Number of beneficiaries of individual agri-environmental packages in the years 2007-2012 in Western Pomerania

Agri-environment package	Number of beneficiaries	
	In the province. West Pomeranian	In the country
Package 1	1 239	35 962
Package 2	4 115	30 887
Package 3	2 521	48 350
Package 4	721	12 190
Package 5	743	10 351
Package 6	229	4 585
Package 7	52	3 630
Package 8	2 192	65 533
Package 9	2	173
Total	11 814	211 661

Source: author's study based on the data from the West Pomeranian Regional Branch of ARMA

Homesteads, which joined the realization of the Programme in 2007-2012 in Western Pomerania, implemented all available packages in the area of over 345 (Table 3). In the study area coincided with the most hectares of farms

implementing Package 2. Organic farming was implemented in more than 138 thou. ha (1.72 % of the total area of implementation of packages in the country), while the smallest area had a buffer zone in the package 9.

Table 3

Total area of the implementation of individual packages in scope of agri-environmental program in 2007-2012

Agri-environment package	Area of farms (ha) that joined the realization of the Programme in the years 2007- 2012	
	in the province. West Pomeranian	in the country
Package 1	75 489.63	1 207 309.75
Package 2	138 097.06	250 188.99
Package 3	33 874.71	953 371.77
Package 4	13 755.86	1 044 567.97
Package 5	19 658.23	1 400 400.02
Package 6	7 879.37	666 631.11
Package 7	1 867.83	680 609.34
Package 8	55 231.14	1 408 660.13
Package 9*	1 280.00	420 994.63
Total	345 853.83	8 032 733.71

* the total length of the buffer zone in the package

Source: author's study based on the data from the West Pomeranian Regional Branch of ARMA

Conclusions

1) Within the 9 available packages of agri-environmental program implemented in 2007-2013 in Western Pomerania, most

Bibliography

1. Agriculture in Western Pomerania in 2013. Statistical Office in Szczecin, Szczecin, 2014, p. 25.
2. Chmielewski T. J., Wegorek T. (2003). *Agricultural Production Space, and Biodiversity*. [W:] Biodiversity Polish. Andrzejewski R., Weigle A. (ed.). National Foundation for Environmental Protection, Warsaw, pp. 203-210.
3. Fisher J., Lindenmayer D. B. (2007). *The Landscape Modification and Habitat Fragmentation: Synthesis*. Global Ecology and Biogeography, Vol. 16, pp. 265-280.
4. Gotkiewicz W., Mickiewicz, B., Koszykowska J. (2009). *The Execution of Agri-Environmental Program in Podlaskie in 2004-2006 and 2007-2008*. Protection of Environment and Natural Resources, No. 41, Warsaw, p. 545.
5. Report on the State of the Environment in Western Pomerania in 2012. Szczecin, 2013, p. 6.
6. Rural Development Programme 2007-2013, 2011. Ministry of Agriculture and Rural Development, Warsaw.
7. Step-by-step Guide to Agri-Environmental Program 2007-2013, 2011. Ministry of Agriculture and Rural Development, Warsaw, pp. 11-12.
8. Strategic Program Economy. Szczecin, 2013, p. 12.
9. Szatkowska-Conon H. (2014). *The State of the Environment in Western Pomerania. Report 2014*. Collective Work. Regional Inspectorate for Environmental Protection in Szczecin

- 2) The lowest interest both in the country and in the test region concerned the package associated with the creation of buffer zones (package 9). This package requires the fulfilment of a number of complex requirements, but on the other hand, it plays an important role in the environmental protection.
- 3) The author's research leads to the conclusion that it is very important to conduct information and education campaigns on agri-environmental programs, which will greatly enhance the environmental knowledge of farmers.
- 4) Throughout the 5-year cycle of the agri-environmental program it can be seen that the interest in this program is a growing trend, which confirms the introduction of this type of activity in West Pomerania province.

IDENTIFICATION AND DEVELOPMENT OF BUILDING MANAGEMENT SYSTEM CHARACTERISTICS IN LATVIA

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Abstract. Building management involves both a certain amount of subject knowledge and specific actions that in the case of management are not limited only to building conservation, but are also associated with effective measures. Implementing a building management process, a customer should be sure that the service provided corresponds to a certain standard, certain level of professional competence. By signing an agreement with a professional and competent building manager, it is expected that a high-quality and professional service will be provided according to modern technological solutions. The topicality of the research is determined by the fact that over the past few years, technological advances in the field of building management call for a high level of professional competence of market players. The goal of the article is to study the scientific articles on building management characteristics and make their comparison with the study programs in the field of real estate management of the Republic of Latvia and evaluate their compliance with contemporary requirements. The present research examines scientists' experience and opinion expressed in the international environment, as well as the recent trends in the building management system, distinguishing the characteristic categories. Results of the research have proven that along with increasing globalisation and information technology development, the property management industry shows a tendency to provide a management system using the building control system and information technologies. Within the framework of the research, scientific research methods – scientific literature review, analysis, synthesis and logical constructive methods have been used.

Keywords: Residential housing, property management, real estate management, building maintenance, building management systems.

Jel Code: J24; J44

Introduction

Building maintenance is a worldwide issue and it is especially used as a timely corrective measure for damage and structural concerns; which, if not properly taken care of, could undermine the reputation and safety of the structure (Ines F.C., Jorge B., 2010). The principal goal of maintenance is to protect a building from damage (Othuman Mydin M.A, 2014) carried out in reaction to the worsening of a unit as designated by a change in its condition or performance (Pintelon, L. ETC., 2006).

In recent years, an increasing number of the so-called "smart" or "intelligent" houses have appeared on the real estate market. It should be noted that the management of these buildings is associated with in-depth knowledge of the latest technologies. Maintenance and management of these technologies makes it necessary to raise the level of competence of stakeholders involved in the management process.

This research examines scientists' experience and opinion expressed in the international

environment, as well as the recent trend in the building management system, distinguishing the characteristic categories.

The goal of the article is to study the scientific articles on building management characteristics and make their comparison with the Occupational Standard of the Republic of Latvia and evaluate its compliance with contemporary requirements. The main tasks are: to explore scientific literature written in the period from 1997 to 2015; to determine categories of management characteristics; to clarify building management main principles in Latvia; to compare categories identified during research with Latvian study programmes in the field of real estate management; to evaluate and analyse research results, to draw conclusions.

The key questions: What features characterise the building management and maintenance process? What trends are observed? in the building management system development? Does the existing Occupational Standard of Manager

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meet the development level of modern building management system?

Hypothesis: With increasing globalisation and information technology development, property management industry shows a tendency to provide a management system using the automated control system and monitoring.

Within the framework of the research, scientific research methods – literature review, analysis, synthesis and logical constructive methods – have been used. During the research, articles in the period from 1997 to 2015 have been studied.

Building Management System Characteristics

High quality maintenance management is urgently needed to increase the life cycle of the property and to minimise unexpected breakdown or deterioration (Mukelas M.F.M. et al., 2012).

Real estate manager works at companies, national and international organisations which operate in the fields related to real estate administration and management.

Buildings require maintenance to ensure optimal performance over their life cycle (Lateef, Abdul, O. Et al., 2009). To achieve this goal, it is necessary to effectively manage the labour factor using sophisticated information technology and good organisational skills (Li Y., Liu F., 2010), as well as operating a variety of engineering systems.

The modern manager will have to rely as much on knowledge from managerial and social sciences as on the traditional knowledge base of building construction techniques and deterioration (Mukelas M.F.M., et al., 2012). High-quality service is the basis of well-educated skilled workers' cycle (Lateef, Abdul, O. et al., 2009).

Due to the complex nature of building infrastructure and heterogeneity of its component systems and assets (Suzuki L.R., 2014), persons who are engaged in the maintenance of buildings should be able to operate in different directions:

safety management, laws, rules, regulations (Deng H., et al., 2008), monitoring and scheduled inspection, construction and repair, engineering maintenance, energy efficiency and financial calculations.

In the scientific literature, the field of building management is associated with a wide range of diverse characteristics and factors. For instance, the Swedish researcher has determined the following specific maintenance objectives: to execute daily housekeeping and cleaning to sustain an appropriately aesthetically pleasing facility, to swiftly react and repair minor discrepancies in the facility, to expand and frequently perform systematically scheduled maintenance checks to avoid untimely failure of the facility and its systems as well as its components, to complete major repairs based on the lowest possible life cycle cost (Imad A., 2009).

In addition, J. Lin, B. Ghodrati, U. Kumar indicate that profound knowledge of the work details and work plan is important for both maintenance engineers at the operational level to perform daily work better and for maintenance managers (at higher management level) to make optimum decisions. At each plant, there can be high-quality management systems, including Quality Management System (QMS), Occupation Health Safety Management System (OHSMS) and Environment Management System (EMS) (Lin J., et al., 2011).

The building management system is also related to repair and restoration work. It is also described in the majority of scientific articles.

The need to rebuild the building justifies the conclusion that each year building technical and normal wear and tear increases, and the building sector is aging (Geipele S., Auzins A., 2015).

Real estate management and construction business are becoming the trend of globalisation especially today (Chen X., et al., 2010). Modern management is increasingly entering new building materials, technical solutions as well as

information infrastructure. As a result, over the past ten years the development is characterised by the so-called "smart" or "intelligent" buildings.

Building information management systems have started to leverage new kinds of digital information infrastructures that integrate activities related to design, budgeting, scheduling, analysis, material management and human resources (Sylvain K., et al., 2014). These systems are based on the flexible communication infrastructure that provides availability of data in different aspects (Vanlande R., et al., 2008).

Management process cannot be carried out without any costs. It means that the process is characterised by management estimate development, construction estimate development, comparison of estimates in compliance with the market prices etc.

According to the researchers from Saudi Arabia, the main characteristics of management process are: to recognise, design and undertake enhancement projects to diminish and curtail the entire building's operating and maintenance costs, to operate the facility's utilities in the most cost-effective way while providing required dependability (Al-Khatam, J.A., 2003).

Management process includes management and construction calculation, financial reports, customer commitment, environmental health and safety ratings (Karodia, A.M., Soni, P., 2007), controlling functions as well as many other applications.

Establishing suitable maintenance strategies is based on the knowledge of the most frequent irregularities, the analysis of the respective causes (Sampaio A.Z., Augusto G, 2015), planning, directing, organising, controlling activities (Mukelas M.F.M., et al., 2012) and the study of the most adequate repair methodologies.

Research and Discussion

To ensure the validity and reliability of the data, the authors of the research have used 57

different articles written in the period from 1997 to 2015 by the researchers from different countries, for example, the USA, Great Britain, Germany, China, Malaysia, Saudi Arabia, Sweden, Lithuania, Latvia etc.

After summarising the data, categories have also been divided into 3 different subcategories by their frequency: high frequency, average frequency and low frequency (Table 1).

Table 1

Summary of categories

No.	Frequency	Category and Number of appearances
1	High frequency	Monitoring and scheduled inspection, 30
2	High frequency	Maintenance operations, 29
3	High frequency	Planning and directing, 28
4	High frequency	Construction and repair, 18
5	Average frequency	Building information management software, 12
6	Average frequency	Maintenance and management cost, 11
7	Low frequency	Energy efficiency, 9
8	Low frequency	Professional knowledge, 9
9	Low frequency	Sophisticated technology, 8
10	Low frequency	Legislation and technical standards, 6
11	Low frequency	Decision making, 4

Source: author's calculations based on research of scientific literature review

As a result of the study, 11 categories have been distinguished (see Table 1). Consequently, it has been concluded that 6 categories appeared more than 10 times. The data have shown that the main categories related to the building management system are:

- 1) monitoring and scheduled inspection;
- 2) maintenance operations;
- 3) planning and directing;
- 4) construction and repair;
- 5) building information management software;
- 6) maintenance and management costs.

The research results show (Table 1) that, with regard to the building management system, the category "Monitoring and scheduled inspection" is most commonly used (**30**). This indicates that in terms of the system the first category is exactly

the building monitoring and management system, which has become particularly topical in recent years, when communication has developed and there is a possibility to develop computerised building monitoring systems. The application of these systems is highly important in the non-residential sector.

The category "Maintenance operations" **(29)** has been used the same number of times in the overall analysis. It includes all the activities related to the building technical repair and maintenance, which is the primary works to ensure the successful building life cycle and functionality.

The category "Planning and directing" **(29)** indicates that the system is also based on the management system, without which the two above-mentioned categories will not function.

The category "Construction and repair" **(18)** is used less frequently. This indicates that the system is more associated with the implementation and monitoring functions and less with the functions related to restoration.

The category "Building information management software" **(12)** is associated with the development of programming in the field of building management. This category has also become the tendency over the past decade and is increasingly used as a system component.

The category "Maintenance and management cost" **(11)** – under this category there are several subcategories because the costs are related to development, administration, management and restoration.

Each of these categories includes a large variety of detailed features, which together form one large category (Table 2).

In Latvia, the principles of property management are determined in the Law on Administration of Residential Houses. They are as follows: continuity of the management process, selection of optimal management working methods, including optimal costing, providing service quality and building sustainability, the

preclusion of invasion of the safety of an individual during the administrative process and maintenance of environment quality during the management process (Law on Administration of Residential Houses, 2010).

Table 2

Categories and subcategories of the building management system

No.	Category	Example (subcategories)
1	Monitoring and scheduled inspection	Monitoring, Controlling Diagnosis, Climate control Identifying failures and damage Conditions and temperature
2	Maintenance operations	Protection, Cleaning services Housekeeping execution Identifying and eliminating the waste Operation of heating systems Operation of cooling systems Operation of mechanical systems Operation of electrical systems Maintenance equipment Ventilation, Assessment Air conditioning equipment Physical condition of a building
3	Planning and directing	Carried out as a result of knowledge Resource allocation Scheduling, Evaluation Provision of communication Safety, Management Quality, Administrative actions Enhancing the productivity Supervision actions, Service
4	Construction and repair	Construction, Renovation Reconstruction, Repair Design, Maintenance materials Material properties
5	Building information management software	Information infrastructure Information technology support Information availability
6	Maintenance and management cost	Maintenance costs Minimisation of the overall costs Development costs, Budgeting Repair costs, Construction costs

Source: author's calculations based on research of scientific literature review

According to the Occupational Standard of Real Estate Manager, the real estate manager performs duties related to the management of buildings technological and procedural requirements determined in technical documentation, implement renovation works, demonstrates a profound knowledge of construction management, construction material technology and building operations, selects the most effective real estate management techniques based on the forecasts concerning the

development trends in the real estate market, evaluation results of technological processes, administration engineering calculations and knowledge and apply of modern information technology. (Occupational Standard, 2017).

Evaluating the principles of the Law on Administration of Residential Houses, as well as the Occupational Standard of the Republic of Latvia, the following categories have been identified: *maintenance operations, planning and directing, as well as maintenance, management costs and building information management software*.

To implement real estate management pursuant to legislative framework, good practice management and quality, innovative solutions need a system, which arranges all the processes according to their characteristics, core values, criteria and functions.

The building management system is a set of interrelated processes that make up a single entity oriented to the achievement of a common goal. The sustainable development of the property depends on the organisation of the building management system.

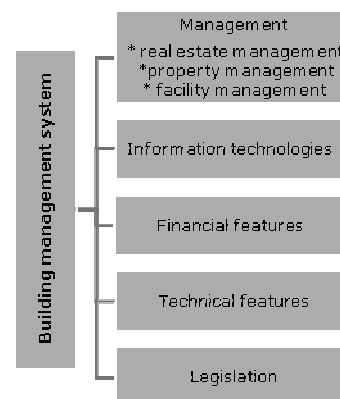
Building management is a complex approach to the proper maintenance of building, engineering system and functionally necessary plot, as well as the provision of services with the aim to benefit from the property and ensure its life cycle extension. To organise the successful management of a residential building, it is necessary to take into account the main management functions and their characteristic features.

By analysing all the features and reviewing the eleven distinguished categories, six broad categories have been identified, among which there is also a mutual synergy.

As a result of the analysis, it has been concluded that dividing all the characteristics into six broad categories, the only category, which is least mentioned (less than 10), is "Legislation". It can be concluded that in the scientific literature it

is considered that the main characteristics of the "building management system" are the ones arising from the execution and implementation, where any of these activities are based on legislation and technical standards that are met, implementing the system as a whole.

As a result of the study, summarising all the characteristics, the authors have distinguished only 5 categories (Fig. 1). In addition, the category "Management" could be subdivided into real estate management, property management and facility management.



Source: author's calculations based on research

Fig. 1. Categories of building management system

Within the framework of the study, the distinguished categories and subcategories have been compared with the curricula of Bachelor study and Master level.

Upon successful completion of the study programme, the graduates who have obtained the Qualification of Real Estate Manager are able: to perform real estate management in accordance with the technological and procedural aspects stipulated in the technical documentation, to analyse the planning and execution of real estate management, renovation works, to demonstrate a profound knowledge of construction management, construction material technology and building operations, to select the most effective real estate management techniques based on the results of evaluation of technological processes and administration engineering calculations, to conduct develop new

forms and methods of real estate management (Riga Technical University, 2017).

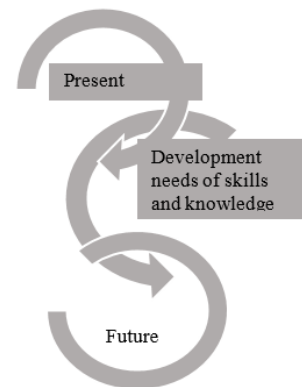
Thus, it can be concluded that gaining knowledge and developing skills in the given programme, students acquire both technological and management skills as well as gain insight into the latest technologies and their implementation in the industry that correspond to building management system categories demonstrated in Fig. 1.

Having obtained the relevant education, persons can work at state budgetary institutions, companies, non-governmental, international and national organisations, which operate in the field of real estate.

There is a key question whether the current programmes fully ensure the appropriate acquisition of the latest directions, especially in technology. The successful acquisition of study courses in real estate management determines the strengths and skills of real estate manager, working in the market, or, in turn, a lack of competences can lead to insufficient competitiveness among similar companies. Consequently, a dilemma appears – what skills and knowledge are necessary to be developed at present and what competences should already be planned to be acquired in the future. One of the solutions is to assess the use and development of skills and knowledge from the company's strategic development perspective. Thus, it can be concluded that in order to determine competence development priorities (Fig. 3), it is necessary to follow the changes taking place in building maintenance, management and construction.

In addition, to enable specialists to develop their skills and knowledge, there is a need for cooperation between companies operating in the field of real estate management and higher education institutions, which implement study programmes in real estate management. Vision of the future depends on the cooperation among institutions such as universities, managers'

associations, property owners' associations, construction associations, employers' associations etc. The development of knowledge and skills is part of the specialist's value scales that creates preconditions for employment potential in the future.



Source: author's based on research

Fig. 3. **Priorities of skills and knowledge development**

Conclusion

- 1) Within the research, the categories have been identified that indicate that the entire management process involves a range of categories with different characteristics, but the prevailing ones are the categories that have become increasingly important in recent years – monitoring associated with the development of building control system and information technologies.
- 2) By evaluating study courses of the study programme, the authors conclude that they include all the categories distinguished within the research. It proves that the study programme complies with the modern requirements, taking into account globalisation and continuous development in the field of information technology.
- 3) Within the framework of the study, the hypothesis has been proven.
- 4) To ensure the successful sustainability of the building life cycle, it is necessary to take building maintenance measures such as technical and sanitary maintenance and improvement works (cleaning of premises and territory, garbage disposal, deratization and

insect control), maintenance of all real estate structures, including buildings, their own structures as well as existing and related engineering systems (maintenance of water supply, sewerage and heat supply systems, ventilation and air conditioning systems, power supply, low-voltage systems), BMS (building management system) maintenance and monitoring as well as improvement and development of buildings and their substantial parts (repair, reconstruction, renovation) in such a way that these structures and systems meet the requirements specified in building project documents and do not become dangerous either to users, third parties, or the environment.

5) Proper management is cost optimisation, maintaining or improving the value of the property. In administering or managing the property, one should reckon with problems and costs; otherwise, the property can lose not only the value, but also can technically deteriorate to such an extent that full renovation is required. To ensure that everything mentioned above would be made in compliance with appropriate technical standards, customer requirements and legislative framework, it is necessary to regularly control and monitor the implementation of these measures, which means that their execution is ensured according to modern information technology solutions.

- 6) Specialists consider that the building life cycle is the time period starting from the moment when a building is constructed till the moment when it is demolished. Life cycle performance is both economic and ecological. Taking into account the economic aspects, the important issue is the costs necessary for building construction as well as management and restoration throughout the building life cycle. From the ecological point of view, the effect of building and its maintenance on environment is important.
- 7) By modelling the development of operation of real estate management company, it is recommended to consider its present operation in the management market and future prospects, including the resulting changes in technology, communication and management sectors.
- 8) The collected data are submitted for evaluation and approbation to the Association of Management and Administration of Latvian Housing in order to develop and improve the construction management system.
- 9) The obtained results will be used in future studies of the authors to identify the opportunities for raising and strengthening competences in the field of real estate management, which is related to the harmonisation of environment devoting particular attention to harmonisation of housing policy in the country.

Bibliography

1. Al-Khatam, J.A. Building Maintenance Cost. Master of engineering report, College of Environmental Design, King Fahd University of Petroleum & Minerals, Dhahran, Saudi Arabia, June 2003, p. 1-66. Retrieved: <http://studylib.net/doc/7501788/buildings-maintenance-cost---king-fahd-university-of-petr>. Access: 02.01.2017.
2. Deng Hao, Xu J., Zeng, H. Study on Measures and Strategies of Use Safety Management of Buildings in Longgang District of Shenzhen, 2008 IEEE. Information Management, Innovation Management and Industrial Engineering, 2008. ICIII '08. ISBN: 978-0-7695-3435-0, DOI:10.1109/ICIII.2008.58, pp. 490 – 493.
3. Geipele, S., Auzins, A. (2015). The Development of Housing Sector and Residential Real Estate Market after Economic Recession in Latvia. *Baltic Journal of Real Estate Economics and Construction Management*. Volume 3. Issue 1. Pages 103–119. ISSN (Online) 2255-9671. DOI: 10.1515/bjreecm-2015-0011
4. Imad, A. Maintenance practices in Swedish industries: Survey results, *International Journal of Production Economics*, vol. 121, no. 1, 2009, pp. 212-223.
5. Ines, F.C., Jorge, de B. A Systematic Approach for Maintenance Budgeting of Buildings Facades Based on Predictive and Preventive Strategies, *Construction and Building Materials*, vol. 24, no. 9, 2010, p. 1718-1829. Retrieved: <http://www.sciencedirect.com/science/article/pii/S0950061810000528>. Access: 02.01.2017.

6. Karodia, A.M., Soni, P. African Land Tenure and Foreign Land Ownership: Threat or Opportunity? Discourse Journal of Agriculture and Food Sciences, 2014 , ISSN: 2346-7002 Vol. 2(11): pp.295-308
7. Kubler Sylvain, Madhikermi Manik, Buda Andrea, Framling Kary, Derigent William, Thomas Andre, Towards data exchange interoperability in building lifecycle management, 2014 IEEE Emerging Technology and Factory Automation (ETFA)
8. Lateef, Abdul,O., Mohd Faris Khamidi and Arazi Idrus (2009). Maintenance Management of University Building, Proceedings International Symposium on Construction in Developing Economies: Commonalities Among Diversities, penang, 5-7 October 2009, CIBW107, University Science Malaysia, pp. 578-592
9. Legislation of the Republic of Latvia (2010). *Dzīvojamā mājā parvaldisanas likums* [Law On Administration of Residential Houses]. Retrieved: <http://likumi.lv/ta/id/193573-dzivojamo-maju-parvaldisanas-likums>. Access: 02.01.2017.
10. Legislation of the Republic of Latvia (2010) Noteikumi par Profesiju klasifikatoru, profesijai atbilstošiem pamatuzdevumiem un kvalifikācijas pamatprasībām un Profesiju klasifikatora lietošanas un aktualizēšanas kārtību. Profesiju standarti. [Regulations Regarding the Classification of Occupations, Basic Tasks Corresponding to the Occupation, Basic Qualification Requirements and Procedures for the Use and Updating of the Classification of Occupations]- Retrieved: <http://likumi.lv/doc.php?id=210806>. Access: 02.01.2017.
11. Lin, J., Ghodrati B., Kumar, U., House of Maintenance Management in Mining Industry, Quality and Reliability (ICQR), 2011, IEEE, DOI: 10.1109/ICQR.2011.6031679, pp. 46 – 51
12. Li, Y., Liu, F., Enlightenment of New Public Management Theory to the Party Building Management in Universities, 2010 IEEE. Management and Service Science (MASS), 2010 International Conference on. ISBN: 978-1-4244-5325-2, 10.1109/ICMSS.2010.5578020
13. Mukelas, M.F.M., Zawawi, E.M.A, Kamaruzzaman, S.N., Ithnin, Z., Zulkarnain, S.H. A Review of Critical Success Factors in Building Maintenance Management of Local Authority in Malaysia, 2012 IEEE Symposium on Business, Engineering and Industrial Applications
14. Othuman Mydin M.A., Significance of Building Maintenance Management Systems towards Sustainable Development, Academic Publishing House Researcher, 2014. Retrieved: http://www.erjournal.ru/journals_n/1401603141.pdf. Access: 03.01.2017.
15. Pintelon, L., Srinivas, K.P., Vereecke, A. Evaluating the Effectiveness of Maintenance Strategies, Journal of Quality in Maintenance Engineering, vol. 12, no. 1, 2006, pp. 7-20.
16. Profesiju standarti.- [Occupational Standard]. Retrieved: http://www.lm.gov.lv/upload/darba_devejiem/profesiju_standarti.pdf. Access: 04.01.2017.
17. Rīgas Tehniskā universitāte. Studiju programma "Nekustama īpašuma parvaldība. [Riga Technical University. The study programme "Real estate management"]. Retrieved: https://stud.rtu.lv/rtu/spr_export/prog_pdf_lv.124. Access: 04.01.2017.
18. Sampaio Alcinia Zita, Gomes Augusto M. Maintenance of Building Components Supported in Interactive Environments, Information Systems and Technologies (CISTI), 2015
19. Suzuki Larissa Romualdo, Brown Kevin, Pipes Stephen, Ibbotson John. Smart Building Management through Augmented Reality, 2014 IEEE, Pervasive Computing and Communications Workshops (PERCOM Workshops), DOI: 10.1109/PerComW.2014.6815174, pp. 105 – 110
20. Vanlande R, Nicolle C, and Cruz C. "IFC and building lifecycle management," Automation in Construction, vol. 18, no. 1, pp. 70–78, 2008.
21. Xing-hai Chen, Li-xing Li, Da-wen Huang. Research on The Best Maintenance Cycle Based on Maintainability of Housing, 2010 IEEE, Mechanic Automation and Control Engineering (MACE), ISBN: 978-1-4244-7737-1, DOI:10.1109/MACE.2010.5535995. pp.1577 – 1581

GASTRONOMIC HERITAGE: DEMAND AND SUPPLY

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Abstract. Gastronomic cultural heritage is a part of cultural heritage. Today people are becoming interested in gastronomic topics, such as reconstruction and conservation of cultural traditions, authentic cuisine, gastronomic customs and traditions at local, regional or national scale, and promotion of local products. Previous research studies conducted in Latvia focused on the progress of cultural heritage products as value and the introduction of such products by businesses in Latvia's rural areas. Scientific cooperation opened up opportunities to study the phenomenon across a wider geographical space covering four countries – Poland, Lithuania, Romania and Latvia. This research phase aim: identification of an impact of information on the demand-supply balance of gastronomic heritage as a product in the market. The method of the research: a sociological survey (n=1000 from Poland, Lithuania, Romania and Latvia; 285 men and 715 women) that was carried out during 2016.

Keywords: gastronomic heritage, demand , supply.

JEL code: 01, L66, L83

Introduction

At EU level, an increasing interest in European gastronomic heritage was manifested in the last years. In this sense, the European Parliament in the Report of 2014 states that gastronomy forms part of our identity and is an essential component of the European cultural heritage and of the cultural heritage of the Member States and emphasises the need to create awareness of the diversity and quality of the regions, landscapes and products that are the basis of Europe's gastronomy, which forms part of our cultural heritage, and also recommends the Commission to include European gastronomy in its cultural initiatives and programmes (European Parliament Report, 2014).

Previous research studies have led to a conclusion that gastronomic cultural heritage is a part of cultural heritage that can be contacted by any member of society under many and various circumstances, thus showing the understanding of the national value accumulated within many years (Albala, 2000; Katz, 2003; Bendiner, 2004; Poulain, 2005; Watson and Caldwell, 2005; Duran and MacDonald, 2006; Pfeilstetter, 2015; Matta, 2016).

The studies of revival and consolidation of national and local traditions, preservation of cultural and historical heritage are becoming increasingly popular worldwide (Nestle, 2000;

Mennell, 2005). This matter is influencing the marketing concept, especially in the field of gastronomy. The questions of locality and authenticity of gastronomic experiences are becoming vital nowadays. On this subject, in the project Food as Cultural Heritage: A critical and Comparative Perspective, Matta (2013) considers that "in different regional context, heritage policies are encouraging the revitalisation and the promotion of particular and "traditional" food products with different aims, such as cultural recognition and market exploitation. The listing of the "gastronomic meal of the French", the "traditional Mexican cuisine" and the "Mediterranean diet" as Intangible Cultural Heritage by UNESCO, along with promotion of "routes" of gastronomic heritage, are clear evidence of these trends. As a consequence, food cultures have moved to the centre of a triangulation between culture, identity and markets".

Today people are becoming interested in gastronomic topics, such as reconstruction and conservation of cultural traditions, authentic cuisine, gastronomic customs and traditions at local, regional or national scale, and promotion of local products.

Many authors consider gastronomy to be closely linked to cultural tourism, viewing food as a manifestation of the culture of a destination

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(Van Westering, 1999; Hjalager & Corigliano, 2000).

Scientific literature abounds today in papers devoted to gastronomy in the different aspects, as well as gastronomy tourism, gastronomic events or gastronomic festivals, but the benefits of gastronomic cultural heritage as a promoter of small business and as a response to globalization are still barely studied.

Many research studies indicate that the modern world is characterised by two pronounced trends: the expansion of globalisation in the economy, politics and culture and at the same time the preservation of national identity; the preservation of national cultural heritage and the use of it in real life are emphasised as significant indicators of national and territorial identity (Morley, 2002; Moore, 2007; Pieterse, 2015; González, 2017).

The trend of preserving and strengthening the national identity and of appreciating the cultural heritage emerges to ensure their transfer to next generations, stressing the role of cultural heritage in preserving the local identity. The national identity is strongly associated with the national country, a single ethnic community and a single culture, whereas globalisation erases these traditional boundaries, supposing that national identity and cultural uniqueness are possible only in relation to some locality, whereas globalisation as deterritorialisation (decreasing the role of territory) melts national uniqueness (Jeroscenkova, 2016).

The local products and ingredients have their own value in the context of globalization. The modern gastronomy has a strong local vocation: creative global chefs, in their pursuit of quality, encourage and commonly use fresh, local, non-industrialized and organic ingredients. But they do not feel bound to the area where they work because local has been redefined in nowadays (Scarpato and Daniele, 2003).

"Globalization will not make local cultures disappear", on the contrary, in a framework of

worldwide openness, "all that is valuable and worthy of survival in local cultures will find fertile ground in which to bloom" (Vargas Llosa, 2001).

The understanding of cultural heritage in terms of intangible and tangible value or historical and socio-economic value is an important feature of a society in the modern world regardless of a country's location or the ethnicity of the society (Jeroscenkova et al., 2016).

The European Parliament states that gastronomy is a source of both cultural and economic wealth for the regions which make up the EU, and in cultural aspects points out that gastronomy is an instrument which can be used to develop growth and jobs in a wide range of economic sectors, such as the restaurant, tourism, agri-food and research industries; it notes that gastronomy can also develop a keen sense for the protection of nature and the environment, which ensures that food has a more authentic taste and is less processed with additives or preservatives. Also, it stresses that gastronomy is a strong cultural export for the EU and for individual Member States and calls on the Member States to support initiatives related to agri-tourism that foster knowledge of the cultural and landscape heritage, offer regional support and promote rural development (European Parliament Report, 2014).

The concept of heritage leads us to a discussion of the continuity between past and present. Heritage provides historical depth and a permanent pattern in a perpetually changing world. Heritage is part of the present, and at the same time holds promises for the future; the problem of the past is a modern one. (Besiere, 1998).

Gastronomic heritage has positive economic impacts, especially for rural areas. As tourists become more adventurous in their interest areas, rural areas have an opportunity to develop. Promoting gastronomic heritage in rural areas helps local farmers, producers and small business

owners, and helps these rural economies to diversify (Everett and Aitchison, 2008).

Gastronomy is one of the elements incorporated in a new concept of cultural heritage and cultural tourism, driven by growing trends of a well-being lifestyle, authenticity, environmental protection and the need to have a high-quality experience. The relationship between gastronomy and heritage is a key motivator for travel (Van Westering, 1999). Tourists increasingly want foods which emphasise the heritage and culture of a place, which assist the preservation of traditional forms of agriculture and cultural heritage. Tourists agree that local cuisine is an important part of the culture of the region and that the taste experience is important to the overall experience of the journey (Velissariou and Vasilaki, 2014). In this context, gastronomy, as a tourist resource, is appreciated not only for its own sake, but also for its ability to generate rural development. Gastronomic tourism is helping to increase rural revenue sources and improve income levels and employment of local labour (especially women). "Local food" has the potential to enhance the visitor experience by connecting consumers to the region and its perceived culture and heritage (Sims, 2009).

Gastronomy is considered an important cultural product, not only being by itself very attractive for visitors, but also constituting a valuable complement to the conventional portfolio of cultural products offered by destinations, which includes the monuments, museums, local architecture, etc.

Previous research studies conducted in Latvia focused on the progress of cultural heritage products as value and the introduction of such products by businesses in Latvia's rural areas (Jeroscenkova, 2013; Kruzmetra, 2013a; 2013b, Jeroscenkova et al., 2016).

The consumption of local products which are considered as 'authentic' and qualitative is a means of developing rural areas. The advantages of such initiatives can be the economic and

technical infrastructure, the improvement of the characteristics of the human and social capital. The development of local products even means development of associated enterprises and thus improvement of many sectors of the local economy while enhancing the development. At the same time the promotion of local products in the tourist market can increase the agricultural activity and the production of agricultural goods, the strengthening of the region (through job creation and encouraging local entrepreneurs), but also by strengthening the identity of the brand name from food-local products. (Lamprianidis, 2003).

Poland, Lithuania, Romania and Latvia are privileged by a good geographic position, cultural characteristics and ancient traditions, which make the local products of both agriculture and tourism unique. Linking tourism and agriculture through the use of particular agricultural food products is important for both the local products and gastronomic heritage.

The aim of the research: identification of an impact of information on the demand-supply balance. The method of the research: a sociological survey (n=1000 from Poland, Lithuania, Romania and Latvia; 285 men and 715 women) that was carried out during 2016. Despite the fact that the sample groups were not representative (did not reflect the views of the entire population), the obtained data and results of this analysis provided insight into the cultural issues under today's circumstances through the population's views.

The proposed tasks: 1. the demand for and supply of culinary heritage in the countries surveyed; 2. information sources for the provision of relevant information and their evaluation by their users; 3. the gender impact on the gastronomic cultural heritage: the demand, the supply and the current information sources for this kind of cultural heritage.

The information about the assessments of demand for and supply of gastronomic heritage

acquired in the present research can contribute to the expansion of small businesses in the rural territories of the countries examined by the present research.

Research results and discussion

Over the past 10 years, there has been a surge in demand for locally produced foods. The availability and amount of local food products are unprecedented in recent history. Consumer decisions to buy local or purchase items for specific product characteristics have proliferated into new marketing opportunities for farmers and ranchers. In addition, local direct marketing opportunities – such as farmers' or greenmarkets, retail food cooperatives – have grown as consumers have been increasingly looking for local and regional foods (Matson, 2013).

Individuals increasingly consume high-quality and healthy food products. This particular wish make them interested in gastronomic cultural heritage both in the narrow sense of this term – in some foods nominated by UNESCO or the EU (e.g. "sklandrausis" for Latvia etc.) and in the broad sense – the foods traditionally consumed by the people before chemicals started to be intensively used in agriculture, which are now produced by organic farms in each of the country surveyed. According to the survey data, the demand for such products was quite high in all the countries where a survey of their residents was conducted(Figure 1). This was confirmed not only by the respondents' wish to purchase such products themselves but also their readiness to recommend the products to others – their relatives, friends and acquaintances, which would result in an increase in the demand.

The supply of gastronomic cultural heritage is reflected, first of all, by shopping sites for this product, which is the territorial distribution of the supply. The survey did not reveal too large disparities in terms of demand for the product, yet in terms of supply of the product, i.e. the

shopping sites for it, the disparities were significant (Figure 2). As regards shops as shopping sites, in Romania, Latvia and Lithuania the demand was mainly met at specialty shops (50.9 % in Romania, 22.3 % in Latvia and 27.0 % in Lithuania) rather than at the organic departments of stores (13.7 % in Romania, 9.2 % in Latvia and 16.0 in Lithuania %). In Poland, the organic departments of stores (18.9 %) were more popular than specialty shops (16.0 %). Shopping for gastronomic cultural heritage products at marketplaces was also done in two ways: at conventional marketplaces and at so-called greenmarkets that recently emerged with traditional organic foods becoming more popular.

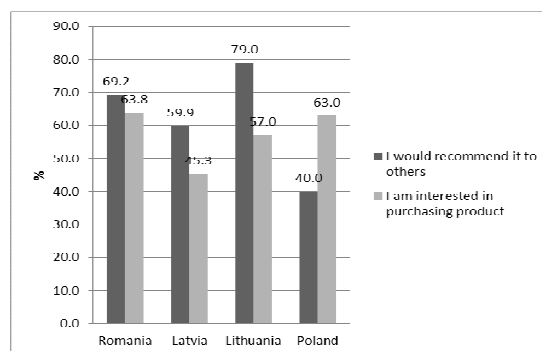


Fig. 1. Current and potential demand for gastronomic cultural heritage, %

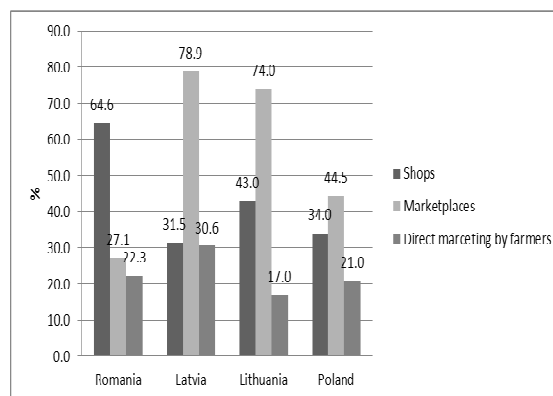


Fig. 2. Supply of gastronomic cultural heritage (shopping sites), %

Conventional marketplaces, which are used for shopping for gastronomic heritage products, were popular mostly in Romania and Poland, although at very different extents (18.8 % of the respondents preferred them in Romania and 40.0 % in Poland). Greenmarkets are an explicit phenomenon of Latvia and Lithuania. Of the

respondents, 40.1 % preferred this kind of shopping site in Latvia and 39.0 % in Lithuania. Conventional marketplaces were also popular in Latvia and Lithuania (38.8 % in Latvia and 35.0 % in Lithuania). The popularity of marketplaces in Latvia and Lithuania may be associated with the relatively small territories of both countries compared with Romania and Poland, which reduce the distance between the customer and the seller and therefore promotes direct marketing – purchasing products from the producer on the farm. The trend in making direct contacts between the customer and the seller is characteristic of all the countries surveyed, and especially Latvia where 30.6 % of all the respondents mentioned this kind of shopping for gastronomic heritage products.

Since the gastronomic heritage market system becomes noticeable, as the market demand and supply exist, an urgent problem is marketing communication. From the customer perspective, it, first of all, represents information about shopping sites and the available assortment as well as – which is even more important – the quality of the product, the effectiveness of it in comparison with other products and knowledge needed for its production (Table 1).

Table 1.

Percentage of the consumers wishing relevant information, %

	Romania	Latvia	Lithuania	Poland
Shopping sites	28.7	26.9	24	31.5
Available assortment	10.7	39.4	27	34
Specific qualities of a product	23.1	32.4	28	27.5
Production of the product	20.4	44	30	33

Romania's respondents mentioned information about shopping sites for gastronomic heritage products as the most important. Information about the production of a product seemed to Latvia's and Lithuania's respondents the most important. In contrast, Poland's respondents almost unambiguously preferred information

about the available assortment and product descriptions.

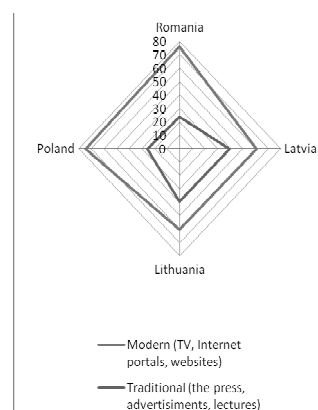


Fig. 3. Percentage of the respondents using particular information sources for acquiring information about gastronomic cultural heritage, %

The set of the information sources was the same in all the countries, yet there were some differences in their use (Figure 3). In Romania (74.0 %) and Poland (88.0 %), the key information source, according to the respondents, was the Internet, while in Latvia (73.7 %) and Lithuania (62.0 %) the prevalent source was TV. This means that modern information sources widely used by the public were the most popular. As shown in Figure 3, traditional information sources still played some role, yet they were used less than the digitalised ones.

Although the flow of information on gastronomic heritage functioned, the surveys in all the countries examined showed that the respondents wished more information and that of better quality (in terms of content, design, explanations). This was mentioned by 31.0 % of the respondents in Romania, 41.9 % in Latvia, 31.0 % in Lithuania and 29.5 % in Poland. The data obtained in the surveys convincingly show that the improvement of marketing communication is necessary, which, in its turn, can result in an increase in the demand for gastronomic heritage; this, in its turn, promotes the development of small businesses in rural areas through the expansion and enhancement of the supply.

Although gender equality is legally and really in place under today's circumstances, the surveys showed that gastronomic activities still were mainly the sphere of women's interests. This was proved by the overall opinion of the respondents (Table 2).

If focusing on the geographic affiliation, there are some nuances regarding women's interests. Of the women surveyed in Poland, 68.9 % expressed their wish to consume gastronomic heritage products. In Lithuania, 80.2 % of the surveyed women would recommend such products to their friends and acquaintances. Specialty shops as shopping sites for gastronomic heritage products were especially stressed by the surveyed women in Romania (57.4 %). In contrast, the female respondents in Latvia and Lithuania preferred greenmarkets (43.8 % in Latvia and 45.3 % in Lithuania).

These nuances could emerge owing to a number of reasons. Of course, the location of the respondents' countries, the historical events in their territories and the particular cultural heritage could contribute to the differences. At the same time, the quality of marketing communication systems could make considerable effects under today's circumstances, the key shortcomings of which noted by the respondents were mentioned above.

However, the use of information sources was gender specific. There were information sources that were not gender specific with regard to the acquisition of information about gastronomic heritage, and they were modern sources such as Internet portals, TV shows and websites of institutions and personalities (Figure 4). However, there were some information sources in which mostly women were interested in, i.e. newspapers (written text) and lectures, presentations ("live words").

The authors believe that it may be explained by women's interest in multiple accessibility of the same information in the form of written text or in discussions and in asking questions during

lectures and presentations, i.e. their strong interest in gastronomic heritage. This is also confirmed by the survey data, as women expressed a stronger interest than men in more information about gastronomic heritage. Such a wish was made by 20.7 % of the surveyed men and almost by a third (30.2 %) of the women. This means that gender makes some influence on the demand for gastronomic heritage.

Table 2.

The most significant differences in opinions broken down by gender, %

Respondent wishes	Men	Women
Wish to consume gastronomic heritage	52.3	58.7
Readiness to recommend it to others	56.1	61.4
Specialty shops as shopping sites	27.7	34.0
Greenmarkets as shopping sites	11.9	24.6
Information about the specific qualities of a product	52.3	56.8
Information about the production of the product	28.1	33.0

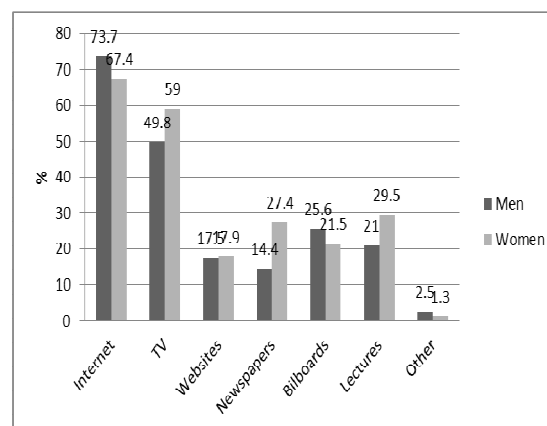


Fig. 4. **Use of information sources broken down by gender, %**

Conclusions, proposals, recommendations

No matter how great globalisation effects on the world's countries are, which result in similar features in the countries, an increasing focus is placed on every country's and its people's cultural heritage and one of the most important components of it – gastronomic heritage.

- 1) The market demand for and supply of gastronomic heritage were explicitly observed in all the countries surveyed. At the same time, the respondents' wish to get more information about this heritage indicates that the demand for it could increase, compared with the current situation, and the increase in the demand could contribute to the expansion of small businesses in the rural territories of the countries examined by the present research. The process of development of small businesses with respect to the maintenance of gastronomic cultural heritage is an important priority of further research.
- 2) In case of both direct and indirect marketing communication between the customer and the seller, an essential role is played by information – its sources, availability of the sources, quantity of the information and especially its quality. The research results explicitly reflected the wishes of information requestors, which may be divided into two parts. The first one represents information about a product (the shopping site, the assortment and qualities of products, the production process of the products), while the second part – the information as such (its availability, amount and design). The present research only gives insight into the customer's wishes regarding indirect information sources used for marketing communication such as the Internet, TV, websites of institutions and individuals, billboards etc. Since there are not only customers but also sellers in the market, in the further research it would be important to identify the opinions of the sellers on information about gastronomic cultural heritage available in various sources, placing a special focus on the desirable content of the information.
- 3) Even though globalisation brings an increase in gender equality, the demand for gastronomic cultural heritage is mainly shaped by women, which is influenced by neither citizenship nor ethnicity. Women are more interested in the availability and usability of such products, confirming the gender difference that is still present in today's society. The further research on this phenomenon could help to explain the influence of respondent gender on the wish to consume particular gastronomic heritage products.

Acknowledgements

The paper was financially supported by the Latvia National Research programme EKOSOC-LV.

Bibliography

Journal paper with authors

1. Bessiere, J. (1998). Local Development and Heritage: Traditional Food and Cuisine as Tourist Attraction in Rural Areas, *Sociologia Ruralis*. Vol. 38. No. 1: 21–34. doi:10.1111/1467-9523.00061.
2. Duran, N. and MacDonald, K. (2006). Information Sources for Food Studies Research *Food, Culture & Society* 9(2), pp. 233-243.
3. European Parliament Report of 19 February (2014) on the European gastronomic heritage: cultural and educational aspects (2013/2181(INI)).
4. Everett, S. and Aitchison, C. (2008). The Role of Food Tourism in Sustaining Regional Identity: A Case Study of Cornwall, South West England. *Journal of Sustainable Tourism*, Volume 16. Issue 2: 150-167. doi:10.2167/jost696.0
5. Gonzalez, P.A. (2017). Heritage and Rural Gentrification in Spain: the Case of Santiago Millas. *International Journal of Heritage Studies*. Volume 23, Issue 2: 125-140. doi:10.1080/13527258.2016.1246468
6. Hjalager, A. and Corigliano, M. (2000). Food for Tourists – Determinants of an Image. *The International Journal of Tourism Research* 2, pp. 281-293.
7. Jeroscenskova, L., Kruzmetra, M. and Rivza, B. (2013). Enhancing the Competitiveness of Tourism through Cultural Heritage as a Tourism Product. *Rural Development 2013: Innovations and Sustainability. Proceedings of the 6th International Scientific Conference*. Kaunas: Akademija. Vol. 6. Book 1, pp 163–167.
8. Jeroscenskova, L., Kruzmetra, M., Rivza, B., Foris, D. (2016). Similarities and Differences in the Value Manifestations and Management of Cultural Heritage, *Management Theory and Studies for Rural Business and Infrastructure Development*. Vol. 38. No. 1: 18–27, doi: 10.15544/mts.2016.2

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9. Kruzmetra, M., Rivza, B. and Rivza, L. (2013). Culture Heritage as Important Product of Rural Tourism. Rural development and entrepreneurship. Marketing and sustainable consumption. *Proceedings of the International Scientific Conference Economic Science for Rural development* No. 32. Jelgava: LUA, pp. 83–88.
10. Kruzmetra, M., Rivza, B. and Jeroscenkova, L. (2013). Culture Heritage as a Product of Rural/Farm Tourism: the Case of Latvia. *Proceedings of the 14th International Joint World Cultural Tourism Conference*. World Cultural Tourism Association, pp. 27–37.
11. Lamprianidis, L. (2003). Local Products as a Means to Assist the Development of Less Developed Areas of Rural Europe. *Aichoros, Texts of Urban Planning, Regional Planning and Development*, Vol.2. No.1.
12. Matta, R. (2016). Food Incursions into Global Heritage: Peruvian Cuisine's Slippery Road to UNESCO. *Social Anthropology*. Volume 24. Issue 3: 273–413, doi:10.1111/1469-8676.12300.
13. Mennell, S. (2005). "Conclusions. Culinary Transitions in Europe: an Overview". *Culinary cultures of Europe: Identity, diversity and dialogue*, pp. 469–488.
14. Pfeilstetter, R. (2015). Heritage Entrepreneurship. Agency-driven Promotion of the Mediterranean Diet in Spain. *International Journal of Heritage Studies*. Volume 21. Issue 3: 215–231, doi:10.1080/13527258.2014.930502
15. Sims, R. (2009). Food, Place and Authenticity: Local Food and the Sustainable Tourism Experience. *Journal of Sustainable Tourism*. Volume 17. Issue 3: 321–336, doi:10.1080/09669580802359293.
16. Vargas Llosa, M. (2001). The Culture of Liberty. *Foreign Policy*. No 122, pp. 66–71.
17. Van Westering, J. (1999). Heritage and Gastronomy: The Pursuits of the 'New tourist'. *International Journal of Heritage Studies*. Volume 5. Issue 2: 75–81. doi:10.1080/13527259908722252
18. Velissariou, E. and Vasilaki, E. (2014). Local Gastronomy and Tourist Behavior: Research on Domestic Tourism in Greece. *Journal of Tourism Research*. 9, pp. 120–143

Books

19. Albala, K. (2000). The History and Culture of Food and Drink in Europe: Southern Europe. in: *The Cambridge World History of Food*. edited by K. F. Kiple and K. C. Ornelas. Cambridge: Cambridge University Press, pp. 1203–1210.
20. Bendiner, K. (2004). *Food in Painting: From the Renaissance to the Present*. London: Reaktion Books.
21. Katz, S. H., Ed. (2003). *Encyclopedia of Food and Culture* (3 Vols). New York: Charles Scribner's Sons.
22. Moore, N. and Whelan, Y. (2007). *Heritage, Memory and the Politics of Identity: New Perspectives on the Cultural Landscape*. Aldershot: Ashgate Publishing.
23. Morley, D. and Robins, K. (2002). *Space of Identity: Global Media, Electronic Landscapes and Cultural Boundaries*. London: Routledge.
24. Nestle, M. (2000). The Mediterranean Diet and Disease Prevention in *The Cambridge World History of Food: The History and Culture of Food and Drink in Europe*. edited by K. F. Kiple and K. C. Ornelas. Cambridge, Cambridge University Press, pp. 1193–1203.
25. Pieterse, J. N. (2015). *Globalisation and Culture: Global Melange*. London: Rowman & Littlefield.
26. Poulain, J.-P. (2005). France gastronomy. French gastronomies. in *Culinary cultures of Europe: Identity, diversity and dialogue*. edited by D. Goldstein and K. Merkle. Strasbourg: Council of Europe Publishing, pp. 157–170.
27. Scarpato, R. and Daniele, R. (2003). New Global Cuisine: Tourism, Authenticity and Sense of Place in Postmodern Gastronomy. in *Food Tourism Around the World Development management and markets: New Global Cuisine*. edited by C. M. Hall, L. Sharples, R. Mitchell, N. Macionis and B. Cambourne. Oxford: Butterworth Heinemann, pp. 296–313.
28. Watson, J. L. and Caldwell, M. L. (2005). *The Cultural Politics of Food and Eating: A Reader*. Oxford: Blackwell Publishing.

Internet Sources

29. Matta, R. 2013. Food as Culural Heritage: A critical and Comparative Perspective project. DFG-GEPRIS. <http://gepris.dfg.de/gepris/OCTOPUS?context=projekt&id=243489380&language=en&task=showDetail>. Access 01.12.2016.

DIVERSIFICATION OF RURAL AREAS IN POLAND IN TERMS OF LEVEL OF LIVING

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Abstract. In the study, the two methods of linear ordering of objects - the Hellwig pattern and the TOPSIS (Technique for Order Preference by Similarity to an Ideal Solution) - were used for the evaluation of the rural areas in the voivodeships of Poland in 2014 in terms of the level of living. As the features were characterized by a strong asymmetry, in the research the position approach of multivariate Weber median was used. In the estimate of the level of living of the population, several areas of life were taken into account: labour market, health care, housing conditions and municipal infrastructure, culture and tourism, environment as well as pre-primary education and education. The obtained orderings of rural areas are similar in terms of position, and rural areas of the Slaskie Voivodeship came in the first place in the ranking. The last place in the ranking fell to areas in regions Kujawsko - Pomorski and Lubelski. A high level of living of the population of rural areas in Poland was mainly related to the good situation in such aspects of life as housing conditions and municipal infrastructure, environmental protection, pre-school education and education.

Key words: level of living, linear ordering, Weber median, class typological.

JEL code: C38

Introduction

Areas of a rural character occupy half of Europe and they are the place of residence for approximately 20 % of its population. In Poland, public statistics distinguishes rural areas on the basis of the territorial division according to the Polish National Registry of the Territorial Division of the country (TERYT). As rural areas, TERYT deems the areas outside the administrative boundaries of the cities, i.e. rural municipalities and rural part of urban-rural municipalities. According to the data of the National Census of Population and Housing of 31 March 2011, the population of rural areas consisted of 15.1 million people. In comparison to the results of the census of 2002, this number rose by 3.3 %, while in the cities it decreased by 0.9 %, whereas in comparison with the year 2009 it increased by 1.3 %. In rural areas, which covered 93.1 % of the territory of Poland, lived 39.2 % of the population of the country, i.e. by 1,0 percentage point more than in 2002 (Rural areas. The National Census of Population and Housing of 2011). The rural areas in Poland are diversified in relation to the level and quality of living, social and technical infrastructure possessed by inhabitants and wealth of local governments (Szymanska, Bieganska, 2011). In connection with this, there is an increased interest in the

aforementioned phenomena, also with regard to rural areas. Spatial diversification in the level of living of the population in Poland and in the EU member countries is linked to the overall socio-economic development of these countries, degree of their urbanization, the level of education of the society etc. Many authors indicate the need to survey the level of living, which is a complex phenomenon, conditioned by a variety of different features.

The level of living is one of the basic categories of research relating to the diagnosis of the degree of satisfaction of the different needs of the population. In the subject literature, the category of the level of living is defined in different ways. According to the UN Commission of Experts of 1954, "the concept of living standard comprises the entirety of real living conditions of people and the degree of satisfaction of their material and cultural needs through the stream of goods and services against payment and also financed from the social funds (Zelias, 2000). This definition became the cornerstone for many other definitions of this notion. Out of many definitions of the level of living, the following wordings are most closely associated with the concept of need (Panek, 2007):

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- 1) the level of living is the degree of meeting the material and cultural needs with the existing infrastructure enabling this satisfaction (Slaby, 1990);
- 2) the level of living is the degree of meeting the needs arising from the consumption of material goods and services produced by man (Bywalec, Rudnicki, 1992).

All definitions of the level of living draw attention to the complex nature of this notion and the need of examining it in many aspects concerning the different areas of life.

The aim of this study is to identify the factors affecting the level of living and the assessment of the level of living of the population living in rural areas in the voivodeships of Poland. To implement this objective, the following areas of life determining the examined category were taken into account: labour market, health care, housing conditions and municipal infrastructure, culture and tourism, environmental protection, pre-primary education and education. Information on these areas of life was obtained from the publications of the Central Statistical Office, Rural areas in Poland in 2014 (Rural Areas in Poland in 2014, 2016). In view of the complex nature of the surveyed phenomenon, for its assessment the chosen methods of multidimensional comparative analysis were used - linear ordering of objects and the classification of the objects created on the basis of it.

Research methodology

Implementation of the purpose of the study occurred due to building of the linear ordering of rural areas in the voivodeships of Poland using methods based on synthetic characteristics.

In these methods, the following stages are distinguished (Wysocki, 2010).

Stage I. Selection of simple features describing the explored complicated phenomenon and determining their values for the surveyed objects as well as eliminating from the set those features which are characterised by a low variation.

On the basis of the merits, a selection of diagnostic features was made in the various areas of life. The choice was dictated by the availability of data on rural areas in Poland and it was applicable to 2014. In the analysis, the following aspects of life and characteristics of the area were taken into account :

I Labour market:

X_1 - the non-working age population per 100 persons of working age, X_2 - the working age population in % of the total population, X_3 - the share of the unemployed without the right to the allowance in the overall number of the registered unemployed in %, X_4 - the economic activity rate in %, X_5 - the employment rate in %, X_6 - the unemployment rate in %, X_7 - the entities of the national economy entered in the REGON register per 1000 population, X_8 - the entities of the national economy newly entered in the REGON register per 1000 population, X_9 - the entities of the national economy removed from the REGON register per 1000 population.

II Health care:

X_{10} - population per 1 out-patient health care facility, X_{11} - population per 1 generally available pharmacy, X_{12} - per capita consultations provided, X_{13} - bed places per 10 thousand population as part of stationary social welfare.

III Housing conditions and municipal infrastructure:

X_{14} - the average usable floor space in m^2 per capita, X_{15} - the dwelling equipped with bathroom in % of total dwellings, X_{16} - the population connected to the water supply system in % of total population, X_{17} - the population connected to the sewerage system in % of total population, X_{18} - the population connected to the gas supply system in % of total population, X_{19} - the dwellings per 1000 population.

I Culture and tourism:

X_{20} - public library loans per 1 borrower in volumes, X_{21} - event participants per 1000 population, X_{22} - bed places per 1000 population,

X_{23} - persons accommodated in thousands per 1000 population.

II Environment:

X_{24} - forest cover in %, X_{25} - population connected to wastewater treatment plants in % of the total population, X_{26} - treated wastewater per 100 km² in dam³, X_{27} - recovered waste (excluding municipal waste) in %, X_{28} - municipal wastes collected from households in %.

III Pre-primary education and education

X_{29} - children attending pre-primary education establishments per 1000 children aged 3 to 5 years, X_{30} - children attending nursery schools per 100 places at the nursery school, X_{31} - gross enrolment rate at primary schools, X_{32} - gross enrolment rate at lower secondary schools, X_{33} - the number of pupils per 1 primary school, X_{34} - the number of pupils per 1 lower secondary school.

The set of potential diagnostic features as determined on the basis of the merits was verified in terms of indicative value of the features. Because the conducted analysis covered diversification of objects, it is very important that the features should be characterised by the appropriate variation i.e. they should effectively discriminate between objects. In order to determine the final set of diagnostic features, the following diagnostic procedure was adopted:

- 1) the weights of individual areas of life were specified - identical weights for each area were adopted;
- 2) the selection of features in each area of life was made using the approach based on merits and analysing the variation of each of the features. From each area, three features were selected, characterized by the strongest variation.

Finally, the following features were adopted for research, from areas characterizing the level of living (Table 1).

Stage II. Determining of the direction of preferences of simple features in relation to the phenomenon considered and their normalization.

Table 1

The areas and features characterizing the level of living

No	The areas characterizing the level of living	Feature
1.	Labour market	X_6, X_8, X_9
2.	Health care	X_{11}, X_{12}, X_{13}
3.	Housing conditions and municipal infrastructure	X_{17}, X_{18}, X_{19}
4.	Culture and tourism	X_{21}, X_{22}, X_{23}
5.	Environment	X_{25}, X_{26}, X_{27}
6.	Pre-primary education and education	X_{29}, X_{32}, X_{33}

Source: author's calculations

Out of the features finally adopted for research, there were distinguished destimulants among which the following were counted: the unemployment rate in %, the entities of the national economy removed from the REGON register per 1000 population, population per 1 generally available pharmacy, the per capita consultations provided, the number of pupils per 1 primary school. Other features were considered as stimulants. The features were also subjected to statistical analysis by calculating the basic descriptive parameters, including the specifying of the degree of asymmetry of distributions of features. The obtained result was that most features were characterized by a strong or very strong asymmetry, e.g.: $X_1, X_3, X_4, X_8, X_9, X_{11}, X_{12}, X_{13}$ and X_{14} . The skewness coefficients for these features are ranging from 0.69 to 3.36. Due to the strong asymmetry in linear ordering of objects the position based approach was taken, based on position measure - the Weber median, which was also used in the stage of normalization of features. The use of position measures is justified in cases where a feature has got asymmetric distribution. The median as the primary position parameter is characterized by a high resistance to the occurrence of outliers and is used at the stage of normalization of features,

in the standardized transformation. In the case of the Weber median, it concerns the vector that minimizes the sum of Euclidean distances from given points representing the objects being considered, and therefore it is "in the middle" of them, so to speak, but is at the same time resistant to the occurrence of outliers (Lira, Wagner, Wysocki, 2002, Mlodak, 2010). Normalization using the Weber median is carried out according to the following formula:

$$z_{ij} = \frac{x_{ij} - \text{m}\ddot{\text{e}}\text{d}(x_j)}{1,4826 \cdot \text{m}\ddot{\text{a}}\text{d}(x_j)} \quad (1)$$

where: $\text{m}\ddot{\text{e}}\text{d}(x_j)$ - the Weber median, $\text{m}\ddot{\text{a}}\text{d}(x_j) = \text{med}_{i=1, \dots, n} |x_{ij} - \text{m}\ddot{\text{e}}\text{d}(x_j)|$ the median absolute deviation exploring the distances of features to the Weber median.

Stage III. The determining of the synthetic feature value using the selected method of aggregation of simple features.

For the determining of the synthetic feature value, the Hellwig pattern method and the TOPSIS method were used, based on the position Weber median. The value of the synthetic feature in the first method is determined as follows:

$$\mu_i = 1 - \frac{d_i}{d_-} \quad (2)$$

where: $d_i = \sqrt{\sum_{j=1}^J (z_{ij} - z_{0j})^2}$ ($i = 1, \dots, n$), z_{ij} are standardized values of features

according to the formula (1), z_{0j} are the coordinates of the pattern of development, where, if the feature is a destimulant, then $z_{0j} = \min_i \{z_{ij}\}$ and when the feature a stimulant, then ($j = 1, \dots, J$), J - J - the number of features, n - the number of objects. The

aggregate measure is calculated according to the formula (2), where:

$$d_- = \text{med}(\mathbf{d}) + 2,5 \cdot \text{mad}(\mathbf{d}) \quad (3)$$

where: $\mathbf{d} = (d_1, \dots, d_n)$ is the distance vector determined according to the formula:

$d_i = \text{med}_{j=1, \dots, J} |z_{ij} - \varphi_j|$, $\varphi_j = \min_{i=1, \dots, n} \{z_{ij}\}$ - for destimulants or $\varphi_j = \max_{i=1, \dots, n} \{z_{ij}\}$ - for

stimulants, 2.5 - the robust threshold value that determines the barrier of favourable values of measurements of objects distances from the development pattern (Rousseeuw, Leroy, 1987, Mlodak, 2006). In the case of the measure μ_i in extreme cases, when the object is significantly distant from the pattern, there may occur values below 0 (Luczak, Wysocki, 2013).

An alternative approach is linear ordering of objects using the TOPSIS method that in terms of position is resistant to the occurrence of outliers of features and the adopted values of anti-pattern and pattern of development (Luczak, Wysocki, 2013). Distance of this multi-feature object from the development pattern and anti-pattern is expressed by the vectors:

$$z_0^+ = (z_{01}^+, \dots, z_{0J}^+), z_0^- = (z_{01}^-, \dots, z_{0J}^-) \quad (4)$$

where: z_0^+ - the maximum value of each feature, z_0^- - minimum value of each feature.

The value of synthetic feature is determined according to the formula (Hwang, Yoon, 1981):

$$\mu_i = \frac{D_i^-}{D_i^+ + D_i^-} \quad (5)$$

where:

$$D_i^+ = \text{med}_{j=1, \dots, J} |z_{ij} - z_{0j}^+|, \\ D_i^- = \text{med}_{j=1, \dots, J} |z_{ij} - z_{0j}^-|$$

The higher the value of the measure determined using the formulae (2) and (5), the higher the level of development of the object.

Stage IV. Linear order of objects and classification of objects based on the linear ordering and recognition of the development types of classes.

In the study, the clustering of objects was carried out on the basis of the values of the measures (2) and (6). Population of objects can be divided into four classes of development (Wysocki, 2010):

I class: $\mu_i \geq \text{med}(\mu) + 2.5 \cdot \text{mad}(\mu)$ - a very high level of phenomenon,

II class: $\text{med}(\mu) \leq \mu_i \leq \text{med}(\mu) + 2.5 \cdot \text{mad}(\mu)$
- a high level of phenomenon,

III class: $\text{med}(\mu) - 2.5 \cdot \text{mad}(\mu) \leq \mu_i \leq \text{med}(\mu)$
- an average level of phenomenon,

III class: $\mu_i < \text{med}(\mu) - 2.5 \cdot \text{mad}(\mu)$ - a low level of phenomenon.

Research results and discussion

Spatial diversification in the level of living of the population in rural areas in Poland is shown with a synthetic measure, which was determined by means of the Hellwig pattern method and the TOPSIS method using the Weber median. The value of the synthetic feature describing the level of living of the population allows one to order the rural areas in the voivodeships of Poland from the best one to the worst one. On the basis of the measures there were distinguished typological groups which reflect the level of living of the population in rural areas in Poland (Table 2).

On the basis of the results shown in Table 2, one can conclude that between places occupied in the ranking by the voivodeships, rather strong connections are observed (the value of the Kendall correlation coefficient was 0.533).

Part of the objects occupies the same or similar places in the ranking, e.g. the Slaskie, Wielkopolskie, Mazowieckie, Lubelskie or

Kujawsko-Pomorskie Voivodeships. In the case of certain voivodeships, the places in the ranking differ, for example it applies to the Pomorskie, Podkarpackie or the Podlaskie Voivodeship.

In both orderings, the rural areas of the Slaskie Voivodeship came in the first place in terms of the level of living, which are distinguished mainly in respect of: the housing conditions and the municipal infrastructure (high values of features: X_7 and X_8), the environmental protection (the highest values of features: X_{14} and X_{15}) as well as the pre-primary education and the education (the highest values of features: X_{16} and X_{17}). However, the rural areas of the Kujawsko-Pomorskie and Lubelskie Voivodeships, in both orderings occupied the lowest places due to unfavourable situation, especially in such spheres of life like the health care, the culture and the tourism and the protection of the environment.

The Hellwig pattern method using the Weber median enabled one to extract the four typological classes of rural areas in regions of Poland. The first class includes three objects: the Slaskie, Malopolskie and Zachodniopomorskie Voivodeships. This class is characterized by very favourable values of most features, significantly exceeding average values for the whole population. A particularly high level of development occurs in the area of the housing conditions and the municipal infrastructure. In this class, a very high percentage of the population connected to sewerage system and gas supply system in % of the total population was observed. Also in the field of the culture and the tourism, the average values of the diagnostic features exceed the average values of the other groups, e.g. the number of bed places per 1000 population exceeds more than twice the overall average. A similar situation occurs in the area of the environmental protection: the percentage of population connected to sewage treatment plant in % of the total population is the highest, the amount of treated municipal wastewater and

recovered waste (excluding municipal waste) is clusters.
twice higher in comparison with the other

Table 2

The results of the linear ordering of rural areas in the voivodeships of Poland

No	Voivodeship	Method					
		Hellwig			TOPSIS		
		measure	position	group	measure	position	group
1.	Dolnoslaskie	0.0504	13	III	0.3928	9	III
2.	Kujawsko-pomorskie	-0.2623	16	IV	0.2625	15	III
3.	Lubelskie	-0.0846	15	IV	0.1923	16	III
4.	Lubuskie	0.0480	14	III	0.3149	11	III
5.	Lodzkie	0.1064	7	II	0.3093	12	III
6.	Malopolskie	0.2601	2	I	0.4871	4	II
7.	Mazowieckie	0.0968	9	III	0.3518	10	III
8.	Opolskie	0.1936	4	II	0.5010	2	II
9.	Podkarpackie	0.0874	11	III	0.4903	3	II
10.	Podlaskie	0.0974	8	II	0.2966	14	III
11.	Pomorskie	0.0930	10	III	0.4788	5	II
12.	Slaskie	0.2901	1	I	0.5297	1	II
13.	Swietokrzyskie	0.0662	12	III	0.3092	13	III
14.	Warminsko-mazurskie	0.1239	5	II	0.4003	8	II
15.	Wielkopolskie	0.1223	6	II	0.4069	7	II
16.	Zachodniopomorskie	0.2053	3	I	0.4301	6	II

Source: author's calculations

The second cluster covering rural areas in five voivodeships (the Podlaskie, Lodzkie, Opolskie, Warminsko-Mazurskie and Wielkopolskie) is distinguished by the lowest unemployment rate and the lowest number of national economy entities removed from the REGON register per 1000 population, which may prove the economic boom in the region. The third class with the highest number of objects, includes rural areas of such voivodeships as: Dolnoslaskie, Lubuskie, Mazowieckie, Mazowieckie, Podkarpackie, Podlaskie, Pomorskie and Swietokrzyskie. In the third cluster, the highest values of the following data were noted: the average unemployment rate and the number of population per 1 generally available pharmacy. In clusters: the second and the third ones, the average values of most features fluctuate around the overall averages.

The fourth group with the rural areas from the two voivodeships: the Kujawsko-Pomorskie and Lubelskie is the cluster in which most of the features take the lowest average values as compared to the rest of the classes. In this class, the following situation was observed: the lowest number of entities of the national economy newly registered in the REGON register per 1000 population, the lowest percentage of the population connected to sewerage system in % of the total population, the lowest number of flats completed per 1000 population. Also in the field of the culture and tourism, the worst level of development was observed, e.g. the number of bed places per 1000 population is five times lower for the first class. The worst situation occurs in the field of environmental protection. Only 30 % of the population in this cluster are connected to the municipal wastewater treatment system, which makes half

the value for the first class. The amount of treated wastewater per 100 km² and the percentage of recovered waste are the lowest in relation to the other three classes. Particularly low value concerns the percentage of wastes recovered - it represents a mere 4.5 % of the average for all the surveyed objects.

In the case of the TOPSIS method, the value of the measure specified with (5) allowed to distinguish two typological classes of objects - the second class and the third class. The second class, comprising the rural areas in eight voivodeships is characterized by the higher level of living of rural areas residents as compared with the third class, mainly in such areas of life as the municipal infrastructure, the culture and tourism and the protection of the environment.

Conclusions

The conducted research permitted to reach and formulate the following conclusions.

- 1) Rural areas in the voivodeship of Poland are highly diversified in relation to the level of living of the population.
- 2) Because of the strong asymmetry of most of the features adopted in the research, such an approach was used which was based on the position measure - multidimensional Weber median.
- 3) Items of rural areas in the voivodeships specified by the two methods: the Hellwig pattern and the TOPSIS method show quite a strong correlation. Most of the analysed objects occupy the same or similar places in linear orderings.

Bibliography

1. Bywalec, Cz., Rudnicki, L. (1992). Podstawy teorii i metodyki badania konsumpcji (Basic Theory and Methodology of the Study Consumption). Wydawnictwo Akademii Ekonomicznej w Krakowie, Krakow, p. 13.
2. Hellwig, Z. (1968). Zastosowanie metody taksonomicznej do typologicznego podziału krajów ze względu na poziom ich rozwoju oraz zasoby i struktury wykwalifikowanych kadr (The Application of the Taxonomic Method for the Typological Division of Countries in Terms of their Development Level as well as the Resources and Structure of their Qualified Staff), *Przegląd Statystyczny*, 4/1968, pp. 307-327.
3. Hwang, C. L., Yoon, K. (1981). Multiple Attribute Decision-making, Methods and applications, Springer, Berlin.
4. Lira J., Wagner W., Wysocki F. (2002). Mediana w zagadnieniach porządkowania obiektów wielocechowych (The Median Issues in Ordering Multivariate Objects), *Statystyka regionalna w służbie samorządu lokalnego i biznesu*, Internetowa Oficyna Wydawnicza Centrum Statystyki Regionalnej, Akademia Ekonomiczna w Poznaniu, Poznan, pp. 87-99.
5. Luczak, A., Wysocki, F. (2013). Zastosowanie mediany przestrzennej Webera i metody TOPSIS w ujęciu pozycyjnym do konstrukcji syntetycznego miernika poziomu życia (The Application of Spatial Median of Weber and

- 4) The first place in both orderings occupy rural areas the Slaskie Voivodeship that are characterized by high level of living, particularly in areas such as: the housing conditions and the municipal infrastructure, the environmental protection the pre-primary education and the education. However, the rural areas of the Kujawsko-Pomorskie and Lubelskie Voivodeships, are distinguished by the low level of living, due to unfavourable situation, especially in such spheres of life like the health care, the culture and tourism and the protection of the environment.

- 5) Based on the Hellwig pattern method, four typological classes of rural areas were selected, similar in terms of the level of living of the population. In the class comprising the voivodeships: Slaskie, Malopolskie and Zachodniopomorskie, the highest level of living of the population was found taking into account the diagnostic features adopted in the research. However, in the fourth class of the rural areas from the two voivodeships: Kujawsko-Pomorskie and Lubelskie, the lowest level of living of the population was found.

- 6) The TOPSIS method enabled one to distinguish two typological classes excluding classes with the highest and the lowest level of the surveyed phenomenon. The second cluster in comparison with the third cluster has a higher level of living of the population, which is proven by higher average values of most of the diagnostic features.

the Method Topsis in Positional Formulation for the Construction of Synthetic Measure of Level of Living). Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu, Wrocław, 20/2013, pp. 63-73.

6. Młodak, A. (2006). *Analiza taksonomiczna w statystyce regionalnej* (Taxonomic Analysis in Regional Statistics). Difin, Warszawa, pp. 7-23.
7. Obszary wiejskie w Polsce w 2014 (Rural Areas in Poland in 2014). (2016). Retrieved: <http://stat.gov.pl/obszary-tematyczne/rolnictwo-lesnictwo/rolnictwo/obszary-wiejskie-w-polsce-w-2014-roku,2,2.html>. Access: 10.01.2017.
8. Obszary wiejskie. Narodowy Spis Ludności i Mieszkań 2011 (Rural areas. The Population and Housing Census 2011). (2012). Retrieved: <http://stat.gov.pl/spisy-powszechne/nsp-2011/nsp-2011-wyniki/obszary-wiejskie-narodowy-spis-powszechny-ludnosci-i-mieszkan-2011,20,1.html>. Access: 10.01.2017.
9. Panek, T. (2007). *Statystyka społeczna* (Social Statistics), Polskie Wydawnictwo Ekonomiczne, p. 105.
10. Rousseeuw, P.J., Leroy, A. M. (1987). *Robust Regression and Outlier Detection*, John Wiley and Sons, New York.
11. Ślaby, T. 1990, Poziom życia, jakość życia (Level of Living and Quality of Life), *Wiadomości Statystyczne*, 6/1990, p. 25.
12. Szymanska, D., Bieganska, J. (2011). Obszary wiejskie w Polsce w świetle analizy wybranych elementów infrastruktury i mieszkalnictwa (Rural Areas in Poland in the Light of the Analysis of Selected Elements of Infrastructure and Housing), *Biuletyn Instytutu Geografii Społeczno-Ekonomicznej i Gospodarki Przestrzennej Uniwersytetu im. Adama Mickiewicza w Poznaniu. Rozwój Regionalny i Polityka Regionalna*, Poznań, 14/2011, pp. 57-74.
13. Wysocki, F. (2010). *Metody taksonomiczne w rozpoznawaniu typów ekonomicznych rolnictwa i obszarów wiejskich* (Taxonomic Methods in Identifying the Types of Economic Agriculture and Rural Areas). Wydawnictwo Uniwersytetu Przyrodniczego, Poznań.
14. Zelas, A. (2000). *Taksonomiczna analiza przestrzennego zróżnicowania poziomu życia w Polsce w ujęciu dynamicznym* (Taxonomic Analysis of Spatial Differentiation of Level of Living in Poland in Terms of Dynamics). Wydawnictwo Akademii Ekonomicznej w Krakowie, Kraków, p.17.

THE CONVERSION OF THE AREA OF ECOLOGICAL CROPS IN THE SELECTED EU STATES

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Abstract. The study describes the changes in the area of organic farming in selected countries that joined the EU in 2004. Changes in the years 2005-2015 were analysed as well as the dependence between changes in the area of the country and prosperous organic operators there. The development of organic farming in the EU is determined by many factors, including the large financial support from the EU budget. Therefore, in May 2004, not only was the biggest ever enlargement of the European Union (the Community has adopted the 10 countries (EU-10): Cyprus, the Czech Republic, Estonia, Latvia, Lithuania, Malta, Poland, Slovakia, Slovenia, and Hungary) but also for those countries it created a chance for alteration their farms to organic farms, owing to EU subsidies.

Key words: organic farming, agriculture, area of agricultural crops.

JEL code: Q15, Q18

Introduction

The 80s of the 20th century witnessed the popularisation of the term "ecological farming" (Duda-Krynicka M., Jaskolecki H., 2010) whose principles, accepted methods, and practices have been specified in detail in the Regulation of the European Economic Community (EEC) no. 2092/91 of 24 June 1991 on organic production of agricultural products and indications referring thereto on agricultural products and foodstuffs, which was subsequently repealed by the Regulation of the European Economic Community (EEC) no. 834/2007 of 28 June 2007 that entered into force on 1 January 2009 (European Commission, 2007). As part of EU legislation, it had priority over national regulations, and it has been complemented as a part of national laws. The Act of 16 March 2001, amended on 20 April 2004 (in connection with Poland's accession to the EU) (Zelezik M., 2009) defines "production by ecological methods" as the manner of producing an ecological product based on – to the extent possible – natural methods which do not disturb natural balance (Zelezik M., 2009). The International Foundation for Organic Agriculture Movements (IFOAM) defined in 2002 "ecological farming" as the set of various concepts for agriculture management that complies with the needs of the soil, plants, and primarily aims at quality food production while maintaining a biological diversity in natural environment (Rudenska B., Wojcicki Z., 2015; Tabor S.,

Kowalski J., Michalek R., Kubon M., Kwasniewski D., Malaga-Tobola U., 2014). In 2005, the "IFOAM Norms for Organic Production" (Domagalska J., Buczkowska M., 2015) extended this definition: "a whole system approach based upon a set of processes resulting in a sustainable ecosystem, safe food, good nutrition, animal welfare, and social justice (Zelezik M., 2009). Due to the abundance of legal regulations which must be observed, relevant documents that must be kept as well as complex certification and control mechanisms, this type of activity that constitutes an alternative to conventional farming requires substantial commitment and specialised knowledge (Zelezik M., 2009; Tyburski J., Zakowska-Biemans S., 2007). Despite these highly restrictive factors, we can observe a global an increased interest in this type of agricultural production (Komorowska D., 2015). Ecological production constitutes an attractive niche for small agricultural farms which are unable to compete with large enterprises (Ligenzowska J., 2014). Moreover, in connection with the fact that many countries are committed to environmental protection, certain governments also support ecological production (Ligenzowska J., 2014). Apart from a vague statement that ecological farming is "economically friendly", this practice gives rise to a number of advantages for the environment and not only (Table 1); however, as with many other directions, it also has some weaknesses (Table 1). The primary and

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substantial task of agriculture is to provide agricultural products, which is the essential part of the national food chain (Zietara W., 2008). However, as a result of constant social and

economic development of countries, the mere production function of agriculture is no longer sufficient.

Table 1

Advantages and disadvantages of ecological farming

Ecological farming	
ADVANTAGES	DISADVANTAGES
<ul style="list-style-type: none"> Local biodiversity is preserved; Soil is not barren nor saline; No eutrophication of surface waters; Surface waters are not contaminated; Rural unemployment rate decreases; Small farms become more profitable; The use of renewable energy sources; Little or no chemicalization; Proper conditions for farm animals. 	<ul style="list-style-type: none"> Smaller yield (on average by 20 % of conventional production); Labour intensity; Lower management efficiency; Products are more expensive than those manufactured by traditional methods; Frequent inspections.

Source: authors' study on the basis of M. Zelezik (2009) "The Reasons for Ecological Farming", "Rocznik Swietokrzyski", B series – Natural Science, no. 30, p. 155-166, and Malgorzata Duda - Krynicka, Henryk Jaskolecki (2009): The History and Perspectives of Ecological Farming in Poland, Problems of Ecology, vol. 14, no. 2, March - April, 85 – 91.

At present, due to the expectations of the residents of Europe as regards food safety and environmental protection, the function of agriculture also involves services in relation to the environment and people (Koloszko-Chomentowska Z., Sieczko L., 2014). Therefore, the fact that ecological farms which produce economically friendly goods is a response to the expectations of conscious society, and as to the analyses on the ongoing and probably long-term development of ecological farming (Brodzinska K., 2014) - they all seem to be understandable. In his work published in 2009, H. Runowski claims that the dynamic growth in ecological crops in the general area of arable land primarily resulted from substantial subsidies to the areas of ecological crops, which were granted as part of Poland's accession to the EU. He argues that this was the reason for certain newly registered ecological farms to commerce the new type of production (Runowski H., 2009). Similarly to T. Tambovceva (2016), H. Runowski states that ecological farming is already a global trend, and its dynamic in Europe should be emphasised (Tambovceva T., 2016). In 2014, R. Kisiel and N. Grabowska also stated that Poland's integration with the European Union had a positive impact on

agriculture in Poland. The changes were primarily caused by the introduction of area payment scheme to national agriculture that took into account agricultural farms (Kisiel R., Grabowska N., 2014). In her work "Ecological Farming and GMO as a Chance for the Development of Polish Economy. Advantages and Risks", M. Ciepielewska also emphasises that the development of ecological farming all around the world within the last several years was substantial. There were several reasons for that, for instance, undermined trust in products developed by traditional farming methods that focus on production volume and intensification instead of product's quality. With interest of natural environment in mind, farmers change the profile of their activities because they want their children and grandchildren to live in uncontaminated environment (Ciepielewska M., 2014). She also emphasises the significance of aid programmes of the European Union which support ecological farming and promote sustainable development (Ciepielewska M., 2014; Harasim A., 2010).

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Materials and methods

The purpose of this article is to review the changes in organic crop areas in the chosen EU countries and to analyse the correlation between organic crop areas in each country and the prosperous organic operators within this area. The time series moments (Pulaska-Turyna B., 2008) considered in this article relate to the period from 2005 to 2015. The data used in this paper refer to organic crop areas and the prosperous organic operators in chosen EU countries at this time. The countries analysed in this paper belong to the group of countries which were given access to the European Union in 2004, with the exception of Cyprus and Malta because of no data available. Thus, the analysed countries are: Czech Republic, Estonia, Lithuania, Latvia, Poland, Slovakia, Slovenia and Hungary. The source of the data was Eurostat Database. Firstly the chain indices and average pace of change in organic crop areas in considered period were computed. To check the correlation between both the variables, the Pearson correlation coefficient was used. The computation was made with SPSS software.

There were no prosperous organic operators' data available for Lithuania, Hungary and Slovenia, therefore the correlation was considered for the Czech Republic, Estonia, Latvia, Poland and Slovakia.

When creating this article, the theoretical part was made with based on the review of the literature and the methodological part was presented with tables and figures.

Research result and discussion

Development of the organic agriculture within the EU area is determined by many factors, such as financial support from the EU budget

(Golinowska M., 2013). Therefore, in May 2004 not only the biggest enlargement of the EU took place (UE-10, when ten countries: the Czech Republic, Cyprus, Estonia, Lithuania, Latvia, Malta, Poland, Slovakia, Slovenia and Hungary got access to the EU), but also there was an opportunity created for those countries to transform their agricultural farms into the ecological ones with the help of EU subsidies. As it was said before, eight countries were considered: the Czech Republic, Estonia, Lithuania, Latvia, Poland, Slovakia, Slovenia and Hungary. Table 2 presents ecological crop area in chosen countries from 2005 to 2015 (from right after the access to the EU to the last year, where data is already available).

In the analysed period, there was a visible, regular increase in the ecological crop area in each country. For example, in Poland the crop area was almost five times smaller than in the Czech Republic, where the crop area was the biggest then, and in 2015 ecological crop area in Poland became the biggest one at the time and was 70 000 hectares bigger than in the Czech Republic.

So significant increase of the discussed area was possible because of 1257/99 Regulation of the Council of Europe from 2001, which established the financial support to the ecological agriculture at 519 385 000 euro and was received by 118 656 recipients from the EU countries (Golinowska M., 2013). In Figure 1, the average ecological crop area in the analysed period is presented. After the access of the considered countries to the European Union, the average annual ecological crop area was successfully increasing in the period of 2005-2014. In 2015 however, there was a decrease.

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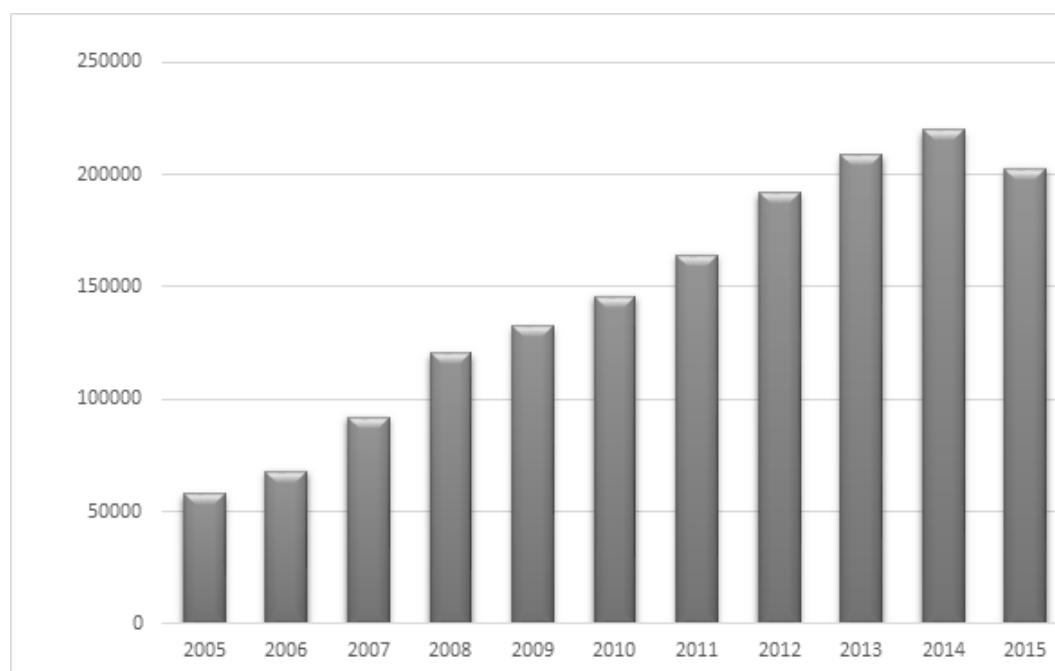
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Organic crop areas in the chosen countries EU in 2005 – 2015 [ha]

Country/ Year	Czech Republic	Estonia	Latvia	Lithuania	Hungary	Poland	Slovenia	Slovakia	mean
2005	226209	36487	20691	13905	84765	38609	15985	27247	57987
2006	216319	44878	51213	30498	92167	47570	20151	40085	67860
2007	224373	55445	62321	56542	98243	135815	23560	80268	92070
2008	232939	71848	141524	89890	108578	178670	26125	113132	120338
2009	267483	76200	141070	106060	110916	222022	25816	111466	132629
2010	296379	82391	140946	103225	97584	309219	25056	112314	145889
2011	354649	101906	130059	99410	101801	375086	27448	123272	164203
2012	402659	119899	144652	114479	106279	457478	28807	162199	192056
2013	448258	129705	163133	136486	112266	492897	30041	156336	208640
2014	447972	136267	179082	144320	111233	555898	33536	150861	219896
2015	428560	132686	160964	131456	94163	501926	32488	139234	202684

Source: author's calculations based on

<http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tag00098>



Source: author's calculations based on

<http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tag00098>

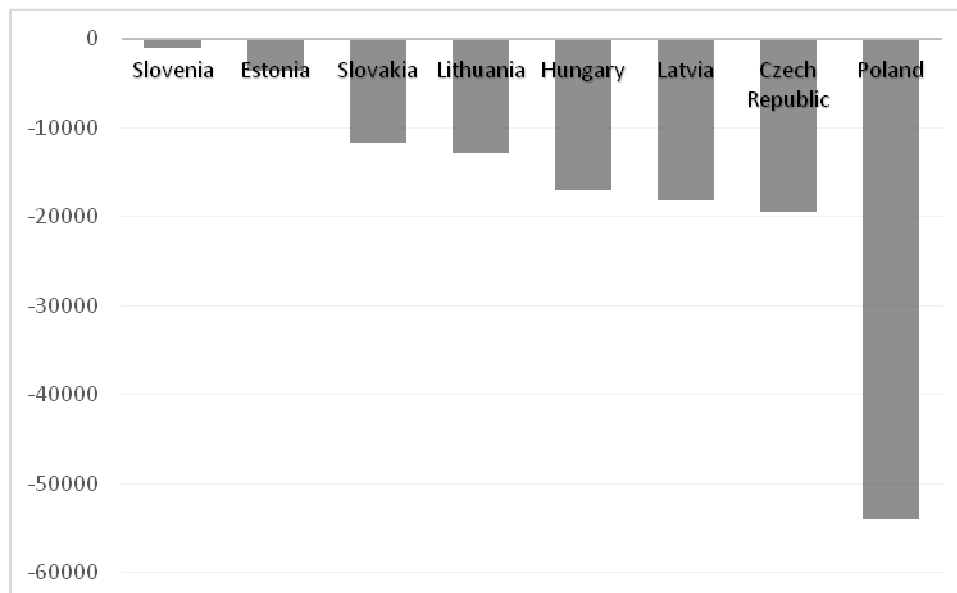
Fig. 1. Mean organic crop area in the chosen countries of EU in 2005-2015 [ha]

Figure 2 presents how much the ecological crop areas decreased in 2015 in comparison with 2014 in the chosen countries. Within the considered countries, the biggest decrease of the ecological crop area was observed in 2015 in Poland and stood at 54 000 hectares. What is more, the difference between Poland and following country – the Czech Republic stood at

approximately 345 000 hectares. Following countries had very similar decrease of the ecological crop area, with the exception of Estonia and Slovenia, where minor decrease of the area was observed – for Estonia it was slightly over 3000 hectares and for Slovenia – slightly over 1000 hectares.

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Source: author's calculations based on <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tag00098>

Fig. 2. Changes of organic crop area between 2014 and 2015 [ha]

In Table 3 the chain indices and the average pace of change in each country and year is specified. When analysing the values of the chain indices and average pace of change of the ecological crop areas in following years in each country, it may be established that on average in years 2006-2014 there was an increase in ecological crop areas. At the beginning of the analysed period it was significant – in 2006 in each of the considered countries, it was an increase of approximately 41.27 %, and in 2007 almost 46 %. In 2008, the average pace of change was smaller and established at approximately 35 %. It coincided with the world's financial crisis of 2007–2008. In the following years until 2014, the ecological crop area was fairly increasing. When analysing changes of the ecological crop areas for the considered countries, it may be established, that three countries – Poland, Lithuania and Latvia had the biggest average increase at that time and it was respectively 29.24 %, 25.19 % and 22.17 %. Hungary presented the smallest dynamic of growth, where the area was increasing on average by 1 % annually. The country with the greatest crop area at the end of the considered period was Poland. The country with the smallest

crop area at the end of the considered period was Slovenia.

Subsequently, the correlation between the ecological crop area and the number of the prosperous organic operators was researched. Table 4 presents the number of the prosperous organic operators in the considered countries. Value 'ed' in the Table means no data available

Table 5 presents computed Pearson correlation coefficients. Given the received results, it may be established that in the Czech Republic, Estonia, Poland and Slovakia the Pearson correlation coefficients between the ecological crop area and the number of the prosperous organic operators are statistically significant and the significance level equals 0.01 (values marked with **). Whereas in Latvia the correlation is not statistically significant. The values of significant correlation are positive and over 0.85. It may be established, that in the Czech Republic, Estonia, Poland and Slovakia in correlation with the increase of the ecological crop areas, the number of the prosperous organic operators also increases and this dependence is very strong. This dependence was not identified in Latvia.

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Table 3

Chain indices and average pace of change of ecological crop area in the chosen countries EU in 2005 – 2015[%]

Country	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	Average pace of change
Czech Republic	95.63	103.72	103.82	114.83	110.80	119.66	113.54	111.32	99.94	95.67	6.60
Estonia	123.00	123.55	129.58	106.06	108.12	123.69	117.66	108.18	105.06	97.37	13.78
Latvia	247.51	121.69	227.09	99.68	99.91	92.28	111.22	112.78	109.78	89.88	22.77
Lithuania	219.33	185.40	158.98	117.99	97.33	96.30	115.16	119.22	105.74	91.09	25.19
Hungary	108.73	106.59	110.52	102.15	87.98	104.32	104.40	105.63	99.08	84.65	1.06
Poland	123.21	285.51	131.55	124.26	139.27	121.30	121.97	107.74	112.78	90.29	29.24
Slovenia	126.06	116.92	110.89	98.82	97.06	109.55	104.95	104.28	111.63	96.88	7.35
Slovakia	147.12	200.24	140.94	98.53	100.76	109.76	131.58	96.39	96.50	92.29	17.72
Average pace of change	41.27	45.96	35.01	7.40	4.26	9.06	14.76	8.01	4.91	-7.82	x

Source: author's calculations based on <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tag00098>

Table 4

Organic operators in the chosen countries EU in 2005 – 2015

Year/Country	Czech Republic	Estonia	Latvia	Lithuania	Hungary	Poland	Slovenia	Slovakia
2005	835	1 016	2 873	ed	ed	7 182	1 724	195
2006	963	1 176	4 095	ed	ed	9 187	1 953	265
2007	1 314	1 220	4 108	ed	1 612	11 870	ed	280
2008	1 842	1 245	4 203	ed	1 429	14 896	2 067	346
2009	2 665	1 278	4 017	2 652	1 620	17 092	2 096	363
2010	3 500	1 356	3 593	2 623	1 577	20 578	2 218	394
2011	3 904	1 431	3 484	ed	1 439	23 427	2 363	365
2012	3 907	1 478	3 496	2 511	1 560	25 944	2 680	362
2013	3 910	1 553	3 490	2 570	1 682	26 598	3 045	343
2014	3 866	1 542	3 475	2 445	1 672	24 829	3 293	403
2015	4 121	1 629	3 634	2 672	1 971	22 277	3 412	420

Source: author's calculations based on <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tag00098>

Table 5

Pearson correlation coefficient between organic crop area and

Country	Czech Republic	Estonia	Latvia	Poland	Slovakia
Specification					
Correlation coefficients	0.902**	0.975**	0.072	0.958**	0.852**

Source: author's calculations based on <http://ec.europa.eu/eurostat/tgm/table.do?tab=table&plugin=1&language=en&pcode=tag00098>

Conclusions, proposals, recommendations

After the access of the considered eight countries to the European Union, the development possibilities of their agriculture

farms have changed. The European Union, all set for environmental protection, the beauty of the nature and the food safety offered subsidies for the ecological agriculture, which gave farmers a chance to transform their cultivation and development of the already existing ecological cultivations. On the basis of the analyses of the ecological crop areas in eight countries from the EU in 2005-2015, the following conclusions can be made:

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- 1) In this period (2005-2015) in almost every following analysed year there was an increase of the ecological crop area in the considered countries.
- 2) Only the year of 2015 brought a bigger decrease in the ecological crop areas in the six considered countries, and in the other two countries – a smaller decrease.
- 3) In the Czech Republic, Estonia, Poland and Slovakia, there is a very strong correlation between ecological crop area and the number of the prosperous organic operators.
- 4) In Latvia, there is no correlation ecological crop area and the number of the prosperous organic operators.
- 5) To summarize the considerations on the subject of ecological crop areas, it may be interesting to research a possibility of correlation between the ecological crop area and the amount of subsidies in each country.

Bibliography

1. Brodzinska, K. (2014). Rolnictwo ekologiczne – tendencje i kierunki zmian (Ecological Farming – trends and anticipated changes), Scientific Papers of Warsaw University of Life Sciences – SGGW in Warsaw, the Problems of Global Agriculture, Volume 14, No. 3, p. 27-36.
2. Ciepielewska, M. (2014). Rolnictwo ekologiczne i GMO szansa dla rozwoju polskiej gospodarki? Korzyści i zagrożenia (Ecological Farming and GMO as a Chance for the development of Polish economy? Advantages and Risks), Economy in Theory and Practice, No. 4 (37), p. 8.
3. Council Regulation (EC) No. 834/2007 of 28 June on Organic Production and Labelling of Organic Products and Repealing Regulation (EEC) No. 2092/91, Official Journal of the European.
4. Domagalska, J., Buczkowska, M. (2015). Rolnictwo ekologiczne. Szanse i perspektywy rozwoju (Ecological farming. Chances and Development Perspectives), Hygiene and Epidemiology Issues No. 96 (2), p. 370 – 376.
5. Duda-Krynica, M., Jaskolecki, H. (2010). Historia i perspektywy rozwoju rolnictwa ekologicznego w Polsce (The History and Perspective of Ecological Farming in Poland), Problems of Ecology, Volume 14, No. 2, p. 85-91.
6. Golinowska, M. (2013). Rozwój rolnictwa ekologicznego (Development of Ecological farming), Publishing House Uniwersytet Przyrodniczy we Wrocławiu, Wrocław, p. 7-26.
7. Harasim, A. (2010). Stan obecny i perspektywy rozwoju rolnictwa ekologicznego w Polsce (Current Condition and Perspectives of Ecological Farming in Poland), Institute of Soil Science and Plant Cultivation, State Research Institute, Pulawy, p. 23.
8. Kisiel, R., Grabowska, N. (2014). Rola dopłat unijnych w rozwoju rolnictwa ekologicznego w Polsce na przykładzie województwa podlaskiego (The Role of EU Subsidies in the Development of Ecological Farming in Poland on the basis of Podlaskie Voivodship), Water – Environment – Rural Areas, Volume 14, No. 3 (47), p. 61-73.
9. Koloszek – Chomentowska Z., Sieczko, L. (2014). Gospodarstwo rolne jako podmiot w gospodarce narodowej (Agricultural Farm as a Unit in the National Economy), Economics and Management 1/2014, p. 97-112.
10. Komorowska, D. (2015). Znaczenie rolnictwa ekologicznego w Polsce (The Meaning of Ecological Farming in Poland), Polish Association of Agricultural and Agribusiness Economists, Scientific Annals, Volume 17, No. 2, p. 119-126.
11. Ligenzowska, J. (2014). Rolnictwo ekologiczne na świecie (Ecological Farming in the World), Scientific Papers of Warsaw University of Life Sciences – SGGW in Warsaw, The Problems of Global Agriculture, Volume 14, No. 3, p. 150-157.
12. Pulaska-Turyna, B. (2008). Statystyka dla ekonomistów (Statistics for economists), extended edition II, Publishing House Difin, Warsaw, p. 317.
13. Rudenska, B., Wojcicki, Z. (2015). Systemy rolniczej produkcji ekologicznej i precyzyjnej (informacyjnej) (The System of Ecological and Precision (Information) Agriculture Production), The Problems of Agricultural Engineering, Issue 2 (88), p. 5-15.
14. Runowski, H. (2009). Rolnictwo ekologiczne: Rozwój czy regres? (Ecological Farming: Growth or decline?), Agriculture Science Annals, G Series, Volume 96, No. 4, p. 186.
15. Tabor, S., Kowalski, J., Michalek, R., Kubon, M., Kwasniewski G., Malaga-Tobola, U. (2014). Rozwiązania modelowe gospodarstw ekologicznych (The Model Solutions of Ecological Farms), Publishing House PTIR, Cracow, p. 217.
16. Tamboveceva, T. (2016). Development of Organic Agriculture in Latvia, Economic Science for Rural Development, No. 41, p. 147-155. Retrieved: http://llu.lv/conference/economic_science_rural/2016/Latvia_ESRD_41_2016.pdf. Access: 5.01.2017.
17. Tyburski, J., Zakowska-Biemans, S. (2007). Wprowadzenie do rolnictwa ekologicznego (Introduction to Ecological Farming), Publishing House SGGW, Warsaw, p.112-176.
18. Zietara, W. (2008). Wewnętrzne uwarunkowania rozwoju polskiego rolnictwa (Internal Factors in the Development of Agriculture in Poland), Agriculture Science Annals, G Series, Volume 94, No. 2, p. 80-94.
19. Zelezik, M. (2009). Dlaczego rolnictwo ekologiczne? (The Reasons for Ecological Farming), Rocznik Swietokrzyski, No. 30, p. 155-166.

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RURAL DEVELOPMENT POLICY INCENTIVES ENCOURAGING ENTREPRENEURSHIP IN SELECTED EU COUNTRIES

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Abstract. The importance of entrepreneurship for the growth of the economy brings little of doubts; however, the majority of all studies until now focuses on country's or region's entrepreneurship and entrepreneurial policy rather than on specific industry's entrepreneurship policy. The same applies to rural economy and development policy and there is the lack of comparative studies on rural policies aimed at supporting entrepreneurship in rural areas. In order to fill this gap, the comparative analysis of Rural Development Programmes 2014-2020 in selected EU countries is envisaged in order to answer the question how rural entrepreneurial policies in high income and low income EU countries differ. Thus, the object of the research is rural entrepreneurship policy in selected EU countries. The main goal of the research is to carry a comparative analysis of rural entrepreneurship policy measures in selected EU countries and to draw the links between income level in countries and implemented rural development policy in these countries. The results of the analysis reveal that in high-income EU countries entrepreneurship policy is targeted and aimed at addressing knowledge and cooperation issues, while in lower income EU countries emphasis is still put on financial assistance. The validity of results is limited because other factors of entrepreneurship environment, the effects of entrepreneur personality and potential synergies among these factors were left out of the scope of the analysis.

Key words: entrepreneurship, rural development policy, EU.

JEL code: Q18

Introduction

The importance of entrepreneurship for the growth of the economy and the environment encouraging it are at the centre of scientific and policy debate focussing on the economic growth driven by knowledge and innovation (Shriff M. and Muffatto M., 2014; Gnyawali D. and Fogel D., 1994; Ciobotaru A.-C., 2014; Murdok K., 2012; Morris M. and al., 2015; Xheneti M. and Smallbone D., 2006; Dennis Jr. W., 2011; Kreft S. F. and Sobel R. S., 2005; Bradley A. W. and Klein P., 2016; Lathi A., 2010) in the today's world facing global integration, international competition among economies, businesses and entrepreneurs. The entrepreneurship here can be perceived as a continuous process of discovery (Ciobotaru A.-C., 2014) launched by an entrepreneur while organizing resources in innovative manner, i.e. launching a new venture, and doing so in a specific, from institutional perspective, socio-economic context (Xheneti M. and Smallbone D., 2008). Whether entrepreneurship is productive or unproductive depends on the incentives created by institutional environment (Baumol W. J., 1996; Bradley S. W. and Klein P., 2016). Leaving behind issues of

personality (even if the Generation Y, joining the labour market, is driven by career-personal balance values that little coincide with the high-growth venture development) (Claire, L., 2012) of the entrepreneur and social (especially, cultural context) environment apart, the focus of that study is on public policy as one environmental element in support for entrepreneurship.

It is argued by scientists that entrepreneurship can be encouraged by supportive public policy (Gnyawali D. and Fogel D., 1994; Murdock K., 2012). Public policies can be designed and aimed at addressing any of entrepreneurship encouraging environment elements such as government policies and procedures, socioeconomic conditions, entrepreneurial and business skills, financial and non-financial assistance measures, i.e. five environmental dimensions as identified by D. Gnyawali and D. Fogel (1994). According to the integrative model of entrepreneurial environments, developed by the same authors, government policies and procedures create opportunities for entrepreneurship. The ability of enterprise is dependent upon entrepreneurial and

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business skills of entrepreneurs; however, socio-economic factors influence propensity of enterprise and together with ability of enterprise encourage like a hood of an enterprise (Table 1). Finally, existing financial and non-financial support can become the final determinants for a new venture creation.

Table 1

Dimensions of entrepreneurial environments

Five dimensions
Government policies and procedures Restrictions on imports and exports Provisions on bankruptcy laws Entry barriers Procedural requirements for registration and licensing Number of institutions for entrepreneurs to report to Rules and regulations governing entrepreneurial activities Laws and regulations governing entrepreneurial activities Laws to protect proprietary rights
Socioeconomic conditions Public attitude towards entrepreneurship Presence of experienced entrepreneurs Successful role models Existence of persons with entrepreneurial characteristics Recognition of exemplary entrepreneurial performance Proportion of small firms in the population of firms Diversity of economic growth Health and mobility of human capital Right mix of risk and rewards
Entrepreneurial and business management skills Technical and vocational education Business management education Entrepreneurial training programmes Technical and vocational training programmes Availability of information while bridging information gaps
Financial assistance Venture capital Alternative source of financing Low-cost loans Willingness of financial institutions to finance small entrepreneurs Credit guarantee programme for start-up enterprises Competition among financial institutions
Non-financial assistance Counselling and support services Entrepreneurial networks Incubator facilities Governmental procurement programmes for small business Government support for research and development lowering its risk Tax incentives and exemptions Local and international information networks Modern transport and communication facilities

Source: adopted D. Gnyawali D. and D. Fogel D. (1994); M. Sheriff and M. Muffatto (2014) and A. G. De Oliveira and M. C. De Oliveira Lopes Melo (2014)

Each public policy shall be designed in response to its target groups, target problems and its context, i.e. a country or a region. The opportunities of enterprise can be encouraged by more liberal governmental policies (Kreft S. F. and Sobel R. S., 2005), propensity of enterprise – by more societal awareness and integration of entrepreneurial values into formal education, ability of enterprise – by vocational training, and like a hood of enterprise – by developing propensity and abilities of enterprises while providing financial and non-financial support for the creation of new ventures (Gnyawali D. and Fogel D., 1994). Entrepreneurship policy is primarily focussed on individuals and groups of individuals dealing with the establishment of ventures, while the small and medium size business policy is primarily focussed on established firms (Sheriff M. and Muffatto M., 2014); however, more often entrepreneurship policy is covered by small and medium size policy in general (Dennis W., 2011; Xheneti M. and Smallbone D., 2008). Entrepreneurship policy should encourage productive entrepreneurship, and the rest shall be done but the market (Preuss L., 2011), i.e. it should not eliminate market incentives and should not aspire to no struggle (Holz-Eakin D., 2000).

While lower income countries should focus on the increase of human capital, availability of technology and promotion of venturing in order to increase positive perception of entrepreneurship, higher income countries should be dealing not so much with loosening of regulation, but more with labour market reform and financial market deregulation (Acs, Z. J. and Szerb L., 2007). According to the study of Z. J. Acs, S. Desai and J. Hessel (2008), countries being in the innovation-driven economic development stage, should focus on entrepreneurship education and training, outwards foreign direct investments, international trade and supporting role models, while countries in factor-driven stage should

focus on transition to efficiency-driven stage by developing stable institutional and macro-economic environment and increasing entrepreneurial capacity, i.e. knowledge spillovers (Audretsch D. and Keilbach M., 2004). The authors of the comparative study on impediments for entrepreneurship policy in managed and entrepreneurial economies (Murdock K., 2012) revealed that there is an important positive relationship between business regulation and entry rate of new firms in entrepreneurial and managed economies. Investments into R&D by higher education are important for entrepreneurial economies and relatively unimportant in managed economies. It is of little importance how entrepreneurial policy is developed (locally, regionally or nationally). Finally, even if availability of venture capital is crucial for the development of entrepreneurship, its impact on entry rate of new firms is limited in both types of economies. The same was identified by S. F. Kreft and R. S. Sobel (2005), as their implemented empirical research results revealed that entrepreneurship causes the inflow of venture capital, and entrepreneurship policy should focus on attracting entrepreneurs and not to attract venture capital.

By designing the entrepreneurship policy, it is important to understand the target group and to make the difference among types of ventures (Morris M. et al., 2015): survival ventures providing basic subsistence for the entrepreneur; lifestyle ventures providing rather stable income based on business model; managed growth ventures seeking for stable business growth; and aggressive/high-growth ventures, named gazelles, going for technology driven innovations and funded by equity capital. S. Shane (2009) and C. Mason and R. Brown (2013) argue that entrepreneurship policy should focus on high-growth ventures and do not encourage other ventures as they are less productive than existing firms. The differing needs of these target groups should be on the focus while designing

entrepreneurship policy, having in mind that high-growth ventures are the main source of economic growth.

Majority of all studies until now focus on country's or region's entrepreneurship and entrepreneurial policy rather than on specific industry entrepreneurship policy. The same applies to rural development policy, and there is lack of comparative studies on rural policies aimed at supporting entrepreneurship in rural areas, i.e. area with its own contextual factors. In order to fill this gap, the comparative analysis of Rural Development Programmes 2014-2020 in selected EU countries is envisaged in order to answer the question how rural entrepreneurial policy differs in high income and low income EU countries. Thus, the object of the research is rural entrepreneurship policy in selected EU countries. The main goal of the research is to carry a comparative analysis of rural entrepreneurship policy measures in selected EU countries and to draw the links between income level in the countries and implemented rural development policy in these countries. The tasks of the research are: to identify entrepreneurship encouraging rural development measures under Rural Development Programmes 2014-2020 in selected EU countries, to make their comparative analysis with the link to income level in these countries, and to draw conclusions on the potential dependencies between the entrepreneurship encouraging measures applied and income level in selected EU countries. Sixteen Rural Development Programmes 2014-2020 were analysed using for the analysis the theoretical framework of dimensions of entrepreneurial environment presented in Table 1.

Research results and discussion

The sixteen EU countries' Rural Development Programmes 2014-2020 (European Parliament, 2013) were compared and among them programmes of Austria, Bulgaria, the Czech Republic, Estonia, Finland, Hungary, Ireland,

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Latvia, Lithuania, Poland, Portugal, Romania, Sweden, Slovakia, Slovenia, and the United Kingdom. The policy measures planned in Rural Development Programmes 2014-2020 were analysed using the theoretical framework presented in Table 1 with the focus on the type and target of measures. Among all rural development policy measures, only those

targeting entrepreneurship, i.e. new venture creation (in agriculture, forestry and other industries in rural areas) were analysed and compared. It must be noticed that many other rural development measures, not directly or specifically, also could have impact on entrepreneurship; however, they are not taken into account as not specifically targeted.

Table 2

Population and GDP in rural areas in selected EU countries

Country	Population in predominantly rural areas in 2010, %	Economically active rural population in 2010	GDP per capita in 2013, EUR (current prices)	GDP relative to EU 28 level
EU 28			26700	
SE	16.3	680700	45400	1.70
IE	72.4	1371100	39200	1.47
AT	44.6	1653600	38000	1.42
FIN	40.9	902700	37400	1.40
UK	2.9	689800	32000	1.20
SL	43.8	409000	17400	0.65
PT	34.1	1750800	16300	0.61
CZ	33	1586500	15400	0.58
EE	48.1	280300	14300	0.54
SK	50.4	1252000	13700	0.51
LT	42.3	596900	11800	0.44
LV	37.2	364700	11300	0.42
HU	46.7	1806000	10300	0.39
PL	33.4	5328600	10300	0.39
RO	45.6	3934700	7200	0.27
BG	37.7	1128200	5800	0.22

Source: Eurostat (2011) for population in predominantly rural areas; Eurostat (2010) for economically active rural population; Eurostat data on GDP per capita in 2013; author's calculations based on Eurostat data on GDP per capita in 2013

The economic and social profiles of the countries under analysis are drawn by comparing the data on their share of population in predominantly rural areas (Eurostat, 2011), economically active rural population (Eurostat, 2010) that is the potential target group for entrepreneurship policy and GDP per capita (Eurostat, 2013), and calculating relative differences in GDP per capita in the countries (GDP per capita in a specific country divided by the average GDP per capita in EU 28; Table 2).

The results of the first stage in comparative analysis reveal that in selected group of countries only five could be categorized as high income countries and these are Sweden, Ireland, Austria, Finland and the United Kingdom. In all these countries, GDP per capita is higher than the average in EU 28. The lowest GDP per capita is identified in Bulgaria and Romania where it accounts for less than one fourth of the average GDP per capita in EU 28. There are no direct links observed between the GDP per capita and the importance of rural population in a country.

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Countries with high-income level and those with the low one have rather dispersed share of rural population. Poland, Romania are two countries with overall biggest economically active rural

populations among the countries under analysis. Economically important rural populations live also in Ireland, Austria, Portugal, the Czech Republic, Slovakia, Hungary, and Bulgaria.

Table 3

Rural development funds and rural development funds dedicated to support entrepreneurship

Country	Total RD 2014-2020, EUR	Total RD for SMEs, EUR	Share of RD for SMEs, %	RD per capita, EUR	RD per capita relative to average RD per capita	RD for SMEs per capita, EUR	RD for SMEs per capita relative to average RD for SMEs per capita
AT	7811596314	210008250	2.69	4724	0.84	127	0.48
BG	2917848203	228809976	7.84	2586	0.46	203	0.76
CZ	3074231995	107612874	3.50	1938	0.34	68	0.25
EE	9928000000	109200000	1.10	35419	6.27	390	1.46
FIN	8265331757	525000000	6.35	9156	1.62	582	2.18
HU	4170628157	538865450	12.92	2309	0.41	298	1.12
IE	3909500630	122250000	3.13	2851	0.50	89	0.33
LT	1977771625	166806297	8.43	3313	0.59	279	1.05
LV	1531595207	171068124	11.17	4200	0.74	469	1.76
PL	13513295000	1131937712	8.38	2536	0.45	212	0.80
PT	4173398703	206595239	4.95	2384	0.42	118	0.44
RO	9472648512	1111497643	11.73	2407	0.43	282	1.06
SE	4300321096	145973734	3.39	6317	1.12	214	0.80
SK	2079595130	134980000	6.49	1661	0.29	108	0.40
SL	1107279334	166900938	15.07	2707	0.48	408	1.53
UK	4055698788	292285856	7.21	5880	1.04	424	1.59

Source: The European Commission (2016) for total RD and RD for SMEs budget data, author's calculations based on the European Commission (2016) data and data in Table 1

According to the allocated support for the overall rural development (Table 3; total rural development funding– total RD), funding for entrepreneurship countries under the analysis can be grouped into three main groups: those assigning 0-4.99 % of their total RD funding to support entrepreneurship; those allocating 5.00-9.99 % of funding, and those allocating >10 % of their funding. The biggest share of Rural Development Programme 2014-2020 funding for new venture creation (in form of small and medium enterprises – SMEs) will be allocated in Slovenia, Hungary, Romania, and Latvia. The lowest share of total RD funding allocated for entrepreneurship is identified in Austria, the Czech Republic, Estonia, Ireland, Portugal, and Sweden. The rest of the countries compose the

second group of countries with moderate share of funding allocated for entrepreneurship. However, even if total RD funding and RD funding for entrepreneurship are rather limited in certain countries their relative importance differs when total RD funding and rural development funding for entrepreneurship per capita (of economically active rural inhabitant) is calculated. The selected countries under analysis can be grouped into two groups: those with or above average of RD and RD for entrepreneurship per capita and those with lower levels of funding per capita. Estonia, Finland, Sweden, and the United Kingdom are the countries with higher than average RD funding per capita, the rest of the countries – with lower than average RD funding per capita. However, Estonia, Finland, Hungary, Latvia, Lithuania,

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Romania, Slovakia, and the United Kingdom are those countries that invest the most into one economically active inhabitants of rural areas in their countries as the RD for entrepreneurship per capita is higher than average among these countries.

The Rural Development Programme's 2014-2010 measures, relative to entrepreneurship and its support, were grouped into three groups using the theoretical framework of dimensions of entrepreneurial environments presented in Table 1: first group – measures addressing entrepreneurship and business management skills; second group – addressing non-financial assistance; and third group – providing financial assistance (Table 4). The relative share of particular measure in the frame of RD funding for entrepreneurship is calculated and analysed

among countries under analysis and presented. There are three countries putting emphasis on relative importance of investments into knowledge - Sweden, Austria and Finland. The rest of the countries are moderately investing in their rural entrepreneurial and business management skills. Sweden is a country with the highest relative importance of advisory measure to support entrepreneurship, while in other countries it is of rather marginal importance. Relatively, high importance of entrepreneurship supporting measure is given to cooperation in Sweden, Austria, and Finland, which is relatively modest in other countries. Leader measure is undertaken only in the United Kingdom and it accounts for almost 60.0 % of the total RD funding for entrepreneurship.

Table 4

Rural development measures to support entrepreneurship

Country	Entrepreneurship and business management skills, %	Non-financial assistance, %				Financial assistance, %	
	Knowledge	Advisory	Cooperation	Leader	Basic services	Start-up aid	Investments
SE	11.97	8.00	20.25	0.00	0.00	55.71	4.07
AT	10.28	2.49	18.98	0.00	0.00	68.25	0.00
FIN	9.71	0.00	13.71	0.00	0.00	76.57	0.00
LT	2.24	0.84	0.00	0.00	0.00	96.92	0.00
SK	2.04	0.24	2.22	0.00	0.00	82.17	13.34
HU	1.30	0.47	2.55	0.00	0.00	52.39	43.29
BG	0.87	0.59	0.00	0.00	0.00	89.36	9.18
EE	0.64	2.20	0.00	0.00	0.00	81.59	15.57
RO	0.57	3.19	0.00	0.00	0.00	66.34	29.89
SL	0.37	0.00	1.14	0.00	0.00	75.10	23.38
CZ	0.05	0.00	0.00	0.00	0.00	99.95	0.00
IE	0.00	0.00	1.84	0.00	0.00	0.00	98.16
LV	0.00	0.00	0.00	0.00	74.03	25.97	0.00
PL	0.00	0.00	0.00	0.00	0.00	100.00	0.00
PT	0.00	1.24	0.00	0.00	0.00	98.76	0.00
UK	0.00	0.21	4.28	59.37	0.00	36.14	0.00

Source: author's calculations based on the European Commission (2016) data

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Basic services as a measure to support entrepreneurship are foreseen only in Latvia and they account for more than 74.0 % of the total RD funding for entrepreneurship. There are two types of financial assistance measures to support entrepreneurship in rural areas, i.e. start-up aid and investment aid, and they account for majority of total RD funding for entrepreneurship in almost all countries under analysis. Start-up aid is relatively modest in Latvia and the United Kingdom, and even non-existent in Ireland. The rest of the countries support the start-up creation where Poland allocates even 100.0 % of its total RD funding for entrepreneurship. Investments into new ventures are supported and can be financed using RD funding in Sweden, Slovakia, Hungary, Bulgaria, Estonia, Romania, Slovenia, and Ireland.

Conclusions, proposals, recommendations

- 1) The importance of entrepreneurship for the growth of the economy brings little of doubts; however, the majority of all studies till now focuses on country's or region's entrepreneurship and entrepreneurial policy rather than on specific industry entrepreneurship policy. The same applies to rural economy and development policy and there is lack of comparative studies on rural policies aimed at supporting entrepreneurship in rural areas.
- 2) The comparative analysis revealed that rural development policies in selected EU countries do not target specifically high-growth ventures and provide support for any kind ventures, i.e. no important growth of rural economy could be expected as being driven

by rural entrepreneurship policy in these countries.

- 3) The results of the analysis reveal that in high-income EU countries entrepreneurship policy is targeted and aimed at addressing knowledge and cooperation issues, while in lower income EU countries emphasis is still put on financial assistance.
- 4) The entrepreneurship policy design is subject to the stage of economic development in a specific country. It would focus knowledge and non-financial assistance on developed economies, innovation-driven economies, while it would focus on financial assistance, where normally there is a lack for venture capital in less developed, efficiency or factor driven economies.
- 5) The theoretically discussed importance of knowledge (as entrepreneurship and business management skills addressing measure) and public policy encouraging were not fully reflected by the results of the research. The validity of the results is limited because other factors of entrepreneurship environment, the effects of entrepreneur personality and potential synergies among these factors were left out of the scope of the analysis.

Bibliography

Journal paper with author(s)

1. Acs, Z. J., Desai, S., Hessels, J. (2008). Entrepreneurship, Economic Development and Institutions. *Small Business Economics*, Vol. 31, pp. 219-234.
2. Acs, Z. J., Szerb, L. (2007). Entrepreneurship, Economic Growth and Public Policy. *Small Business Economics*, Vol. 28, pp. 109-122.
3. Audretsch, D. B., Keilbach, M. (2004). Does Entrepreneurship Capital Matter? *Entrepreneurship Theory and Practice*, Fall, pp. 419-430.
4. Baumol, W. J. (1996). Entrepreneurship: Productive, unproductive, and Destructive. *Journal of Business Venturing*, Vol. 11, No.1, pp. 3-22.

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² Jolita Vveinhardt. . Tel.: + 370 37 327 856; fax: + 370 37 327 857. E-mail: jolita.vveinhardt@vdu.lt.

5. Bradley, S. W. Klein, P. (2016). Institutions, Economic Freedom, and Entrepreneurship: The Contribution of Management Scholarship. *Academy of Management Perspective*, Vol. 30, No. 3, pp. 211-221.
6. Ciobotaru, A.-C. (2014). The Case for (or against) Smart Specialization: Entrepreneurial Process vs. Weak Interventionism. *Review of Economic Studies and Research Virgil Madgearu*, No. 1, pp.5-40.
7. Claire, L. (2012). Re-Storying Entrepreneurial Ideal: Lifestyle Entrepreneurs as Hero? Tamara- Journal for Critical Organization Inquiry, Vol. 10, No. 1, pp. 31-39.
8. Deennis Jr., W. (2011). Entrepreneurship, Small Business and Public Policy Levers. *Journal of Small Business Management*, Vol. 49, No. 1, pp. 149-162.
9. Gnyawali, D., Fogel, D. (1994). Environments for Entrepreneurship Development: Key Dimensions and Research Implications. *Enterprise Theory and Practice*, Summer, pp.43-62.
10. Holz-Eakin, D. (2000). Public Policy toward Entrepreneurship. *Small Business Economics*, Vol. 15, pp. 283-291.
11. Kreft, S. F., Sobel, R. S. (2005). Public Policy, Entrepreneurship, and Economic Freedom. *Cato Journal*, Vol. 25, No. 3, pp. 595-616.
12. Lathi, A. (2010). Towards a New Entrepreneurial Growth Theory. *Economics and Management*, Vol. 15, pp. 130-139.
13. Mason, C., Brown, R. (2013). Creating Good Public Policy to Support High-Growth Firms. *Small Business Economics*, Vol. 40, pp. 211-225.
14. Minniti, M. (2008). The Role of Government Policy on Entrepreneurial Activity: Productive, Unproductive or Destructive. *Entrepreneurship Theory and Practice*, Vol. 32, No. 5, pp. 1042-2587.
15. Morris, M., Neumeyer, X., Kuratko, D. (2015). A Portfolio Perspective on Entrepreneurship and Economic Development. *Small Business Economics*, Vol. 45, pp. 713-728.
16. Murdok, K. (2012). Entrepreneurship Policy: Trade-Offs and Impact in the EU. *Entrepreneurship & Regional Development*, Vol. 24, No. 9-10, pp. 879-893.
17. Preuss, L. (2011). On the Contribution of Public Procurement to Entrepreneurship and Small Business Policy. *Entrepreneurship & Regional Development*, Vol. 23, No. 9-10, pp. 787-814.
18. Schott, T., Jensen, K.W. (2008). The Coupling between Entrepreneurship and Public Policy: Tight in Developed Countries but Loose in Developing Countries. *Estudios du Economica*, Vol. 35, No. 2, pp. 195-214.
19. Shane, S. (2009). Why Encouraging More People to Become Entrepreneurs is Bad Public Policy. *Small Business Economics*, Vol. 33, pp. 141-149.
20. Sheriff, M., Muffato, M. (2014). Reviewing Existing Policies for Unleashing and Fostering Entrepreneurship in Selected African Countries. *Journal of Developmental Entrepreneurship*, Vol. 19, No. 3, pp. 1-36.
21. Xheneti, M., Smallbone, D. (2008). The Role of Public Policy in Entrepreneurship Development in Post-Socialist Countries: A Comparison of Albania and Estonia. *EBS Review*, Vol. 24, No. 1, pp. 23-36.

Internet sources

22. European Commission (2016). Rural Development: Country Files. Retrieved: http://ec.europa.eu/agriculture/rural-development-2014-2020/country-files_en. Access: 30/11/2016.
23. Eurostat (2010). Rural Development Statistics by Rural-Urban Typology. Retrieved: http://ec.europa.eu/eurostat/statistics-explained/index.php/Rural_development_statistics_by_urban-rural_typology. Access: 30/11/2016.
24. Eurostat (2011). Urban-Rural typology Update. Retrieved: http://ec.europa.eu/eurostat/statistics-explained/index.php/Urban-rural_typology_update. Access: 30/11/2016.
25. European Parliament (2013). Regulation (EU) NO 1305/2013 of the European Parliament and of the Council of 17 December 2013 on Support for Rural Development by the European Agricultural Fund and Rural Development (EAFRD) and Repealing Council Regulation (EC) No 1698/2005. Retrieved: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:L:2013:347:0487:0548:en:PDF>. Access: 30/11/2016.

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ECO-INNOVATIONS AND SUSTAINABLE DEVELOPMENT OF BUSINESSES IN RURAL AREAS OF KUJAWSKO-POMORSKIE PROVINCE OF POLAND

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Abstract. The aim of this paper is to present issues of eco-innovations in relation to sustainable development of businesses. Research was conducted among 225 owners, managers or other persons involved in environmental issues in businesses located in rural areas of Kujawsko-pomorskie Province of Poland.

The research showed that caring for the environment is one of the key assumptions of sustainable development undertaken by the businesses. The environmental benefits are an important, but not the most important factor which determines the introduction of eco-innovations. Economic advantages also matter. Environmental protection may be a way of a simultaneous improvement in economic results, e.g. a decrease in the cost of energy usage, resources and raw materials affects the profitability of the business.

Key words: eco-innovations, innovativeness, rural areas, sustainable development.

JEL code: Q01, Q56, R11

Introduction

Innovativeness is expressed by the ability of economies and businesses to create, introduce and absorb innovations. Innovations and advanced technologies are nowadays the basis of the development of both the world's largest economies and particular, rapidly developing businesses (Glodek, Golebiowski, 2006). Subject literature describes innovativeness of economies/regions as "the ability and willingness of this economy/these regions to constantly search for and use in economic practice the results of scientific and developmental research, new concepts and ideas, inventions, improvements and development of used technology of material and non-material (service) production as well as the ability to introduce new methods and techniques in the organisation and management and to develop infrastructure and knowledge resources" (Wasilewska, 2013).

The notion of innovation was brought into economic sciences by J. Schumpeter who maintained that the innovation lies in:

- introducing new products into production or improving the existing ones;
- introducing a new or improved method of production;
- opening a new market;
- employing a new way of sales and purchases;
- applying new materials or semi-finished products;

- introducing a new organisation of production (Bujak, 2011).

Innovation is also defined in the subject literature as "introducing into economic practice a new or significantly improved product, service or process, including the introduction of a new marketing or organisational method which redefines the manner of operation or the business's relations with the surrounding environment" (Bukowski, Szpor, Sniegocki, 2012).

This notion is also understood as "the entire process of managing, including various actions leading to the creation, development and introduction of new value in products or new combination of means and resources, which are new to the individual unit who creates or introduces them (Bujak, 2011).

The basic aim of innovation are changes that lead to an increase in modernity and competitiveness of the business, thus to an increase in its value (Sosnowska, 2005; Zuzek, 2016). It is related to the active engagement in innovative processes. It means a high activeness in obtaining resources and abilities necessary to take part in those processes (Matusiak, 2005).

The aim of the research was an analysis of certain issues of eco-innovations in relation to sustainable development of the businesses.

The research was conducted among 225 purposefully selected businesses from the rural

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areas of Kujawsko-pomorskie Province of Poland. The qualifying criterion for the research was whether the business had introduced any eco-innovation in the years 2013-2015 or intended to do so within the next three years. The owners, managers and/or other persons involved in environmental issues in the businesses were asked to fill in a specially designed questionnaire for further research purposes. Data thus collected was then subject to a statistical analysis.

Businesses and the natural environment

The basic impact on the state of the environment is conditioned by industrialisation as well as such factors as meeting the aspirations of the consumer resulting from the development of civilisation, the necessity to satisfy rocketing needs and expectations in terms of access to energy, production of material products that meet customers' expectations (Kuraszko, 2010).

The weight of environmental problems in the operation of businesses contributed to the increased interest in this sphere of investments (Zuzek, 2015).

Some of the measures to support decreasing the pressure on the environment, while generating financial savings, include:

1) in the field of water management:

- identification of areas of unjustified energy consumption,
- analysis of accounts and data from meter readings with the current activities of the company,
- turning on all the devices only in justified cases,
- turning off all equipment operating in standby mode,
- overview inspection of thermostats which regulate the temperature of hot water,
- tightening windows and doors and install heat-retaining curtains,
- insulation of hot water installation,
- proper technical condition of equipment and power tools,

- cleaning lamps and introduction of energy-saving light bulbs and sensors for switching lights on and off,
- introduction of switching on/off controllers for heating,
- introduction of magnetic cards which automatically switch power off indoors,
- replacement of household appliances with energy-efficient ones;
- in the field of waste management:
- identification of areas where it is possible to reduce waste, analysis of the quantity and composition of waste to determine the purchasing policy (e.g. cleaning agents, office equipment, food products),
- purchasing supplies for the facility in large or recyclable packaging,
- analysis of the costs of the use of a particular type of packaging,
- developing a program of recycling waste (materials),
- reducing packaging for toilet products, introduction of soap dispensers,
- limiting the amount of information brochures for clients, printing on recycled paper,
- composting of organic waste on site in an "ecological earthworm box" (lower waste disposal costs),
- use of electronic mail (less paper);

2) in the field of water management:

- identify areas that allow saving water,
- measurements at various points of water consumption (e.g. wash basins, toilet cisterns),
- water reuse, where possible,
- repair of any leaking equipment (e.g. taps, toilet cisterns), introduction of water consumption stops (self-switching taps, IR sensors, aerators),
- rainwater harvesting and its use, e.g. for watering greenery areas,
- use of biodegradable and phosphorus-free cleaning agents (Kostecka, Kostecki, 2006).

Awareness of the impact of industrial activity on the state of the environment leads to minimization of the risks and adverse effects as much as possible and taking of measures aimed at preservation of clean natural environment in the best possible state (Kuraszko, 2010).

Preventing the progressive degradation of the environment and restoring its damaged components require its users to use various ways of protection. The eco-innovation is of great importance in this respect.

Eco-innovation in business operations

Taking care of the environment should be one of the key objectives of sustainable development. Sustainable development should ensure a balance between economic growth and environmental protection in order to ensure a high quality of life for the society (Sobczyk, 2014). Only a sustained and sustainable development gives a guarantee of development that will meet the needs of the present without depriving future generations of a possibility to meet their own needs.

The realisation of the idea of sustainable development is based on such environment management, which does not cause a threat to ecosystems and socio-economic systems (Wielewska, 2014; Prus, 2010). The concept of sustainable development is aimed at preventing negative processes in relation to the environment and requires social acceptance of functioning of businesses. The idea of sustainable development will be fulfilled when the environment is protected, along with the maximum economic development of the company as well as – in the long term – when resources are renewed (Brelík, Matuszczak, 2013).

A peculiar line of thought and action, which determines the basic path of development, is eco-innovativeness, referred to today as sustainable development (Zuzek, 2015).

Eco-innovation leads to obtaining and maintaining the state of sustainable development, which includes not only

environmental protection, but also a system perspective on the economic activity of man and his/her relationship with the basic biological, chemical and physical systems in order to establish and maintain the human race at such a level that is sustainable, while leading to the continuous economic, cultural and technological evolution (Foltynowicz, 2011).

Businesses are able to combine economic and environmental targets to achieve long-term economic benefits. They should, however, review its environmental policy and thus choose activities in this area, to make them more coordinated with the strategy of their business. These measures should focus on improving the competitiveness and market value of the company, among other things through eco-innovation (Kryk, 2007).

For the innovation to be called *eco*, it must be good for the natural environment. Aspects of eco-innovation in the surveyed enterprises are presented in Table 1.

Table 1

Aspects of eco-innovation in the surveyed enterprises *

No	Specification	N=225	%
1.	Modernisation of technological lines	78	34.7
2.	Modernisation of media infrastructure	63	28.0
3.	Construction of sewage treatment (pre-treatment) plants for wastewater	36	16.0
4.	Detailed segregation of waste	41	18.2
5.	Organic production	27	12.0
6.	Reducing emissions of harmful gases	35	15.6
7.	Reducing emissions of harmful dusts	28	12.4
8.	Other	6	2.7

*the surveyed respondents were allowed to select more than one answer

Source: author's study based on research conducted

Among the surveyed enterprises, the fundamental aspect of eco-innovation was the modernisation of production lines. It was performed in 34.7 % of the surveyed subjects. In addition, the eco-innovation also involved the

modernisation of the infrastructure of the media (28 %), detailed segregation of waste (18.2 %). The company also invested in the construction of sewage processing sub-plants (16 %), devices for reducing the emission of harmful gases (15.6 %) and dusts (12.4 %) and organic production (12 %).

The implementation of the basic objective of the company, which is survival and development, requires appropriate measures, which among others may include investment projects (Kuczowic, 2002).

The introduction of environment-friendly investment first of all involves the examination of the impact of production processes or services of the company on the environment. Then, actions are taken towards the introduction of eco-innovations to bring about a gradual reduction of known negative impacts (e.g. to reduce the volume of waste produced, less pressure on the environment through economizing in terms of power and heat consumption, water consumption and sewage production – which reduces emission of harmful substances into the atmosphere and surface waters) (Kostecka, Kostecki, 2006).

The main reason for the introduction of eco-innovations in the surveyed businesses (Table 2) is to reduce the overload of the natural environment through the rational use of natural resources (56 %). The stimulus for the introduction of eco-innovations was also the prospect of a higher market share compared with competing companies (18.2 %). Profitability is also essential - gross or net profit as interest on invested capital (9.8 %) and the economy of eco-innovations, which accounts for the relation of the effect to the expenses borne (8 %), and the development of resources, products and services (7.1 %).

Environmental benefits may be the primary objective of the innovation or the result of other

targets, they can also arise during the manufacture of the product or service, or during the use of the purchased product or during the use of the service by end users (GUS – Main Statistical Office, 2010).

Table 2

The main reason for the introduction of eco-innovation in the surveyed enterprises

No	Specification	N=225	%
1.	Profitability	22	9.8
2.	The prospect of higher market share compared with competing companies	41	18.2
3.	Cost-effectiveness – relationship between results and expenses	18	8.0
4.	Development of resources, products and services	16	7.1
5.	Relations with the environment – improving the state of the environment and quality of life	126	56,0
6.	Other	2	0.9
7.	Total	225	100.0

Source: author's study based on research conducted

The respondents saw the following as the basic benefit of the introduction of eco-innovation (Table 3): reducing the impact of the business on the environment achieved by: improving control, modifying or changing the process, changes and implementation of recycling of raw materials and media, and the amount of waste generated, reducing fees for using the environment and environmental fines (58.3 %). It also seemed significant to the surveyed business to reduce the cost of the company by reducing consumption of raw materials (31.6 %) as well as to improve the image of the organisation and its relations with the surrounding environment (25.3 %) (Table 3). Achieving compliance with applicable laws is another benefit cited by respondents (20.4 %). The respondents also pointed out reducing the risk of environmental failure (14.7 %), reducing the risk of civil and criminal liability (12.9 %) and facilities in obtaining external funds (11.1 %).

Benefits for the company resulting from eco-innovation *

No	Specification	N=255	%
1.	Achieving compliance with the current law	46	20.4
2.	Reducing the impact of the business on the environment achieved by: improving control, modifying or changing the process, changes and implementation of recycling of raw materials and media, and the amount of waste generated, reducing fees for using the environment and environmental fines	121	53.8
3.	Improving the image of the organisation and its relations with the surrounding environment	57	25.3
4.	Reducing the costs of the company by reducing consumption of raw materials	71	31.6
5.	Reducing the risk of environmental failures	33	14.7
6.	Reduce the risk of civil and criminal liability	29	12.9
7.	Facilities to obtain external funding	25	11.1

* Respondents were allowed to choose more than one answer

Source: author's study based on the research

An adequately high position of the company on the market depends not only on the current efficient management, but it is important to make optimal decisions about the development and sources of funding (Sierpinska, Jachna, 2005). Table 4 presents economic barriers for creating eco-innovation in the surveyed companies.

Table 4

Economic barriers for the implementation of eco-innovation

No	Specification	N=225	%
1.	Lack of own financial resources	101	44.9
2.	High costs of eco-innovation	36	16.0
3.	High interest rates on loans	57	25.3
4.	High economic risk	31	13.7
5.	It is difficult to say	-	-
6.	Total	225	100.0

Source: author's study based on research conducted

Among the barriers for the implementation of eco-innovation in the surveyed companies, lack of funds for the investment is at the forefront (44.9 %) along with high interest rates on loans (25.3 %). Another obstacle is also high economic costs of eco-innovation (16 %) and high economic risk (13.7 %).

In addition, research conducted by B. Grzybowska and Juchniewicz M. (2005) showed that the vast majority of the surveyed businesses saw main barriers for the implementation of innovations in factors of economic nature, particularly lack of own funds, high interest rates

on loans, and long period of return-on-investment.

There are also internal factors in the implementation of eco-innovation that prevent this process (Table 5).

Table 5

Internal barriers hindering the implementation of eco-innovations

No	Specification	N=225	%
1.	Rigid rules of management and organisation in the company	73	32.4
2.	Lack of research within the company about its position on the market	32	14.2
3.	Lack of qualified staff and appropriate knowledge resources in enterprises	58	25.8
4.	Mentality of the staff in terms of environmental protection	44	19.6
5.	It is difficult to say	18	8.0
6.	Total	225	100.0

Source: author's study based on research conducted

Internal barriers hindering the implementation of eco-innovation primarily include rigid principles of management and organisation in the company (32.4 %), lack of qualified staff and appropriate knowledge resources in enterprises (25.8 %), mentality of the staff in terms of environmental protection (19.6 %) and lack of research on the company's position in the market (14.2 %).

Table 6

Other factors hindering the implementation of eco-innovations

No	Specification	N=225	%
1.	Laws and regulations	104	46.2
2.	Conditions and norms of using the environment	90	40.0
3.	Poor access to new technologies	25	11.1
4.	It is difficult to say	5	2.2
5.	Total	225	100.0

Source: author's study based on research conducted

In addition to economic and internal factors in the process of implementation of eco-innovation, there are other barriers (Table 6). The leading role is played here by legal regulations (46.2 %) and the conditions and standards of the use of the environment (40 %) as well as poor access to new technologies (11.1 %).

Conclusions, proposals, recommendations

Undertaking voluntary commitments in the field of environmental protection is beginning to constitute an important element of the development strategy of the company, promoting pro-environmental orientation of management. This behaviour confirms the involvement of industry in the implementation of the concept of sustainable development. The concept of sustainable development is to prevent negative processes in relation to the environment and requires social acceptance of the functioning of businesses. Eco-innovations conducted in enterprises can be of a corrective or preventive nature. All of them should significantly contribute to improvement in the state of the environment and quality of life in rural areas.

Research has shown that, among the surveyed enterprises, the fundamental aspect of eco-innovation was the modernisation of

technological lines, modernisation of the media infrastructure, thorough waste segregation. The companies also invested in the construction of sewage sub-plants, equipment for reducing emissions of harmful gases and dusts, and organic production.

The main reason for the introduction of eco-innovation in the surveyed enterprises was decreasing the overload of the natural environment through the rational use of natural resources and the prospect of a higher market share compared with competing companies.

The basic benefit of the introduction of eco-innovation is reducing the impact of the business on the environment achieved by improving control, modifying or changing the process, changes and implementation of recycling of raw materials and media, and the amount of waste generated, reducing fees for using the environment and environmental fines.

Economic barriers are the main obstacle for the introduction of eco-innovation. First of all, there is a lack of funding for this type of investment.

High interest rates on loans as well as high costs of eco-investment and high economic risk are also demotivating for the companies. Internal barriers hindering the implementation of eco-innovation primarily include rigid rules of management and organisation in the company, lack of qualified personnel and appropriate knowledge resources in the companies. In addition to economic factors and internal in the implementation of eco-innovation, there are other barriers in the form of legislation and the conditions and standards of using the environment and poor access to new technologies.

Bibliography

Journal paper with author(s)

1. Brelik, A., Matuszczak, A. (2013). *Issues of Public Goods in a Multi-Functional Development of Rural Areas* (Zagadnienia dobr publicznych w wielofunkcyjnym rozwoju obszarów wiejskich). *Economic Science for Rural Development Conference Proceedings*. 2013, Issue 31, pp. 28-32.
2. Bujak, A. (2011). *Innowacyjność i innowacyjne rozwiązania w logistyce* (Innovativeness and Innovative Solutions in Logistics). *Logistyka* no. 2, p. 86.
3. Foltynowicz, Z. (2011). *Ekologia przemysłowa we wdrażaniu zrównowzonego rozwoju* (Industrial Ecology in the Introduction of Sustainable Development). *Zeszyty Naukowe Uniwersytetu Ekonomicznego w Poznaniu*, No. 199.

4. Glodek, P., Golebiowski, M. (2006). *Finansowanie innowacji w małych i średnich przedsiębiorstwach* (Financing Innovation in Small and Medium-sized Businesses), WIP, Warszawa, p. 5.
5. Grzybowska, B., Juchniewicz, M. (2005). *Bariery działalności innowacyjnej polskich przedsiębiorstw* (Barriers for Innovative Activity in Polish Businesses). *Ekonomika i Organizacja Przedsiębiorstwa*, No. 4(663), p. 55.
6. Kostecka, J., Kostecki, A. (2006). *Ochrona środowiska w działaniach przedsiębiorstwa* (Environmental Protection in Business Enterprises). *Ekonomika i Organizacja Przedsiębiorstwa*, No. 12, pp. 78-79.
7. Kryk, B. (2007). Wartość przedsiębiorstwa a inwestycje proekologiczne, w: *Zrównowazony rozwój i ochrona środowiska w gospodarce* (The Value of an Enterprise and Pro-ecological Investments, [in:] Sustainable Development and Environmental Protection in Economy). Dobrzanska, B. M., Kielczewski, D. (ed.), *Wydawnictwo Wyższej Szkoły Ekonomicznej w Białymstoku, Białystok*, p. 305.
8. Kuczowicz, J. (2002). Strategie inwestowania jako pochodne strategii rozwojowych przedsiębiorstwa (Strategies for Investment as Derivatives of Developmental Strategies in a Company). *Zeszyty Naukowe AE w Katowicach, Katowice*.
9. Sobczyk, W. (2014). Sustainable Development of Rural Areas, *Problems of Sustainable Development*, Vol. 9, No. 1, p. 119.
10. Wasilewska, A. (2013). Pomiar i ocena działalności innowacyjnej Polski na podstawie wskaźników pośrednich (Measurement and Evaluation of Innovative Activity of Poland Based on Indirect Factors). *Zeszyty Naukowe SGGW w Warszawie Ekonomika i Organizacja Gospodarki Żywnościowej*, No.101, p. 15.
11. Wielewska, I. (2014). Selected Environmental Aspects of Sustainable Development in Rural Areas (Wybrane aspekty ekologiczne zrównowazanego rozwoju obszarów wiejskich). *Folia Pomeranae Universitatis Technologiae Stetinensis, Oeconomica*, 314(77)4, p. 159.
12. Zuzek, D.K. (2015). Determinanty rozwoju ekoinnowacji w sektorze MSP na przykładzie województwa małopolskiego (Determinants of the Development of Eco-innovation in the SME Sector on the Example of Malopolska Province of Poland). *Roczniki Naukowe SERiA*, Volume XVII, paper 1, p. 240.
13. Zuzek, D.K. (2016). Innovation Efforts by Small and Medium-Sized Enterprises in the Malopolska Province – Research Findings (Działania innowacyjne podejmowane przez przedsiębiorców z sektora MSP w województwie małopolskim – wyniki badań). *Zeszyty Naukowe WSES w Ostrołęce*, No. 2(21), p. 144.

Books

14. Bukowski, M., Szpor, A., Sniegocki, A. (2012). *Potencjal i bariery polskiej innowacyjności* (The Potential and Barriers in Polish Innovativeness). IBS, Warszawa, p. 3.
15. *Działalność innowacyjna przedsiębiorstw w latach 2006-2009*. GUS, Warszawa 2010.
16. Kuraszko, I. (2010). *Nowa komunikacja społeczna wyzwaniem odpowiedzialnego biznesu* (New Social Communication as a Challenge for Responsible Business). Difin, Warszawa, p. 78.
17. Matusiak, K. B. (2005). *Innowacje i transfer technologii. Słownik pojęć* (Innovations and Technology Transfer. A Dictionary of Terms). Polska Agencja Rozwoju Przedsiębiorczości, Warszawa.
18. Prus P. (2010). *Funkcjonowanie indywidualnych gospodarstw rolniczych według zasad zrównowazanego rozwoju* (The Functioning of Individual Farms According to the Principles of Sustainable Development). Bydgoszcz: Wydawnictwo Uczelniane Uniwersytetu Technologiczno-Przyrodniczego w Bydgoszczy, p. 22.
19. Sierpńska, M., Jachna, T. (2005). *Ocena przedsiębiorstw według standardów światowych* (Evaluation of Businesses According to World Standards). Wydawnictwo Naukowe PWN, Warszawa 2005.
20. Sosnowska, A. (2005). *Jak wdrażać innowacje technologiczne w firmie. Poradnik dla przedsiębiorców* (How to Introduce Technological Innovations in a Company. A Handbook for Business People). PARP, Warszawa, p. 8.

MAIN CHARACTERISTICS OF ECONOMIC ZONES TYPES: LATVIA'S EXPERIENCE

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Abstract. Promotion of entrepreneurship in each country nowadays is a key task for reducing regional disparities between regions. Economic zones are an instrument that can attract foreign investments, create new job places and influence business activities in general. Overall, the number of economic zones in the world is growing. The main benefit of operating in economic zone for entrepreneurs is state aid in the form of different tax exemption. There are more than few terms used that refer to economic zones, for example – special economic zone, free trade zone, freeport etc. By using descriptive methods, authors described main characteristics of economic zones' types and presented Latvia's experience about different economic zones. Results of research show that there are four basic types of economic zones and each type has its own specific characteristics. Usually term "special economic zone" is used to describe "economic zone" in general.

Key words: foreign investment; business tax; regional development; economic zone; free zone.

JEL code: F21; H32; R11

Introduction

Regional differences in economic growth have been observed within many countries (Okabe et al., 2017) and regional disparities between different regions of the country is one of the most important aspects of regional policy nowadays, especially in Eastern European countries, including Latvia. In order to reduce the backwardness of the least favoured regions, it is necessary to use tools that can create an immediate and at the same time long-term improvements in the socio-economic situation. One of these instruments to reduce regional disparities is to establish economic zones.

Economic zone is considered as an effective method of promoting regional growth, which is evidenced by the fact that in recent years development of economic zones has been rapid, tendencies show that the number of economic zones still increase. Considering that economic zones develop expansively, one can distinguish several types of economic zones; the terms "special economic zone", "free economic zone", "freeport" etc. are used freely, without accentuating differences and thus creating conception that all above mentioned terms are with one and the same meaning. Authors pay attention to the lack of common criteria about different economic zones' types and unreasonable use of such terms.

The aim of the paper is to define main characteristics of economic zones types and to present Latvia's experience about different economic zones. To achieve the aim, the following tasks are set:

- 1) to describe importance of economic zones in process of decreasing regional disparities;
- 2) to define types of economic zones and main characteristics for their classification;
- 3) to analyse Latvia's experience about different economic zones.

The descriptive methods (analysis and synthesis) were used in the research; which novelty is proper exposition of main characteristics according to different types of economic zones and analysis of Latvia's case.

Research results and discussion

1. Importance of economic zones to reduce regional disparities

Although variety of terms is used to indicate economic zones, researchers link economic zones' existence and importance to regional development from ancient or antique times. Particular historical aspects about creation of economic zones were studied by Latvian researcher V.Rankevica (V.Rankevica, 2006), she elaborated classic model of economic zones' evolution and summarized the possible "free economic zone" concept formulation. Authors agree with above mentioned researcher's opinion

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regarding to historical definition of economic zones, but this article provides up-to-date view about significance of economic zones and characteristics of various term "economic zone". Many countries use free zones as regional development tools in remote areas where they perceive jobs to be particularly needed; economic zones are used as promotion of regional economic integration (Farole et al., 2011).

Nowadays, importance of economic zones in context with regional development is actual research topic; researchers highlight that special economic zones attempt to foster agglomeration economies, as for example attraction of industrial facilities (Wang, 2012). Significant contribution in the field of analysis about economic zone impact to regional development did researchers from India and China, which often evaluated benevolent return of economic zones in the context of regional development. Economic zones as a policy concept and tool were tested over long periods of time in aforementioned countries, which are the most visible examples (Liptak et al., 2015). Example of China (Shanghai free trade zone) shows that implementation of current economic zone will not only stimulate trade, but will also bring increased shipping opportunities to the city; with free trade as new direction and focus of the country's economic initiatives, current economic zone will lay the groundwork for a new round of reforms of Chinese economy (Wan et al., 2014). In many countries, economic zones are key policy instruments that attract foreign direct investment, boost exports and decrease unemployment (Ambroziak, 2016). The Organisation for Economic Co-operation and Development and the World Bank has carried out various studies about economic zones. As the World Bank's expertise says: "Any country that didn't have an SEZ ten years ago either does now or seems to be planning one" (The Economist, 2015).

Various economic zones, regardless of their type, associates organization named World

Economic Processing Zones Association, which carries out in-depth research about meaning of economic zones in context of regional development, as well.

2. Types of economic zones and main characteristics for their classification

Nowadays, regarding to different types of economic zones, researchers and economists use term or concept "special economic zone", which usage is not always proper. The fact that concept "special economic zone" is used mostly in their studies was also indicated by the World Bank (Farole et al., 2011). Multiple variants of terminologies regarding to different economic zones are not always used consistently by different institutions and researchers (Farole et al., 2011). The economic zone concept continues to evolve and expand to include new terminology and functions. There are now "special economic zones", "free zones", "free trade zones", "foreign trade zones", "industrial development zones" and so on (Association of Special Economic Zones).

Researchers in the frame of academic and professional literature have tried to find an opportunity to develop a common approach to define types of economic zones, but still such efforts are not implemented. Researchers say that there are many types of geographically delimited areas offering certain incentives to businesses physically located within the zone (Ambroziak, 2016). Sometimes instead of term "special economic zone" there are used other terms "free trade zone" or "export processing zone", which are established with external trade in mind and aimed at the improvement of conditions for warehousing, storage and distribution facilities for trade, transshipment and export oriented operations (Ambroziak, 2016). Also term "free economic zones" is used freely, the term includes free ports, free trade zones, foreign-trade zones and export processing zones with relaxed laws or regulations that can attract investment and create employment (Chiu et al., 2011). However, there are also risks, one should

be very cautious in classifying free trade zone, because the original concept has evolved over time and has acquired a different meaning in different context (Ambroziak, 2016). Among risks, specific criteria or main characteristics for economic zone types are missing and mostly the definition is given for term "special economic zone". For example, special economic zones are defined as economic enclaves created by government in order to attract domestic and foreign investors, and to stimulate the economy growth and the regional development (Pastusiak et al., 2015).

Based on the assumptions of the Organisation for Economic Co-operation and Development (OECD, 2011), term "economic zone" can be divided into four main groups – free trade zone, special economic zone, investment zone, export processing zone. Characteristics and specific features for each of four groups are settled in following order in Figure 1:

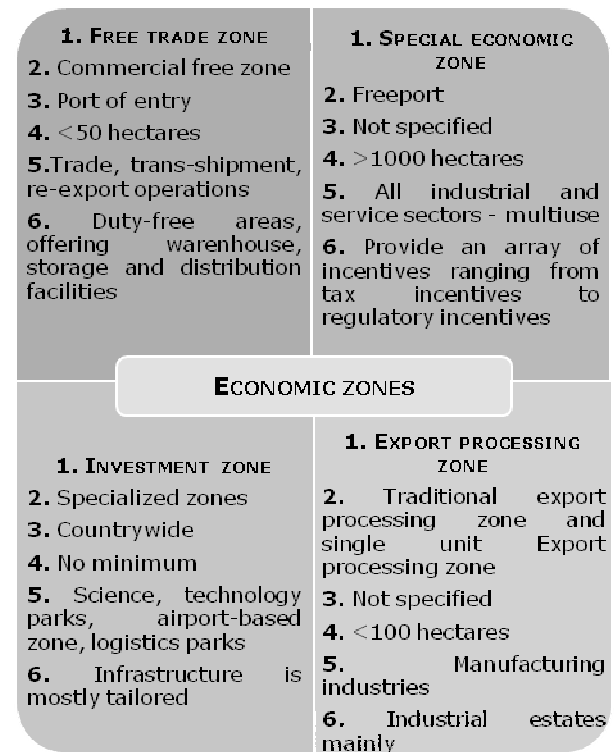
- 1) type of economic zone;
- 2) "also known as" or other used synonyms;
- 3) typical location;
- 4) typical size;
- 5) sectors, industries;

support for investors (infrastructure basically).

As shown in Figure 1, "freeport" is a frequently used synonym for special economic zone; both can provide benefits for various interests of entrepreneurship – all industrial and service sectors. Mainly freeports are located with access to territorial water, mainly – sea.

In the literature related to special economic zones, the importance of the labour ability to communicate in several languages is emphasized in order to increase competitiveness of enterprises (Ezmales et al., 2014). From this point of view, main characteristics or criteria for classification of economic zones may also result from the economic zones' creation aim. For example, researchers distinguish the following objectives:

- to attract foreign direct investment inflows;
- to serve as pressure valves to address high unemployment rates;
- to support national reform strategy;
- to serve as experimental laboratories for the application of new economic policies (Hazakis, 2013).



Source: authors' designed based on OECD, 2010 and Farole et al., 2011

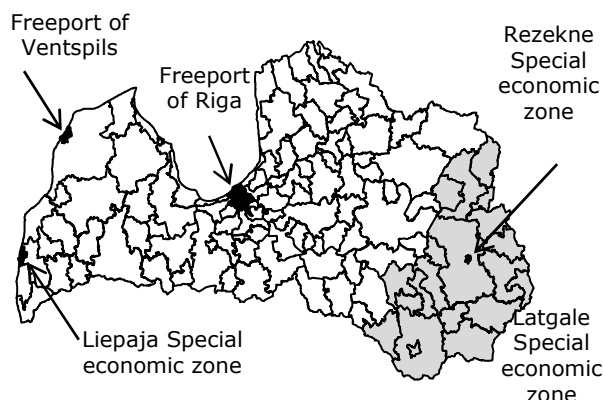
Fig. 1. Types of economic zones and their main characteristics

Only a few countries set official criteria for defining an economic zone, in most cases, as it is currently in Latvia, economic zones are established by a separate Parliament or Presidential decision, without setting any specific criteria, but at the same time emphasizing certain significance for few facts, such as - whether economic zone land is owned by the state or local government.

3. Latvia's experience in field of different economic zones

Latvia, since the restoration of sovereignty, established five economic zones in total - two free ports with access to the sea (Freeport of Riga and Freeport of Ventspils), one special economic zone with access to the sea (Liepaja Special Economic Zone) and two special

economic zones without access to the sea - Rezekne Special economic zone and Latgale special economic zone (Figure 2).



Source: authors' designed

Fig. 2. Location of economic zones in Latvia

Location of economic zones in Latvia varies from one single city as Freeport of Riga, Freeport of Ventspils to multi-municipalities as Latgale Special economic zone (grey coloured in Figure 2). Table 1 provides main characteristics about economic zones in Latvia according to criteria given in Figure 1 – size (ha), year of establishment, main sectors and industries.

Table 1

Characterization of economic zones in Latvia

No	Charac- teristics	Freeport of Riga	Freeport of Ventspils	Liepaja Special economic zone	Rezekne Special economic zone	Latgale Special economic zone
1.	Established	n/a	1997	1997	1997	2016
2.	Size, ha	6348	2451	3979	1155	>72735
3.	Main sectors, industries	Bulk, liquid, general cargos. Engineering, chemical industry, wood processing, electronics.				

Source: authors' designed based on information from economic zones in Latvia

Freeport of Ventspils, Liepaja special economic zone and Rezekne special economic zone were established in 1997. According to Freeport of

Riga information, economic zone was established nine centuries ago and during the time, its development can be measured with high level impact on Riga city. Newest economic zone in Latvia is Latgale special economic zone, which was established in 2016.

Two of economic zones are situated in Latgale– least developed region of Latvia; however, other economic zones are situated in regions with relatively higher territory development index, especially in Riga. Mission for all economic zones in Latvia is to attract investments to develop infrastructure and production, and to create new job places. Each economic zone complies with laws and regulations of the Republic of Latvia, and also with state-aid regulations of the European Union. Law of application of taxes in free ports and special economic zones (2002) sets up procedure for application of tax reductions. In the territory of free port, there is an effect of Law on Ports (1994). Activities of economic zones in Latvia are determined by various laws and regulations that are subordinate to one another. Tasks of each economic zone encompass special law, which usually is regarded to investment policy. Base laws of economic zones in Latvia are:

- Freeport of Riga – Riga Freeport Law (2000);
- Freeport of Ventspils - Ventspils Freeport Law (1997);
- Liepaja special economic zone – Law of Liepaja special economic zone (1997);
- Rezekne special economic zone – Law of Rezekne Special Economic Zone (1997);
- Latgale special economic zone – Law of Latgale Special Economic Zone (2016).

Aims of economic zones are tailor-made for each economic zone, for example, aim of Liepaja special economic zone is to promote shipping as industry. Although with access to the sea, this economic zone is not called as freeport. As shown in the second section of this article, the freeport is synonym of special economic zone. Due to this,

it cannot be declared that case of Liepaja special economic zone shows improper use of current economic zone term. In addition, locally the fact how one or another economic zone is named is irrelevant. As it can be seen from the examples provided by economic zones of Latvia (regardless of type), the main aim is integrated territorial development, without accentuating their differences or some sectors to be supported separately.

In 2016, in Latvia there was established a new economic zone, which will exist in one particular planning region - in all municipalities. This is Latgale special economic zone in Latgale planning region, where each of regional municipalities will be allowed to determine their own territory of special economic zone. This approach is similar to the experience of Poland, where economic zones have their own subzones. So far, Latvia has not used this experience and the flexible approach of determining specific boundaries of special economic zone, may be called as its competitive advantage.

Table 1 shows comparison of economic zones territories' size. Latgale special economic zone's subzones are 11.5 times bigger than the second biggest economic zone in Latvia - Freeport of Riga. Interesting is connection between the size of current economic zone and the size of current city, municipality:

- Freeport of Riga - 21 % of Riga city territory;
- Freeport of Ventspils - 44 % of Ventspils city territory;
- Liepaja special economic zone - 55 % of Liepaja city territory;
- Rezekne special economic zone - 24 % of Rezekne city and Rezekne municipality territory;
- Latgale special economic zone - 5 % of Latgale planning region territory.

Second part of article reflects main criteria about different types of economic zones, and they comply with Latvia's experience. As

mentioned before, in Latgale region there exists one more economic zone. According to the Rezekne Special Economic Zone Law, the purpose of Rezekne special economic zone is to attract investments in production, infrastructure development and job creation. Rezekne special economic zone is located in two local governments - Rezekne city and Rezekne municipality. However, the example of Rezekne special economic zone shows that not always economic zone is understood as an area that belongs to one municipality. Size of economic zone can be different from size of local government where economic zone is located. Rezekne is compact, densely populated city with a small proportion of administrative areas, so the infrastructure in some places even goes beyond its territory. In order to ensure Rezekne special economic zone with necessary areas for economic activities, about half of economic zone's size was found in rural parishes (in Rezekne municipality) bordering Rezekne city (Klavis, 2012). In the time of founding Rezekne special economic zone, it was identified as one monolithic region, but later there were made significant changes in the Law of Rezekne Special economic zone - from economic zone territory forests, cemeteries, residential areas, and places where individual construction is developed or all places where industry cannot develop were deleted. In addition, Rezeknes special economic zone territory was supplemented with areas which, according to the municipal territorial plan, were settled as future developing industrial area (Klavis, 2012).

Success of economic zones in Latvia is based on the available infrastructure, for example, competitive advantages of Rezekne special economic zone are its favourable geographical location of the European Union's eastern border near the international motorway and mainline crossroads, favourable tax system, skilled and motivated workforce, sTable tradition of cooperation with Russia and other countries, as

well as production cost competitiveness (Ekonomikas ministrija, 2012). Rezekne special economic zone was constructed in compact industrial zone (created in Soviet times) with ready-made infrastructure. Similarly, in Latgale Special Economic Zone, where it is expected that potential entrepreneurs would prefer to use already existing infrastructure. Academic researchers mostly emphasize the importance of infrastructure and economic potential (Dhingra et al, 2009).

However, the misconception has always been that the successful implementation of special economic zones is only predicted by the promulgation of relevant laws and policies prescribing a package of benefits, which the willing and capable investment firms in the zones are to enjoy (Boniface O., 2015). All five economic zones in Latvia promote export growth and industrial activities, which increase the amount of attracted investment. Main support and benefit of using economic zone for investors (economic zone entrepreneurs) are direct and indirect tax allowances to 80 %.

Bibliography

1. Ambroziak, A., (2016). Income Tax Exemption as a Regional State Aid in Special Economic Zones and its Impact Upon Development of Polish Districts, *Oeconomia Copernicana*, 7 (2), pp. 245-267.
2. Association of Special Economic Zones. *History*. Retrieved: <http://www.wepza.org/history/>, Access: 12.12.2016.
3. Boniface, O., (2015). Strategies for Improving the Implementation of Special Economic Zoning Programmes in South Africa, *Journal of Economics and Sustainable Development*, 6, pp. 8-17.
4. Chiu, R., Lirn, T., Li, C., Lu, B., Shang, K., (2011), An Evaluation of Free Trade Port Zone in Taiwan, *An Asian Journal of Shipping and Logistics*, 27 (3), pp. 423-446.
5. Dhingra, T., Singh, T., Sinha, A., (2009). Location Strategy for Competitiveness of Special Economic Zones. A Generic Framework for India. *Competitiveness Review* 19 (4): pp. 272-289.
6. Ekonomikas Ministrija (Ministry of Economics (2012). *Informatīvais Ziņojums „Par Brīvostu Un Speciālo Ekonomisko Zonu Darbību 2011.gadā un 2012.gada 1.pusgadā”* (Informative Report "Operations of Freeport and Special Economic Zones In 2011 and the 1st half of 2012"). Retrieved: https://www.em.gov.lv/files/uznemejdarbiba/SEZUB_1.doc. Access: 12.10.2016.
7. Ezmale, S., Rimsane, I., (2014). Promoting the Plurilingual Awareness in Business Environment: Case of Rezekne Special Economic Zone. *Procedia - Social and Behavioral Sciences*, Volume 110 (January), pp. 231-40.
8. Farole, T., Akinci, G., (2011). *Special Economic Zones. Progress, Emerging Challenges and Future Directions*. *World Bank*. Retrieved: <https://openknowledge.worldbank.org/bitstream/handle/10986/2341/638440PUB0Exto00Box0361527B0PUBLIC0.pdf>. Access: 17.11.2016.
9. Hazakis, Konstantinos J., (2013). Key Conditions for the Effectiveness of Special Economic Zones in Regional Development: Opportunities and Challenges for the Thrace Region. In *Greece's Horizons*, The Konstantinos Karamanlis Institute for Democracy Series on European and International Affairs, pp. 237-247.
10. Klavis, A., (2012). Latvijas Speciālās Ekonomiskās Zonas. Rēzeknes SEZ – Sarežģītās Attīstības Ceļš (Special Economic zones of Latvia. Rezekne SEZ - *The complicated way to development*). Retrieved: <http://www.lvportals.lv/visi/likumi-prakse/248601-latvijas-specialas-ekonomiskas-zonas-rezeknes-sez-sarezgita-attistibas-cels/>. Access: 04.07.2016.
11. Lipatek, F., Klasova, S., Kovac, V., (2015). Special Economic Zone Constitution According to Cluster Analysis. *Procedia Economics and Finance* 27, pp. 186-193.

Conclusions

- 1) Economic zones are widely used instrument for fostering agglomeration and decreasing disparities between regions within attraction of foreign investment, creation of new job places.
- 2) From various ranges of economic zones, authors distinguished four main types such as free trade zone, special economic zone, investment zone, export processing zone and their basic characteristics, which all follow certain objectives – mainly to provide benefits for interests of entrepreneurship.
- 3) Latvia's experience proves basic characteristics of economic zones and shows the importance of proper understanding about economic zones' competitive advantages.
- 4) Economic zones in Latvia are key aid for less developed regions for boosting socio-economic situation, but at the same time, there is no restriction from government, where to locate economic zones.

12. Okabe, T., Kam, T., (2017). Regional Economic Growth Disparities: A Political Economy Perspective. *European Journal of Political Economy*, Volume 46, January, pp. 26-39.
13. Pastusiak, R., Jasiniak, M., Kazmierska, A., (2015). Should Local Governments Expect Benefits from Special Economic Zones? The case of Poland. *International Journal of Social, Behavioral, Economic, Business and Industrial Engineering* 9 (3), pp. 913-919.
14. The Economist. (2015). *Special Economic Zones. Political Priority, Economic Gamble*, April 4. Retrieved: <http://www.economist.com/news/finance-and-economics/21647630-free-trade-zones-are-more-popular-everwith-politicians-if-not>. Access: 16.12.2016.
15. The Organisation for Economic Co-operation and Development (OECD). *Designing Economic Zones for Effective Investment Promotion* (2010). Retrieved: <http://www.oecd.org/mena/investment/44866506.pdf>. Access: 17.11.2016.
16. V. Rankevica (2006). *Free Economic zones in Latvia and their regional impact*. Retrieved: <http://lufb.llu.lv/dissertation-summary/economy/Kopsavilkums-Viktorija-Rankevica.pdf>. Access: 09.10.2016.
17. Wan, Z., Zhang, Y., Wang, X., Chen, J., (2014). Policy and Politics Behind Shanghai's Free Trade Zone Program, *Journal of Transport Geography*, 34, pp. 1-6.
18. Wang, J., (2012.) The Economic Impact of Special Economic zones: Evidence from Chinese Municipalities. *Journal of Development Economics* 101 (2013), pp. 133-147.

SPREAD AND CONTROL OF SOSNOWSKY'S HOGWEED IN REZEKNE MUNICIPALITY

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Abstract. As the area invaded by Sosnowsky's hogweed increased in Rezekne municipality, an increasing number of local residents, including agricultural land owners/managers could suffer from coming into contact with this plant. According to research studies, invasive species promote uncontrolled changes in the ecosystem, endangering agriculture and negatively affecting the economy. The research aim is to examine the spread of Sosnowsky's hogweed and the opinions of local residents on the control of this invasive species in Rezekne municipality. Sosnowsky's hogweed spreads in Latvia as a whole, including Rezekne municipality. In the rural territory of Berzgale of Rezekne municipality, Sosnowsky's hogweed has spread the most. A survey of randomly selected territories did not identify considerable differences in the spread of Sosnowsky's hogweed between 2012 and 2016. According to a survey of residents living in Rezekne municipality, the residents chose mainly the cheapest methods to control Sosnowsky's hogweed, and only a small proportion of them believed that they had sufficient knowledge of control methods for Sosnowsky's hogweed. The present research employed the following research methods: monographic and descriptive, analysis, synthesis, statistical analysis and a sociological method – a survey. The Wilcoxon test was employed to analyse field data and compare territories. The Statistical Package for the Social Science (SPSS) and the tools of the R program and Microsoft Excel were employed to process the data. The research was based on the survey of residents, research papers, field studies, State Plant Protection Service data, information provided by Rezekne municipality and other information sources.

Key words: Sosnowsky's hogweed, agricultural land owners/managers, residents, weed control.

JEL code: Q5, Q1

Introduction

The spread of invasive species is a global problem. The Plant Protection Law of the Republic of Latvia (Augu aizsardzības likums, 1999) defines an invasive species as an untypical species for the nature of Latvia that endangers local species and their habitats or causes economic losses and harm to the environment or human health.

The spread of invasive species that displace local ones is increasingly discussed.

One of such species is Sosnowsky's hogweed (*Heracleum sosnowskyi* Manden), which is included in Latvia's list of invasive species (Invazīvo augu sugu saraksts, 2008) and causes problems for agricultural land owners and managers, as well as local residents in Rezekne municipality.

Researchers Sims C., Finnoff D. (Sims C., Finnoff D., 2013) point out that invasive species promote uncontrolled changes in the ecosystem, endanger farming and negatively affect the economy. For this reason, a number of countries as well as their municipalities and other administrative organisations address the

identification, assessment and reduction of damage caused by the invasive plant species.

As the area invaded by Sosnowsky's hogweed increased in Rezekne municipality, an increasing number of local residents, including agricultural land owners/managers could suffer from coming into contact with this plant.

Researchers Haight R.G., Mehta S.V., Homans F.R., Polasky S. (Haight R.G., et al., 2007) point out that in the past decades in the world, both scientists and governments and their responsible institutions focused mainly on the control of the species that became too uncontrollable rather than on timely identification of the spread of the species. If more resources are exploited especially for the identification of danger caused by plant species when they only start spreading in a particular territory, it would be possible to save large amounts of funds on controlling the plants later.

Research hypothesis: Rezekne municipality residents, including agricultural land owners/managers have sufficient knowledge about how to control Sosnowsky's hogweed.

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Research aim: to examine the spread of Sosnowsky's hogweed and the opinions of local residents on the control of this invasive species in Rezekne municipality.

Specific research tasks:

- 1) To summarise information on the spread of Sosnowsky's hogweed in Rezekne municipality as well as to selectively assess Sosnowsky's hogweed control areas in the municipality.;
- 2) To conduct a survey of Rezekne municipality residents, including agricultural land owners/managers, and analyse the survey results.

Research methods employed: monographic and descriptive, analysis, synthesis, statistical analysis and a sociological method – a survey. The Wilcoxon test was used to analyse field data in comparison of territories. The Statistical Package for the Social Science (SPSS) and the tools of the R program and Microsoft Excel were employed to process the data. The research was based on the survey of residents, research papers, field studies, State Plant Protection Service data, information provided by Rezekne municipality and other information sources.

Research results and discussion

1. Spread of Sosnowsky's hogweed in Rezekne municipality

The State Plant Protection Service has performed an assessment of the spread of an invasive plant species – Sosnowsky's hogweed – in the territory of Latvia. In Latvia, 10801 ha of land invaded by Sosnowsky's hogweed were identified in 2016, which was 1.5 % more than in 2013. Sosnowsky's hogweed has spread the most in the regions of Vidzeme and Latgale (Table 1).

According to the information provided by Rezekne municipality, which was submitted by land surveyors in 2012, Sosnowsky's hogweed was present in 16 out of 25 rural territories of the municipality in a total area of 84.34 ha. In 2016, according to the State Plant Protection Service, the area overgrown with Sosnowsky's hogweed in the administrative territories of Rezekne

municipality totalled 239.29 ha. It has spread the most in Berzgale rural territory – in an area of 57.38 ha in 2012(Rezeknes novada., 2016). and 176.11 ha in 2016 (Valsts augu., 2016) (Table 12). (Rezeknes novada., 2016).

Table 1

Administrative territories invaded by Sosnowsky's hogweed in the regions of Latvia in 2013 and 2016

Administrative territory	Area in 2013		Area in 2016		2016/2013 (+/- %)
	ha	%	ha	%	
Kurzeme region	938.29	8.82	915.64	8.48	-2.4
Latgale region	2360.98	22.18	2373.53	21.97	0.5
Riga region	1750.36	16.45	1732.51	16.04	-1.0
Zemgale region	1358.53	12.76	1334.44	12.35	-1.8
Vidzeme region	4234.82	39.79	4445.29	41.15	5.0
Total	10642.98	100.00	10801.41	100.00	1.5

Source: authors' calculations based on State Plant Protection Service data, 2016

Table 2

Spread of Sosnowsky's hogweed (ha) in the rural territories of Rezekne municipality in 2012 and 2016

No	Rural territory	Hectares 2012	Hectares 2016
1	Berzgale	57.38	176.11
2	Silmalas	7.99	3.85
3	Nagli	7.3	8.3
4	Makonkalns	4.6	15.46
5	Cornaja	3.14	10.22
6	Ozolmuiza	3.12	17.74
7	Ozolaine	0.9	1.4
8	Feimani	0.55	1.31
9	Veremi	0.5	0.49
10	Luznava	0.31	0.75
11	Griskani	0.27	1.38
12	Malta	0.11	0.03
13	Nautreni	0.1	1.24
14	Kaunata	0.06	0.97
15	Lendzi	0.05	0.02
16	Struzani	0.014	0.02
Total		84.39	239.29

Source: authors' construction based on information provided by Rezekne municipality; State Plant Protection Service data, 2016

Sosnowsky's hogweed presencet in the specially protected natural territories of Rezekne municipality as well as outside the territories negatively impacts their biodiversity and visual landscape values (Figure 1), reducing their aesthetic and biological quality. In Razna National Park, which is located in Rezekne municipality, Sosnowsky's hogweed is mainly present in unfarmed and abandoned areas, as well as in biotopes with specially protected species (Tripane E., 2013; Zvaigzne A., et al., 2016).

The research summarised information on 33 areas overgrown with Sosnowsky's hogweed in Rezekne municipality, of which 16 were located in Razna National Park and 16 in the nature reserve "Lubans Wetland", as well as a territory in the nature park "Lake Adamova". The data acquired in 2016 were compared with the data on Sosnowsky's hogweed-invaded areas obtained in 2012 from the master's paper "Spread and Control of Sosnowsky's Hogweed in Razna National Park and the Influencing Factors" written by Elina Tripane (Tripane E., 2013).



Source: Zvaigzne A., et al., 2016.

Fig. 2. Lake Lubans bank overgrown with Sosnowsky's hogweed in Rezekne municipality in June 2016, photo: A. Mezaka

Sosnowsky's hogweed control measures are implemented in Latvia, yet there is a lack of comparable data on its spread over time for particular sites.

The territories were represented by diverse biotopes: grassland, roadsides, shrubs, populated places, forest, the edge of a forest, watercourse banks, power-line paths, ditch banks, young forest stands and lake banks. The land survey identified seven Sosnowsky's hogweed control methods employed in Rezekne municipality: polythene sheeting, partial moving, full moving, partial road reconstruction, ploughing and bank strengthening; however, no Sosnowsky's hogweed control was done in some territories. The research found that in the territories surveyed Sosnowsky's hogweed was spread in a total area of 39.15 ha in 2012 (Tripane E., 2013) and 37.27 ha in 2016 (Zvaigzne A., et al., 2016).

The area of new territories where Sosnowsky's hogweed was identified for the first time was smaller than the area of the territories where the spread of Sosnowsky's hogweed decreased or increased.

No significant difference ($p > 0.05$) in the area with Sosnowsky's hogweed between 2012 and 2016 was identified for the selectively surveyed territories.

An area with Sosnowsky's hogweed increased the most in Razna National Park (16.23 ha in 2012 (Tripane E., 2013) and 18.11 ha in 2016) where six biotopes were represented: grassland, roadsides, the edge of a forest, shrubs, populated places and watercourse banks. The largest new area with Sosnowsky's hogweed (0.32 ha) was identified in grassland and shrub biotopes where the spread of the weed was not controlled. The greatest decrease in the area with Sosnowsky's hogweed (2.10 ha in 2012 (Tripane E., 2013) and 0.739 ha in 2016) was reported in the nature reserve "Lubans Wetland", on roadsides and the bank of lake Lubans where bank strengthening works and partial road reconstruction works were done. Polythene sheeting as a control method for Sosnowsky's hogweed was used only in the nature park "Lake Adamova" for managing the grassland area; in the result, the area with

Sosnowsky's hogweed decreased by 84 % in the period 2012-2016.

The research allows concluding that long-term monitoring for at least ten years is necessary for objectively assessing the spatial spread of Sosnowsky's hogweed (Zvaigzne A. et al., 2016).

In her doctoral dissertation, researcher Priede A. (Priede A., 2008) has pointed out that invasive species have to be regularly managed and controlled at the initial stage, which considerably increases the effectiveness of their control and requires much less financial and labour investment.

The reduction of the spread of Sosnowsky's hogweed in Rezekne municipality is possible only if engaging all the owners and managers of land; therefore, it is necessary to identify the opinions of local residents, including land owners and managers, about the control of Sosnowsky's hogweed in this municipality.

2. Results of a survey of Rezekne municipality residents

A survey of residents was conducted within the research; the purpose of the survey was to ascertain how well-informed the residents in Rezekne municipality are about Sosnowsky's hogweed and its control.

The survey involved 749 individuals. The questionnaires were distributed in all the 25 rural territories of Rezekne municipality.

Mostly women were involved in the survey (63.2 %), while men comprised 36.8 %.

The age groups of the respondents were diverse – beginning with the age of 18 through to the age of 62 and older.

The survey data regarding the question "Are you a manager and/or owner of agricultural land?" revealed that 64 % were agricultural land managers and/or owners. The remaining 36 % replied that they were neither land managers nor land owners.

An analysis of the spread of Sosnowsky's hogweed in Rezekne municipality by means of replies given to the survey question "Does

Sosnowsky's hogweed grow in your neighbourhood?" showed that most of the respondents (52.2 %) had not seen the weed in their neighbourhood. However, 29.5 % believed that this weed grew there, and only 18.3 % had no opinion about whether Sosnowsky's hogweed grew or did not grow in their neighbourhood.

According to the survey, 92.7 % of the respondents did not control Sosnowsky's hogweed themselves, and this fact explains why only 15.9 % wished to build up or obtain knowledge about the hazards caused by Sosnowsky's hogweed.

Despite the fact that a relatively small proportion of the respondents controlled Sosnowsky's hogweed – only 7.3 % –, yet their replies to the survey question "Why do you use this particular control method?" allowed ascertaining why particularly such methods were used to control the weed.

The survey results showed that the most often reason (34.5 %) why any particular control method for Sosnowsky's hogweed was used was the fact it was cheap. However, in 23.8 % instances the choice was made because the particular method was effective. Almost the same percentage of the respondents (22.6 %) chose their method because it was easy to use, while 12.1 % gave another reply, e.g. "I control it chemically because I do not know any other method", "there were only a few hogweed plants", "my neighbours helped me" etc.

An analysis of the reasons for the choice of any particular control method for Sosnowsky's hogweed broken down by age groups allows concluding that most respondents who controlled the weed themselves were aged 46-61, which may be explained by the fact that this age group owned land as well as had more experience in controlling the weed, thereby preferring a method that, first of all, was cheap (31.0 %), followed by the methods being effective and easy to use (19.0 % and 13.1 %, respectively). Younger respondents (aged 25 or under)

preferred easy-to-use methods to control Sosnowsky's hogweed.

The respondent replies to the question "Do you think that your knowledge of control methods for Sosnowsky's hogweed is sufficient?" showed whether the respondents rated their knowledge of control methods for the weed as sufficient.

Almost a fourth (22.6 %) believed that their knowledge of control methods for Sosnowsky's hogweed was sufficient. However, 36.6 % believed that their knowledge of such methods was not sufficient. Most respondents (40.9 %) did not know whether they had sufficient knowledge about the hazards caused by Sosnowsky's hogweed, as they never needed such a kind of knowledge.

To ascertain the opinions of the respondents on whether they would wish to build up their knowledge of methods for controlling Sosnowsky's hogweed, the authors summarised their replies to the question "Do you wish to build

up (or obtain) your knowledge of control methods for Sosnowsky's hogweed?".

Regardless of the fact that the reply "certainly not" was given by 10.7 % of the respondents, a high percentage of them replied "certainly yes" (11.3 %) and "rather yes" (44.9 %). However, 33.1 % replied "rather not". Accordingly, one can conclude that most of the respondents would wish to build up their knowledge of control methods for Sosnowsky's hogweed.

Table 2 3 shows the distribution of the replies of the respondents regarding whether their knowledge of the control methods for Sosnowsky's hogweed is sufficient and whether they would wish to enhance or acquire the knowledge.

As shown in Table 3, 73.4 % of the respondents who revealed that their knowledge of control methods for Sosnowsky's hogweed was insufficient wished to acquire the knowledge, giving the replies "certainly yes" and "rather yes".

Table 3

Distribution of the replies of the respondents regarding their knowledge of control methods for Sosnowsky's hogweed and their wish to build up or acquire the knowledge (n=749) (authors' calculations)

Questions, replies			I wish to acquire knowledge about the control methods for Sosnowsky's hogweed				Total
			Certainly yes	Rather yes	Rather not	Certainly not	
I have sufficient knowledge about control methods for Sosnowsky's hogweed	yes	Number	17	68	57	27	169
		Percentage	2.3	9.1	7.6	3.6	22.6
	no	Number	57	144	64	9	274
		Percentage	7.6	19.2	8.5	1.2	36.6
	I do not know because no such a knowledge was needed	Number	11	124	127	44	306
		Percentage	1.5	16.6	17.0	5.9	40.9
Total		Number	85	336	248	80	749
		Percentage	11.3	44.9	33.1	10.7	100.0

Source: Zvaigzne A., et al., 2016

It has to be mentioned that 44.1 % of the respondents who revealed that they did not ever need such a knowledge wished to acquire relevant knowledge, replying "certainly yes" and "rather yes".

The respondents who wished to acquire knowledge of control methods for Sosnowsky's hogweed provided replies to the question "In what way would you like to acquire such a knowledge?". This was a multiple choice question, and the respondents might give

multiple answers: articles in newspapers and magazines; booklets; special seminars; experience sharing trips; information in a book form or on websites.

According to the survey, most respondents (28.0 %) replied that they preferred obtaining information about control methods for Sosnowsky's hogweed on a special website for agricultural land management. The next most popular ways of obtaining information were as follows: booklets and newspaper articles (25.1 %) and magazines (23.7 %). However, the respondents aged 46-61 preferred receiving information about control methods for Sosnowsky's hogweed in a booklet form, while those aged 62 and over preferred newspapers and magazines. The respondents aged 19-25 equally preferred articles in newspapers and magazines as well as booklets.

Conclusions, proposals, recommendations

- 1) Local plant species are endangered with the spread of Sosnowsky's hogweed. In Rezekne municipality, Sosnowsky's hogweed was present in 16 out of the 25 rural territories in an area of 84.39 ha in 2012 and 176.11 ha in 2016.
- 2) No significant difference ($p > 0.05$) in the area with Sosnowsky's hogweed between 2012 and 2016 was identified for the selectively surveyed territories.

Bibliography

1. Haight, R.G., Mehta, S.V., Homans, F.R., Polasky, S. (2007). Optimal Detection and Control Strategies for Invasive Species Management. *Ecological Economics*, 61, pp. 237-245.
2. Sims, C., Finnoff, D. (2013). When is a "Wait and See" Approach to Invasive Species Justified? *Resource and Energy Economics*, 35, pp. 235-255.
3. Tripane, E. (2013). Sosnovska latvana izplatiba un ta ietekmejosie faktori Raznas nacionala parka teritorija. 17. starptautiskas studentu zinatniski - praktiskas konferences CILVEKS. VIDE. TEHNOLOGIJAS. rakstu krajums (Spread of Sosnowsky's Hogweed and the Influencing Factors in the Territory of Razna National Park. 17th international student scientific and practical conference *Human. Environment. Technologies proceedings*), pp. 253-260.
4. Tripane, E. (2013). Sosnovska latvana izplatiba un ta ietekmejosie faktori Raznas nacionala parka teritorija. Magistra darbs. (Spread of Sosnowsky's Hogweed and the Influencing Factors in the Territory of Razna National Park. *Master's paper*). Rezekne Higher Education Institution, Rezekne.
5. Zvaigzne, A., Kotane, I., Mezaka, A. (2016). Evaluation of Control Methods for Sosnowsky's Hogweed *Heracleum sosnowskyi* in Rezekne Municipality: The Results of a Survey of Experts. *Latgale National Economy Research*, 1(8): 125-134.
6. *Augu aizsardzibas likums (1999). (Plant Protection Law)*. Retrieved: <http://likumi.lv/doc.php?id=51662> Access: 10.01.2017.
7. Priede, A. (2008) Invazivie neofiti Latvijas flora: izplatiba un dinamika. Promocijas darba kopsavilkums (*Invasive Neophytes in the Flora of Latvia: Spread and Dynamics. Summary of the doctoral dissertation*). Retrieved: http://www.lu.lv/fileadmin/user_upload/lu_portal/zinas/priede.pdf Access: 10.01.2017

- 3) Long-term monitoring for at least ten years is necessary for scientists to objectively assess the spatial spread of Sosnowsky's hogweed.
- 4) The hypothesis was not proved, as the survey showed that only a small proportion of the respondents believed that they had sufficient knowledge about control methods for Sosnowsky's hogweed, while 74.4 % thought they had insufficient relevant knowledge.
- 5) To enhance the knowledge of residents, including agricultural land owners/managers, about Sosnowsky's hogweed and the control methods for it, relevant information has to be available on websites for agricultural land management, e.g. those of the Ministry of Agriculture, the Rural Support Service and the Latvian Rural Advisory and Training Centre, so that all interested individuals could get the information fast and easily.

Acknowledgements



The research was elaborated with the financial assistance of Rezekne Academy of Technologies provided through a research grant for the "Investigation into the Information Society regarding the Control and Hazards of Sosnowsky's Hogweed in Rezekne Municipality".

8. *Invazīvo augu sugu saraksts (2008) Ministru kabineta noteikumi Nr.468 (List of Invasive Plant Species. (2008). Cabinet Regulation No. 468)*. Retrieved: <http://likumi.lv/doc.php?id=177511> Access: 10.01.2017.
9. *Valsts augu aizsardzības dienests (2016). Paveiktais sosnovska latvāņu izplatības ierobežošana (State Plant Protection Service (2016). Achievements in Controlling the Spread of Sosnowsky's Gogweed)*. Retrieved: <http://www.vaad.gov.lv/sakums/informacija-sabiedribai/par-latviju-bez-latvaniem/paveiktais-sosnovska-latvāņu-izplatības-ierobežošana.aspx> Access: 11.01.2017.
10. *Rezeknes novada pasvaldības sniegta informācija (Information provided by Rezekne municipality)*, 2016.
11. Zvaigzne, A., Kotāne, I., Mezaka, A. (2016). Informācijas sabiedrības izpēti par Sosnovska latvāņu apkarošanu un kaitīgumu Rezeknes novadā. Pētījums (Investigation into the Information Society regarding the Control and Hazards of Sosnowsky's Hogweed in Rezekne Municipality. Study). *Rezekne Academy of Technologies*, Rezekne.

THE ACTIVITY OF LOCAL SELF-GOVERNMENTS IN THE AREA OF CREATING LOCAL INNOVATION (BASED ON THE EXAMPLE OF LUBLIN COUNTIES, POLAND)

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Abstract. The aim of the article is to characterize and evaluate the activities undertaken since 2010 by the local governments of selected Lublin counties aimed at strengthening local innovation, under the provisions of the local innovation strategy (LIS). The article indicates the activities specified in the LIS that should be intensified to improve its innovation and the activities which affect the possibility of increasing the innovativeness of communes. In each of the counties, seven local commune governments were chosen, in which the survey was conducted using an interview questionnaire addressed to the representatives of local authorities. The results indicate that the pro-innovation activities of the surveyed local governments should be regarded as insufficient, taken in a selective and not very common manner, they rarely go beyond the standard activities. As such, they are not an effective factor in the processes of local innovation. In particular, local authorities were too little involved in building local knowledge capital. It has been shown that, in this field, it is reasonable to strengthen the institutional environment of the implementation of the LIS. Moreover, local governments insufficiently built the basis for strengthening the innovation of the selected key sectors of the local economy. It was indicated that greater activity of the local authorities is justified in the creation of long-term core programmes for the stimulation of commune innovation.

Key words: local innovativeness, local innovation strategies.

JEL code: R58

Introduction

The economists analysing the issue of innovation, its role in the economy and the determinants, initially focused on the domestic economy, and then headed towards regional aspects. Today, more and more interest is raised by the local scale of this phenomenon.

At the levels of territorial systems, the category of innovativeness is understood as the capability to participate in the innovation cycle and is seen as the goal of development. Local government units (LGUs) are equipped with instruments of influence on the economy, space and society that can contribute to encouraging the innovativeness of regional and local economy. The essence of the new paradigm of local development is to conduct local, pro-innovation, economic, social and spatial policy stimulating the competitiveness of the local economy. Such a policy, involving the cooperation of both public and private entities, is to stimulate the improvement of the capability of local entities to participate in the innovation cycle (Brol R., 2009, pp. 59-60).

Global economic forces have raised the profile of regions and regional governance not least because of the rise to the prominence of the

regional and local business clusters as vehicles for global and national economic competitiveness (Cooke P., 2001, p.31). The key position is taken by the matter of shaping regional innovation systems treated as a system of interactions between science, R&D, industry, the education system, finance and public authorities supporting interactive and collective learning. The basis of its operation is the existence of networking, environmental innovation (Nowakowska A., 2011) and the integration of regional and local governance.

Local innovation systems (strategies) as an important part of regional innovation systems (strategies)

LGUs are important players in the regional innovation system, along with entrepreneurs, the R&D sector, business environment entities. Their role in the creation and diffusion of innovation is to create conditions to improve the efficiency of the innovation process by initiating or animating improvement in the economic conditions and the functioning of certain elements of the innovation system, as well as the creation and strengthening of ties between the innovation system entities (Study of the..., p.3).

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At the regional level, the main activity is the development and implementation of regional innovation strategies. The strategies are to build a partnership for the regional innovation system as part of the so-called golden triangle, including local authorities, research units and enterprises (Brol R., Sztando A., 2011). Due to the large number and diversity of entities forming regional innovation systems, a robust system of multi-level governance appears to be a sine-qua-non condition for undertaking successful regional innovation strategies (Pellegrin J., 2007, p. 218).

The design and the implementation of innovation strategies at the regional level in the case of the regions where public resources are increasingly limited and partly devoted to short-term goals, the scope of innovation policies has to focus on a relatively narrow set of promising long-term objectives and technological-sectoral targets. What is more, the identification of promising targets should be based on the recognition and the enhancement of a local base of knowledge and competencies (Caloffi A., Mariani M., 2011, p.414). The cognitive concept of local conditions of regional innovation capacity interprets innovation as a result of the presence of the processes of collective learning and adapting to the risks of innovation (Capello R., 2011, p.116).

From a policy, perspective regions are supposed to be able to mobilize resources and institutions towards the development of local areas and should be able to develop a strategic capacity to improve their economic cohesiveness. The relevance of the local dimension of governance has led to the creation of a new strand of research in regional studies, stressing how local policies can play a key role in fostering learning processes. Accordingly, local innovation systems are based on the generation of regionalized learning systems where some local innovation policies are activated to transfer technologies, to enforce technological cooperation, and to provide support and

incentives to innovative networks (Muscio, A., 2006, p. 775).

The design and implementation of local development strategies require not only the involvement of local authorities and local development agencies but also local integration strategies with the knowledge-based economy, the incorporation of skills, innovation, entrepreneurship and social integration (Giguere S., 2007, p.38). The support of local innovation processes must be also embedded in local factors and the social and cultural environment. It must be stressed that the use of local development strategies as a management tool for local development is particularly important, yet difficult in peripheral and less developed regions (Adamowicz M., 2015 p. 11, 18).

The commune, strategic creation of the innovation of the local economy is supported by, among others: 1) a large number of relationships connecting local governments of communes and local economic entities and scientific-research organizations; 2) a high degree of the dependence on the operation of local governments on their innovation; 3) a wide range of the communes' tools of impact on local businesses (Brol R., Sztando A., 2011).

The many activities aimed at supporting innovation and entrepreneurship that can be taken by local governments include, among others: the conduct of a well-thought policy towards investors, granting loans and credit guarantees, leasing or creating facilities, creating guarantee funds, business incubators, technology parks, establishment of research and development facilities, establishment of institutions to stimulate economic initiatives, development of business infrastructure equipment, the creation of economic activity zones, attention to technical infrastructure, undertaking promotional activities (Huczek, p. 31). Local authorities should also co-create the atmosphere of pro-innovation behaviour, mobilize communities to the introduction of new products,

processes, management, and create the atmosphere of the local entrepreneurship. The impact on the local territorial-production system also requires a modern, innovative office (Huczek M., 2006, pp. 31-32).

The aim, materials and methods

The Regional Innovation Strategy to 2020 (2014) is, next to the Lublin Region Development Strategy for 2014-2020 (2014), the basic planning document defining the framework for the economic development of the Lublin region based on the research and innovation generated in research institutions and implemented by companies. It is a development and refinement of the Lublin Region Development Strategy for 2014-2020 in the section devoted to the development of research and innovation for smart specialization. Priority 3, entitled "Strengthening the business environment institutions and public administration open to innovation" assumes the course of measure No. 3.2 entitled "The development of an efficient and open to innovation public administration".

The Lublin region undertook steps to develop the local (county) innovation strategies (LIS) under the system project commissioned by the Marshal's Office¹. These included the formulation of the assumptions of local innovation strategies for the selected counties identified as areas of potential growth or areas directly threatened with stagnation. The first group includes the areas of the Pulawy Region, Leczna and Swidnik counties, the second group - the area of the Biala county and the area of the counties of Chelm, Krasnystaw and Wlodawa.

With reference to the above-mentioned strategic documents, which are the basis of pro-innovation activities at the local level, it is reasonable to monitor the activity of local commune governments within the activities considered as priorities for strengthening the

local socio-economic innovation systems. The aim of this article is, therefore, the characteristics and evaluation of the activities undertaken since 2010 by the local governments of selected Lublin counties and aimed at strengthening local innovation, resulting from the provisions of the LIS. The article also identifies the activities specified in the LIS that should be intensified to improve its innovation and the activities that affect the possibility of increasing the innovativeness of communes. The following research hypothesis was formulated: local commune governments to a limited extent undertake activities to promote local innovativeness beyond the standard measures aimed at developing local entrepreneurship. In the case of the more developed counties, the activity is more advanced.

The research was carried out in two counties - Pulawy - recognized as one of the areas of potential growth and the Biala county, representing the areas threatened by stagnation (Figure 1).



Source: authors' own study based on the "Voivodeship development strategy..."

Fig. 1. Administrative division and location of the Lublin voivodeship

In each of the counties, seven local authorities were selected for studies, including urban, urban-rural and rural units². The selection of units for

¹ The system project "Lublin Region Intellectual Capital 2010-2013" implemented under the operational programme Human Capital, Priority VIII Regional human resources, measure 8.2. Transfer of knowledge, sub-measure 8.2.2. Regional innovation strategies, www.kil.lubelskie.pl.

² The Biala county: the towns Miedzyrzec Podlaski and Terespol and rural communes: Terespol, Wisznice, Tuczna, Drelow and Konstantynow (36.8 % territorial units studied); in the Pulawy county: the town of Pulawy, rural-urban communes: Kazimierz Dolny and Naleczow and rural communes: Baranow, Janowiec, Wawolnica, Kurow (63.6 % territorial units studied).

testing was made taking into account their degree of development and their specificity that are determined by the diversity of locations in the area and the nature of the economy. In each of the studied fourteen units, a survey using an interview questionnaire was conducted with the participation of a representative of the local authority – a mayor or a commune administrator. The study was conducted during the period 1 July - 10 August 2015.

Conditions and assumptions of the Local Innovation Strategies of the surveyed counties

The studied region is located in the Central-Eastern part of Poland, bordering with Ukraine and Belarus. Lublin Voivodeship is one of the least developed, peripheral regions of Poland and the European Union. The bio-economy sector creates large capacity to implement smart specialization and innovations in the region (Zwolinska-Ligaj M., 2016, pp. 281-282).

The Lublin Region is a region with an average level of development of innovation potential, qualified in the group of voivodeships deepening the delay and losing distance. The region is a weak diffuser, with little capacity to generate innovation, but having resources for the development of innovative. The region is characterized by a shortage of working age people capable of generating innovation and marketing them. Low levels of income and expenditure of households do not generate a demand for innovative products and services. The greatest is the importance of the food industry, concentrating 25 % of all employees in the industry and generating almost 24 % of the production sold (Diagnosis ... p.13).

The formulation of the mission of the LIS for the Biala county and the city of Biala Podlaska - the area at risk of economic stagnation - stressed the need for "supporting the process of economic transformation in the Biala county and the city of Biala Podlaska to increase their competitiveness and innovation by stimulating the development of the local innovation system and multifaceted

cooperation in the areas considered key to the development of the county and the city". In the case of this area, its vision for the development assumed that the "Biala county and the City of Biala Podlaska are areas specializing in sectors related to freight forwarding and logistics, low-carbon energy, organic food production, tourism and agro-tourism, innovative and pro-health medical services and support the functions of the Lublin Metropolitan Area as sub-regional area". The overarching strategic aim points to the "Development of an innovative forwarding and logistics sector as well as the sectors of energy (low-carbon energy), production and processing of organic food, tourism and agro-tourism, medical and pro-health services as part of the local innovation system". The following trends were priorities: 1) the creation of conditions for the development of the local innovation system; 2) the strengthening of the process of the technological specialization of the county; 3) the strengthening of the process of the functional specialization of the county (LIS for the Biala county ...).

In the case of the LIS for the Pulawy county and the City of Pulawy – area of potential economic growth, the mission included a provision on "The support of the process of economic transformation in the area of Pulawy county and the City of Pulawy to increase their competitiveness and innovation by stimulating the development of their local innovation system and multifaceted cooperation in areas considered key to the development of the county and the city". The desirable vision of the development of this area assumes that "the Pulawy county and the City of Pulawy are areas specializing in sectors related to innovative chemical and energy and mining industries, manufacturing and food processing, tourism, innovative medical and pro-health services and support the functions of the Lublin Metropolitan Area as sub-regional areas". The overarching aim, therefore, took into consideration the "Development of innovative

chemical and energy and mining industries, manufacturing and food processing, tourism, medical and pro-health services as part of the local innovation system." In the case of the Pulawy county, the same wording was used for the development priorities in the Local Innovation Strategy of the Biala county and the city of Biala Podlaska (LIS for the Pulawy county...).

Pro-innovation activities of local governments

Within the three priorities of local innovation strategies, the studied LGU were most active in relation to the process of creating conditions for the development of the local innovation system. Slightly lesser was the commitment associated with the strengthening of the process of technological specialization of the county, and the minimum activity was related to the process of the strengthening of the functional specialization of the county (Table 1).

With regard to the activities aimed at improving the conditions for the development of the local innovation system, the units declared their activities mainly in the context of consolidating the network of relationships and connections with various entities of the local innovation system. In this area, the activity associated with establishing international contacts should be noted, creating relationships between units of local governments, cooperation with scientific institutions and the business environment as well as participation in various projects implemented by entrepreneurship environment institutions, innovation centres, producer groups and local action groups. However, public-private partnerships were practically not developed as important potential areas of creating local, innovative development

projects. Another area of the perceived activity of the units in terms of strengthening the conditions for the local innovation system development were the activities aimed at increasing the innovativeness of the office, by raising the qualifications of employees and the introduction of advanced technological solutions in the commune economy. The less-developed area of potential importance for the strengthening of local innovation was the measures taken to develop the knowledge of local communities about the possibility of implementation, the support available and the benefits of pro-innovative activities. The activities designed to develop knowledge of modern media, such as websites and Internet platforms, were not common. Local authorities declared a preference for innovations implemented in the directions of development of communes, and supporting innovative projects and promoting local brands.

In the case of the units surveyed, the implementation of priority "Strengthening the process of the technological specialization of the county" consisted in taking up activities including the development of IT and technical infrastructure and supporting the sector of tourism services. Rarely, however, tourism development implemented integrated tourism projects that use information and communication technologies. Half of the LGUs declared taking up initiatives in the field of education and raising the competence of farmers and developing the sector of products and services related to the promotion and protection of health. Quite rarely, however, the surveyed communes supported the development of the key sectors of the local development economy, including the use of local natural resources in an innovative manner.

Activities taken since 2010 by local governments aimed at strengthening local innovativeness pursuant to the provisions of the "LIS for the Pulawy county and the City of Pulawy" and the "LIS for the Biala county and the city of Biala Podlaska" according to the priorities of the LIS and the types of the surveyed territorial units (number of responses, N=14)

No	Activities	Pulawy county		Biala county		Total
		rural communes	urban and urban-rural communes	rural communes	urban communes	
	LSI Priority 1: Creating conditions for the development of the local innovation system					
1.	implementation of modern solutions in the office	2	2	4	0	8
2.	improving the qualifications of office workers	2	2	4	0	8
3.	preference for innovation in the on-going development directions of the commune	0	1	3	0	4
4.	usage of advanced technologies in commune management	2	3	2	0	7
5.	developing public-private partnerships	1	0	0	0	1
6.	creating relationships between local government units	0	3	4	1	8
7.	establishing international contacts	2	2	4	1	9
8.	creating web services / platforms to disseminate knowledge, exchange experience related to the possibilities of innovative activities	0	2	1	1	4
9.	popularization of knowledge about the possibilities of financing innovative projects	1	1	2	1	5
10.	supporting innovative projects, including cooperation networks	1	1	4	0	6
11.	cooperation with scientific institutions and business environment	2	3	3	0	8
12.	dissemination of knowledge about the benefits of cooperation	0	0	2	0	2
13.	participation in integrated projects by innovation centres, producer groups, Local Action Groups and other	2	3	1	1	7
14.	supporting the scheme for the promotion of local brands	2	1	1	0	4
15.	promotion of the environmental values that can be crucial in technological processes	1	2	-	-	3
16.	building pro-innovation awareness through the implementation of innovative educational paths in schools	1	1	-	-	2
	LSI Priority 2: Strengthening the process of the technological specialization of the county					
17.	support for the development of key sectors of the local economy	0	1	3	2	6
18.	support for the cooperation for the development of the products and services based on local raw materials	0	2	2	0	4
19.	support for education and raising the competence of farmers	2	1	3	1	7
20.	support for the promotion of tourist values of the region, implementation and development of niche products and tourism services	2	3	4	1	10
21.	development of cooperation between institutions aimed at promoting traditions, ethnic cultural, local tourism	1	3	5	2	11
22.	implementation of integrated tourism projects using ICT	1	1	2	0	4
23.	strengthening and development of the sector related to the protection and promotion of health	1	1	3	2	7
24.	development of IT and technical infrastructure	2	2	5	2	11
25.	support for the implementation of innovative solutions for the agri-food production	0	1	-	-	1
26.	support for the effective methods of food production and processing	0	0	-	-	0
27.	support for the use of science and industry to protect the environment	0	2	-	-	2
28.	support for the implementation of innovative solutions for agricultural production	-	-	2	0	2
29.	support for the production, promotion and distribution of agri-food products	-	-	1	0	1
30.	efforts to intensify the cultivation and production of flax and herb products	-	-	1	0	1
	LSI Priority 3: Strengthening the process of the functional specialization of the county					
31.	development of the functions of the Pulawy Region and the Pulawy county by creating local partnerships, innovation	0	1	-	-	1
32.	strengthening cooperation with entities from the key sectors: chemical, energy and mining, tourism, agriculture, agri-food, medical and pro-health services	1	1	-	-	2
33.	implementation of projects under the Territorial Strategic Investments	1	3	-	-	4
34.	development of training specialized personnel for the industry: chemical, energy and mining	0	0	-	-	0
35.	cooperation within the City (Biala) Functional Area	-	-	0	0	0
36.	development of border functions within the Terespol Border Functional Area	-	-	2	2	4
37.	cooperation with Wlodawa and Chelm counties in the development of the forwarding and logistics sector	-	-	0	0	0

Source: authors' calculations based on empirical research

The innovative activities undertaken by the surveyed LGUs showed some differences in between the counties. Noted should be the fact that the units from the highly-developed Pulawy county, with reference to the creation of the conditions for the development of the local innovation system, often indicated to undertake such activities as: the implementation of innovative technological solutions in the commune economy, establishing cooperation with scientific institutions and business environment and participation in integrated, innovative projects with institutions with significant potential impact on the local innovation, including innovation centres or LGD. In the Pulawy country, activity can be noted in the promotion of environmental values of the major importance in industrial processes. On the other hand, in the case of the Biala county, with a much smaller growth potential, there were attempts aimed to strengthen this potential by creating relationships with other LGUs and only to support innovative local projects.

In the case of the activities related to strengthening the process of technology specialization of the country, the activities most commonly undertaken by the surveyed communes definitely highlighted the activities of the entities representing the Biala county. They concerned the development of the technical and IT infrastructure, the development of cooperation between institutions to promote local traditions and the development of tourism, the sector related to the promotion and protection of health and cooperation with LGUs for the development of the key sectors of the local economy.

The specific activities concerning only the Pulawy county - support for the innovativeness of the production processes of raw materials and food processing and aimed at protecting the natural environment and the environment of Biala - including support for different phases of the production cycle of food made of flax and herbs - were taken very rarely.

In the Pulawy county, the contribution of the units to the development of the functional specialization of the county was the implementation of the projects under Territorial Strategic Investments, while - in the Biala county - it was the contribution to the development of the border functions of the Terespol Border Functional Area.

The urban and urban-rural communes, possessing the capacity to more strongly influence the development processes of local innovativeness presented particularly proactive approaches within such activities as the development of cooperation between institutions promoting cultural, ethnic traditions and local tourism development, the creation of relationships between local governments, participation in integrated projects implemented by local and supra-local institutions, support for the development of tourism and the development of IT and technical infrastructure. The units were also crucial for engaging in activities related to the strengthening the process of the functional specialization of the county.

Depending on the county, the surveyed LGUs recognized some other type of activities as crucial and demanding intensification in an effort to strengthen the local innovativeness in the implementation of the LIS. In the case of the Pulawy county, it was most frequently pointed out that the activities were related to the introduction of innovative solutions for selected sectors of the local economy, including those based on the use of local raw materials - e.g. in the agribusiness sector, tourism or services and products related to the protection and promotion of health. This group of units also highlighted the need to strengthen measures aimed at the development of various forms of dissemination of knowledge underlying the taking up of innovative activities. Lesser was the importance attributed to the activities in the area of development cooperation with various institutions, activities in developing projects and implementing pro-

innovative solutions in the office. In the case of local governments in the Biala county, the activities subject to the need for intensification included primarily the dissemination of knowledge - as in the Pulawy county - and greater activity in the development of pro-innovation projects. To a lesser extent, they accentuated the need to intensify cooperation with all kinds of institutions and the need for strengthening the innovation of different sectors of the local economy.

The representatives of the governments surveyed perceived inherent factors outside the local socio-economic systems among the main factors which affect the possibility of increasing the innovation capacity of their communes. These included the European Union funds and the emergence of external investors. Quite a big role was ascribed to the activity of local entrepreneurs (Table 2).

Table 2

The activities on which the possibility of increasing the innovativeness of the commune depended

No	Activities	County		Total
		Pulawy	Biala	
1.	The use of EU and other funds	5	5	10
2.	The activity of local entrepreneurs	6	2	8
3.	Bringing an external investor	1	4	5
4.	Developing local innovation networks, clusters	1	3	4
5.	Stimulating the creation of new enterprises	1	3	4
6.	Use of resources and natural assets	2	1	3
7.	Extension of the technical infrastructure	1	2	3
8.	Support of local commune governments in the development of the existing enterprises	2	0	2
9.	Supporting the development of business environment institutions	1	0	1
10.	Support of institutions	1	0	1
Total		21	20	41

Source: authors' calculations based on empirical research

The respondents perceived the development of local cooperative relations and stimulating the creation of new businesses or strengthening and utilization of the resource potential of the local natural environment and technical infrastructure as not having a major impact on local innovation.

It is also characteristic that the respondents, representing the sector of institutions saw no possibility of the impact of the institutional factor on local innovation. Single indications were related to the aid of local communities in the development of the existing enterprises, supporting the development of business environment institutions, or help from other institutions. The activities which were not indicated by any representative of the surveyed local governments included also pro-environmental investments, the development of public-private partnerships and the implementation of the Regional/ Local Innovation Strategy.

Conclusions

The discussion presented in the paper makes it possible to formulate the following conclusions.

- 1) The pro-innovation activities of the surveyed local governments related to the provisions of the Local Innovation Strategy should be regarded as inadequate, taken in a selective and not very common manner. As such, they are not an effective factor in the processes of local innovation. The hypothesis formulated in the study has been verified positively. The local governments of communes to a limited extent take up activities to promote local innovation beyond the standard measures aimed at developing local entrepreneurship. Furthermore, in the case of the more advanced counties, the activities are more advanced.
- 2) The activities to improve conditions for the development of the local innovation systems and to strengthen the technological

specialization of counties undertaken by the surveyed LGUs were predominated by those related to the development of technical infrastructure, creation and development of cooperative relationship between the entities of the local innovation system and the concern about the increasing innovativeness of offices. The local governments were insufficiently involved in building the local knowledge capital of various groups of the community constituting the basis for the strengthening of local innovation systems. At the same time, local governments sought knowledge, recognizing its role in the development of local innovation. The factor of the dissemination of knowledge was in fact recognized by the respondents as one of the key ones and demanding intensification in an effort to strengthen local innovation. It is reasonable, therefore, to strengthen the institutional LSI environment in this regard. In addition, the local governments to an insufficient extent formed the basis for strengthening innovation of the selected key sectors of the local economy. In this area, the possibilities inherent in favouring innovations in the implemented directions of the development of communes were not used, as well as supporting innovative projects and promoting local brands. It is, therefore, grounded to provide greater activity of local authorities in the creation of long-term core programmes - strategic framework - to stimulate the innovativeness of communes. Such programmes, which are an extension of commune development strategies, should form a comprehensive, internally consistent basis for the implementation of pro-innovation activities in the key sectors of the local economy. In the opinion of the respondents, the activities related to the introduction of innovative solutions and implementing innovative projects in the selected sectors of the local economy, including those based on

the use of local raw materials – e.g. the agribusiness sector, tourism or services and products related to the protection and promotion of health, were seen as one of the key factors and requiring intensification of local innovativeness factors.

- 3) In the case of the units from the highly-developed Pulawy county, the creation of conditions for the development of the local innovation system often involved taking up more advanced activities, requiring the use of knowledge and financial resources and presenting an open approach to cooperation with the regional innovation system institutions. Lesser importance was attributed to the activities in the area of the development of cooperation with various institutions, activities in developing projects and using pro-innovative solutions in offices, due to the higher level of sophistication in this area. In the case of the Biala county, co-operation was more limited, with a much smaller growth potential, the partners of the cooperative activities undertaken mainly represented the local government sector, and the surveyed units performed the supporting function of the projects. To a lesser extent, they were involved in the activities in the development of pro-innovation projects.
- 4) The urban and urban-rural communes possess the capacity to more strongly influence the development processes of local innovativeness. As a result, they have a considerable capability of inspiring and taking up various forms of local economic and social cooperation. These units also play an important part in deepening the process of the functional specialization of the county.
- 5) The EU funds are a significant support of commune innovation processes. This factor, combined with the inflow of investment from external sources and the activities of local enterprises constitute, in the opinion of the respondents, the flywheel of local

innovativeness. Its activation requires the strengthening of the institutional factor, including an increase in the role of local

governments in the programme stimulation of local innovativeness.

Bibliography

- Adamowicz, M. (2015). Lokalne strategie innowacji jako narzędzie zarządzania rozwojem powiatów stanowiących obszary potencjalnego wzrostu Lubelszczyzny (Local innovation strategies as a management of development for districts, recognised as growth potential areas in Lublin region), *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu*, Volume 17, No. 3, pp. 11-18.
- Badanie potencjału innowacyjnego jednostek samorządu terytorialnego w Wielkopolsce, Raport końcowy (Study of the innovation potential of local government units in the Wielkopolska region, Final Report), Uniwersytet Ekonomiczny w Poznaniu, Projekt współfinansowany przez Unię Europejską w ramach Europejskiego Funduszu Społecznego.
- Brol, R. (2009). Innowacyjność lokalnych jednostek terytorialnych (Innovativeness of local territorial units), in: *Gospodarka lokalna w teorii i praktyce*, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu No. 46, Wrocław, pp. 59-60.
- Brol, R., Szando, A. (2011). Strategiczne kreowanie innowacyjności gospodarki lokalnej na przykładzie gminy Polkowice in: *Gospodarka lokalna w teorii i praktyce*, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu No. 179, Wrocław, pp. 206-220.
- Caloffi, A. Mariani, M. (2011). Shaping Regional Policy Responses: The Design of Innovation Poles, *Policy Studies*, Vol. 32, No. 4, pp. 413-428.
- Capello, R. (2011). Innovation and Productivity: Local Competitiveness and the Role of Space, in: *Handbook of Regional Innovation and Growth*, ed. P. Cooke, B. Asheim, R. Boschma, R. Martin, D. Schwartz, F. Todtling, Edward Elgar Publishing, pp. 107-119.
- Cooke P. (2001). *Strategies for Regional Innovation Systems: Learning Transfer and Applications*, Centre for Advanced Studies, UNIDO World Industrial Development Report.
- Diagnoza lubelskiego rynku innowacji –synteza ekspertyz na potrzeby RSI 2020, Załącznik do Regionalnej Strategii Innowacji Województwa Lubelskiego do 2020 roku (Diagnosis of Lublin innovation market -synteza of expertises to the needs of RSI 2020, Annex to the Regional Innovation Strategy of Lublin voivodeship 2020), Urząd Marszałkowski Województwa Lubelskiego w Lublinie, Departament Gospodarki i Innowacji, Lublin 2013. Retrieved: http://www.rsi.lubelskie.pl/images/DIAGNOZA/Diagnoza_%20do_%20RSI.pdf. Access: 3.11.2016.
- Giguere, S. (2007). Local Innovations for Growth in Central and Eastern Europe: Policy and Governance Issues, in: *Local Innovations for Growth in Central and Eastern Europe*, ed. S. Giguere, Local Economic and Employment Development, OECD.
- Huczek, M. (2006). Rola samorządu terytorialnego w rozwoju innowacyjności lokalnej (The role of local government in the development of local innovativeness), *Zeszyty Naukowe Wyższej Szkoły Humanitas. Zarządzanie*, No. 1, pp. 27-34.
- Lokalna strategia innowacji dla powiatu bialskiego i miasta Biała Podlaska* (Local innovation strategy for county and the city of Biała Podlaska), Projekt systemowy „Kapitał intelektualny Lubelszczyzny 2010-2013”, (Systemic project "Intellectual Capital of Lubelszczyzna 2010-2013"), Zacher, L. W., Leśniak-Moczuk, K., Betlej, A., Niećko, I., Błaszczak, D. Retrieved: http://www.kil.lubelskie.pl/wp-content/uploads/2013/07/LSI_powiat_bialski.pdf. Access: 15.10.2016.
- Lokalna strategia innowacji dla powiatu pulawskiego i miasta Pulawy* (Local innovation strategy for county and the city of Pulawy), Projekt systemowy „Kapitał intelektualny Lubelszczyzny 2010-2013 (Systemic project "Intellectual Capital of Lubelszczyzna 2010-2013"), Zacher, L. W., Lesniak-Moczuk, K., Betlej, A., Niećko, I., Błaszczak, D. Retrieved: http://www.kil.lubelskie.pl/wp-content/uploads/2013/07/LSI_powiat_pulawski.pdf. Access: 15.10.2016.
- Muscio, A. (2006). From Regional Innovation Systems to Local Innovation Systems: Evidence from Italian Industrial Districts. *European Planning Studies*, Volume 14, No. 6, pp. 773-789.
- Nowakowska, A., Hasło: regionalny system innowacji (Password in the encyclopaedia: regional innovation system), *Słownik Innowacji, Leksykon hasel*. Retrieved: http://www.pi.gov.pl/parp/chapter_96055.asp?soid=3FC1637E1FEF4765BAB9D3DA8A0284CA. Access: 2.10.2016.
- Pellegrin, J. (2007). Regional Innovation Strategies in the EU or a Regionalized EU Innovation Strategy? Conceptual and Empirical Underpinnings of the EU Approach. *Innovation*, Volume 20, No. 3.
- Regionalna Strategia Innowacji Województwa Lubelskiego do 2020 r. (Regional Innovation Strategy of Lublin voivodeship 2020), Urząd Marszałkowski Województwa Lubelskiego w Lublinie, Lublin 2014
- Strategia Rozwoju Województwa Lubelskiego na lata 2014-2020 (z perspektywą do 2030 r.) (Lublin Region Development Strategy for 2014-2020 (with the prospect of 2030)), Urząd Marszałkowski Województwa Lubelskiego w Lublinie, Lublin 2014. Retrieved: http://www.strategia.lubelskie.pl/Strategia_Rozwoju_Wojewodztwa_Lubelskiego_na_lata_2014-2020_z_perspektywa_do_2030_roku.pdf. Access: 10.11.2016.
- Zwolińska-Ligaj, M. (2016). Bioeconomy as a Direction of the Development of Natural Valuable Areas in Lublin Voivodeship (Poland), *Proceedings of the 2016 International Conference "Economic Science For Rural Development"*, No. 41, Jelgava, pp. 281-290.

BIOECONOMY

BIO-ECONOMY AS AN ELEMENT OF DEVELOPMENT STRATEGIES IN THE EUROPEAN UNION

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Abstract. The aim of the study is to present the concept of bio-economy and its development factors, as well as the analysis and evaluation of the use of the bio-economy concept in shaping development strategies in the European Union. Particular attention is paid to bio-economy as part of a sustainable development strategy, implementation of innovations and formation of smart specialization of regions. On the basis of available literature and documents of the European Union, as well as other institutions, bio-economy is presented as a new economic category, and bio-economy development factors and bio-economy itself are presented as a strategic planning tool. One of the key conclusions is the statement that bio-economy, which constitutes an important sector increasing in significance within the real economy, is a new interesting analytical and cognitive concept in economics and also a useful tool in strategic planning development.

Key words: bio-economy, biotechnology, development strategies, biomass.

JEL code: Q5

Introduction

The notion of bio-economy emerged in literature of the late 20th century (Martinez, 1998). However, until the second decade of the 21st century that it had not attracted great interest of scientists and circles shaping development strategies. As a new theoretical and analytical concept, at the same time constituting a planning category, bio-economy gained high popularity while various development strategies were being shaped in the European Union. Separation of various segments of the real economy relating to utilisation of living organisms of plants, animals and microorganisms and their integration into one large segment (complex) of real economy, which is the essence of bio-economy, has become a useful tool for the development of various plans and development strategies throughout the European Union, in the Member States and individual regions. Non-European countries, mainly the United States, as well as international organizations, the OECD in particular, have also displayed interest in bio-economy.

The aim of this article is to present the concept of bio-economy and factors of its development and the analysis and evaluation of the use of the bio-economy concept in shaping development strategies of the European Union. Particular attention will be paid to bio-economy as part of the sustainable development strategy,

implementation of innovations, formation of value chains and specialization of regional development.

This work is based on literature sources of policy papers and reports of various institutions as well as community and international organizations.

Bio-economy as a new economic category

First attempts to define bio-economy took place in the years 1997-1998 in the research community cooperating with the European Union institutions. Juan Enriques and Radrigo Martinez recommended an authorial definition that sparked interest of the European Union in bio-economy as an analytical and cognitive category, useful for programming development strategies for the future. The aforementioned authors perceived bio-economy as an economic activity based on scientific research and implementation, focused on understanding the mechanisms and processes at the molecular (genetic) level, with the aim to implement and use it in industrial processes (Martiez, 1998).

The first stage of the concept development was associated with the dynamic development and achievements in the fields of biology and biotechnology (EC 1993, EC 2000). Attention was then directed towards linking bio-economy with the environment, ecological development and sustainability. Keen interest in bio-economy in

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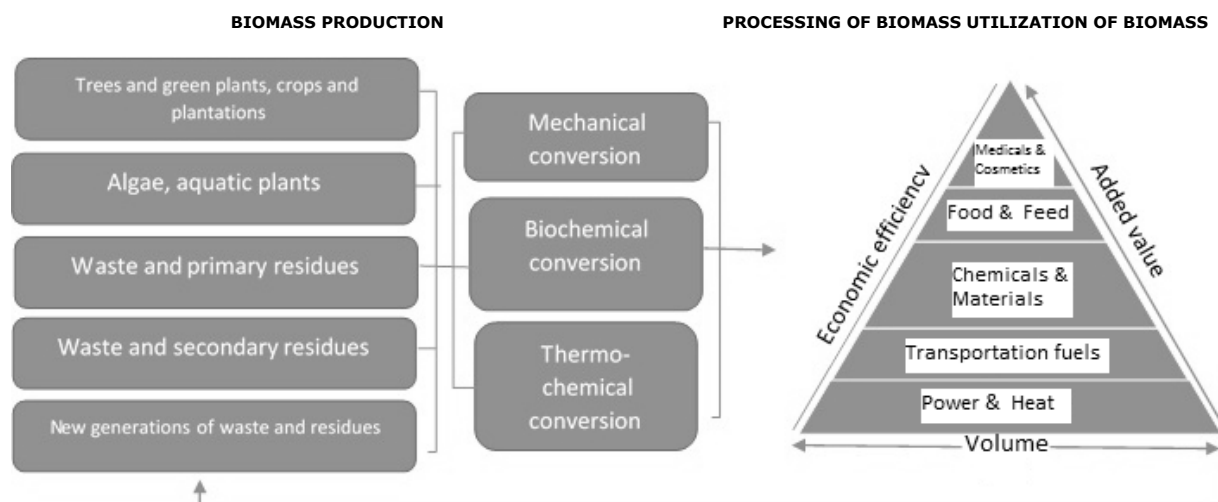
the first decade of the 21st century resulted in the formulation of many definitions of the term. The way bio-economy is defined is important due to the fact that methods and components of its definition are directly reflected in the policies, programmes and strategies of economic development (Maciejczak, Hofreiter, 2013). Different definitions emphasize various technological, economic and social aspects and priorities, and relate to various conditions and developmental concepts such as sustainable development and innovative development, both at national and regional levels.

Bio-economy can be perceived differently not only in individual countries but also by entities in different sectors of economy. However, it has a cross-sectorial character. A common feature, independent of the sector, is considering this concept from the point of view of innovation and economic benefits, which may not only result from its development but also the inherent risk that accompanies it. Despite the differences, it is widely recommended to support the development of bio-economy through state policies and institutions designated for that purpose.

Generally, bio-economy can be defined as economy, in which the main production components - manufacturing of materials, chemical products and energy, are based on biological and renewable resources (McCormick, Kautto, 2013). Bio-economy in its production processes utilises biomass obtained from reproducible biological resources of plant or animal origin, which are processed in mechanical, biochemical and thermo-chemical way (Fig. 1). In addition to trees, shrubs, crops and plantations, the following are also used: algae and aquatic plants, waste and primary agricultural residues, waste and secondary agricultural residues, and successive generations of waste and residues. The use of biomass in economic processes allows obtaining thermal energy, liquid fuels, chemicals, bioproducts, food and fodder as well as cosmetics and medicines.

The definition formulated in 2005 by the Directorate-General for Research and Innovation of the European Commission states that "bio-economy constitutes an environmentally friendly, ecologically efficient conversion of renewable biological resources for food, energy and other industrial products". Similarly, in 2006 the Research DG has developed the concept of bio-economy by specifying that it includes "all production systems that use biochemical and biophysical processes, including all natural science and related technologies that are generally applied, and necessary to produce useful products, including biotechnology applied in agriculture and industry. Bio-economy also encompasses biorefineries, production of bioenergy and biochemicals, innovative means of using the land and the sea to create public goods as well as the use of materials generally regarded as waste (EC, 2012).

Countries with well-developed agriculture and biotechnology, as well as large natural biological resources have also directed their attention to the development of knowledge-based bio-economy. A view that "bio-economy covers the production of renewable biological resources and their conversion into food, fodder, medicines and other bioproducts and bioenergy," which became widespread in the EU Member States, was presented during a conference held at the time of the German Presidency in the EU in 2007. This visionary document stressed that biotechnology will be a key component of the European economy by 2030 (German Presidency, 2007). This document pays particular attention to an increase of participation and importance of the so-called white biotechnology products (medicaments, cosmetics etc.) and of bioenergy in industrial production in Europe (McCormick, Kautto, 2013).



Source: author's calculations based on Bas Eichaut Saerates Schauten. Concept van den Biobased Economy, <http://biobasedeconomy.nl>

Fig. 1. The concept of economy based on biomass

The OECD has defined the concept of bio-economy in 2006 and has determined its use in the development policy. This organization recommends that "bio-economy is the aggregated set of economic operations in a society, which uses the latent (hidden) values embedded in products and in biological processes in order to accelerate the increase and achieve prosperity for citizens and nations" (OECD, 2006). In 2009, the OECD reports that "bio-economy means the exchange of knowledge resulting from the natural sciences to the new, environmentally friendly eco-efficient and competitive products." Depiction of 2009 focuses on the fact that bio-economy should be perceived as a reality, in which biotechnology is an important factor influencing economic growth (McCormick, Kautto, 2013). Developing this concept of OECD shows that bio-economy includes three elements (The OECD 2009):

- using of advanced knowledge on genes and cellular processes for programming and for the development of new processes and products;
- using of renewable biomass and effective bioprocesses in order to stimulate sustainable production;
- integration of knowledge of biotechnology in order to apply it in a wide range of sectors.

The OECD justified that biotechnologies can solve many global problems related to health and nutrition, and suggested that biotechnology and bio-economy will enable significant changes in the global economy in the course of three decades. During forming of this concept, OECD used the achievements of various European and American institutions, including the definition of the British minister of the Department of Environment, Food and Rural Affairs (DEFRA). In 2007, DEFRA defined bio-economy as "economic activity, which grabs value hidden in biological processes and renewable bio-resources, which results in better health, growth and environmentally friendly development " (DEFRA 2007).

While in 2007 the concept of bio-economy was relatively new and unknown (Hilgartner, 2007), rapid spread of the concept took place in the years 2010-2013, which was also influenced by activities of various organs of the European Union. According to the concept formed in the draft platform for gathering information for the bio-economy (BECOTEPS, 2010) "bio-economy means all sectors whose products are biomass-derived" and "this part of the economy, which through the development generates growth and creates workplaces in the process of using and processing of biological resources in an

environmentally friendly way" (Maciejczak, Haffreiter, 2012).

The European Commission in the document from 2010 entitled "Bio-economy for Europe" presented the production models based on biological processes and natural ecosystems using natural materials, which consume minimal amounts of energy without generating waste, as all waste resulting from one process is the material for the next and as a result it is reused in the ecosystem (EC, 2010). Similarly, bio-economy was defined in the documents of the European Union published in 2011 (ETP 2011, Europe Bio 2011), where bio-economy was referred to as "sustainable production and processing of renewable mass into a wide range of products and food, medical, industrial and energy services or for a various biological materials for direct using and in the form of raw materials for the manufacture of other products" (Menard and others 2011, Schmidt and others 2012).

Defining bio-economy in the United States has many similarities as compared to the definition developed by the OECD and in the European Union. Definition from 2012 published in the documents of the White House states that "bio-economy is an economy based on the use of research and innovation in biological sciences in order to power the economic activity and to generate public profits (The White House, 2012). In this country, more attention is being paid to industrial biotechnology, biofuels, biorefineries, chemical industry, transport, and recycling. These areas are mainly within the scope of the so-called grey bio-economy.

The most comprehensive and extensive definition is the one formed in 2012 by the European Commission due to developing the strategy of using renewable biological resources in various sectors of economy (EC, 2012). According to this definition "bio-economy is the sustainable production of renewable biological

resources and their processing into food products, feed and industrial goods and into bioenergy, which is based on agronomy, ecology, food sciences, social sciences, biotechnology, nanotechnology, ICT and engineering and includes agriculture, forestry sectors, fishing industry, food, pulp and paper production as well as elements of the chemical, biotechnology, energy and transport sector" (EC 2012, Chylek, 2012).

The definition of bio-economy given by the European Commission is not final. Conditions are constantly changing, new products and solutions are appearing and concepts of development are modified. In the years 2015-2016, a number of new reports were published resulting from research and deliberations of various conferences of Standing Committee on Agricultural Research (SCAR).

In the SCAR's report presented at the conference "Sustainable agriculture, forestry and fishing industry in bio-economy - challenges for Europe" in October 2015 in Brussels there appeared new elements related to bio-economy, which were confirmed by the IV Cyclical Conference in April 2016 in Utrecht, where a document in the form of a manifesto entitled "European Bio-economy Stakeholders Manifesto" was prepared. In this document, attention was paid to the need of efficient management of raw materials and recycling in a closed circuit - from production through use in order to dispose and process of waste, i.e. the so-called "from cradle to grave" concept; forming a hierarchy and applying the principle of cascading in the biomass chain; creating and strengthening the concept of "product life cycle" and "value chains" within the scope of bio-economy. All these depictions draw attention to the need to strengthen the meaning of the term "sustainability" in the development strategies, i.e. the offsetting and durability, as well as the importance of innovation and participation in actions implementing strategies.

Development factors of bio-economy

Bio-economy is a concept embedded in practical activity and in attempts to describe it scientifically. As a consequence, this description leads to its further use in the activity being aimed at improving the practical activity. Taking this into account, bio-economy can be regarded as (Adamowicz, 2014):

- a separate sector of modern economy;
- a new analytical and cognitive concept of scientific nature;
- a cross-sector, strategic form of analysis and programming of practical and scientific activities.

The first look shows that bio-economy is a capacious and rapidly growing sector of modern economy, which uses biological resources in the economic processes - living organisms, biotechnologies, bioproducts and bioprocesses to produce new products and services. The bioproducts used are manufactured in different branches of the economy - agriculture, forestry, fisheries, aquaculture etc. Using new products goes far beyond the realm of food production, especially in the sphere of production of medicines, industrial products and energy.

The second view concerning the concept of bio-economy means that it is treated not as a new theoretical concept but rather as a new concept concerning an analytical and cognitive view on the economy, which grew out of the needs of science and practice, and helps scientists conduct research and makes it possible for recipients to understand the nature and relations between the various components. This is not an entirely new, although revised, expanded and adapted to modern needs view of reality compared to, for example, the concept of agribusiness and food economy. A new challenge for this concept is to integrate it with the concept of sustainable development.

A third aspect says that bio-economy is a strategic form of intelligent actions enrolling in interdisciplinary planning and funding of research and use of human capital. Bio-based economy may also be perceived as a creative development and new uses of previously known development concepts relating to agribusiness, agriculture and rural areas with extension to other sectors: forestry, fisheries, manufacturing and energy use of waste.

In reference to various approaches to the concept of bio-economy, several groups of premises for the formation and development of bio-economy can be differentiated. Each new concept is an outcome of the past; it has its roots in practical activities and activities attempting to describe it in a scientific manner. By trying to describe bio-economy in a scientific manner one should pay attention to the three most important groups of its creation: general premises, conditions in the field of science and technology, conditions referring to the previously separated theoretical approaches (Chylek, Rzepecka, 2011; EC, 2012; Golebiewski, 2013; McCarmick Kautto, 2013).

The group of general conditions includes population growth, improved incomes and general welfare, diversification of consumer preferences, production capacity, usage of new technologies, searching for rational management of resources and new sources of energy, internationalization and globalization of economy, the development of international integration etc.

Despite different trends in the regional system, there is a further increase in the world population. In many countries, there was an improvement of incomes and general wealth of the population. This applies especially to a large group of developing countries that have undergone or are undergoing a socio-economic transformation. This results in an overall increase in the demand and the diversity of consumer preferences. To ensure food security and to meet

greater and more diverse demand, it is not enough to implement conventional methods and techniques of production. The degree of processing of biological resources is expanding, new branches of processing are developing and new products emerge. Development of various forms of progress and new technologies increase production capacity, market supply and variety within production offer. This allows reducing the barriers in the growth of agricultural production and other forms of production, associated with the use of biological materials resulting from slower growth of food consumption with the increase of population income.

At the same time, more widely recognized is the need for rational management of available resources, especially non-renewable ones. The need for multiple use of raw materials through the creation of organized forms of recycling and modern waste management increases. The most important aspect is refraining from relying on non-renewable energy sources and transition to the wider use of renewable energy. The presented phenomena are becoming increasingly common in every country and in every place due to processes of internationalization and globalization of economy and support created by the process of international integration, thanks to the signing of global agreements concerning international trade, environmental protection and climate change. Problems shown become the subject of conscious development of strategies of sustainable development in individual countries as well as internationally. The most mature forms of these activities on an international scale in a variety of strategies and development policies have been developed in the European Union and individual Member States of this organization.

The development of bio-based economy facilitates rapid development of science technology and technology, particularly in the field of biological sciences and computer science. Initially, researches and scientific achievements

had a great influence on genetics and molecular biology, as well as biotechnology industries. Currently, modern technologies providing the possibility to manufacture new products from biomass are getting increasingly popular. Using a range of colours, you can talk about green, red and blue biotechnologies, referring to the colours of green mass of crops and forest plants, animal products or products resulting from fishing in inland and seawaters. There is also mentioned about pure industrial biotechnologies, white in the pharmaceutical industry and health care, and grey in the manufacture of special chemicals or energy. Black technologies used in the processing of waste and wastewater treatment as well as recycling are currently of greater significance.

Modern biotechnologies increase the opportunities of manufacturing new materials and products, for which raw material is the biomaterial used in various sectors of the economy. The whole process of development and use of biotechnology enables and facilitates the development of microelectronics and utility systems, data processing and communication between the participants of economic processes and research and development. Especially effective communication processes occur in developing network systems in the economy and society.

The basic premise for the concept of bio-economy is the need to seek out how to move from a traditional economy based on fossil fuels to an economy based on renewable biological energy sources to bio-economy and bio-society, the development of which will be driven by research and innovation on biological renewable energy sources. The term "bio-economy" means the economical use of biological resources of sea and land, as well as waste and re-using them in the production processes (Adamowicz, 2014).

The phenomena described above have been noticed by government bodies managing the process of integration in the European Union and

used in programming and implementation of development plans of the European Communities. A new concept of bio-economy and KBBE was introduced to the practice of programming, forecasting and modelling the development of the strategic dimension, both at EU level and in the Member States.

Prerequisites for development of bio-economy grown on the grounds of theory and analysis of scientific evidence and implementation are important in terms of science. Scientific roots of the bio-economy concept can be linked to three theoretical notions and associated practical activities: theory and practice of agribusiness and food economy, the theory and practice of sustainable development, which is still widespread and valid, mentioned in numerous papers and scientific publications, and the theory of regional development, which gives rise to the choice of specialization of the region, especially important for the development of the outermost regions.

The theory of agribusiness and food economy as well as the theory of sustainable development are well known to agricultural economists and therefore do not require a broader interpretation. The issue of the development of the outermost regions is also a common subject of interest to experts involved in the development of agriculture and rural areas. The theory of regional development, giving rise to the choice of region specialization is particularly essential for the development of outermost regions.

The roots of the bio-economy concept are also found in conscious activities of European Union authorities, particularly in analyses, reports, plans and strategies developed by them, which aim at developmental convergence of Member States.

Bio-economy as a tool for planning development strategies

The basis for the development of the European bio-economy concept may be found in

documents of the European Union gathered in the years 1993-2007. The first one was the so-called White Paper published in 1993, reflecting the need to develop non-tangible, knowledge-based investments, which also included biotechnologies. The Lisbon Agenda adopted in 2000 outlines a strategy for the development of knowledge-based economy (EC, 2000), competitive to the US. In 2002, the European Commission stated that natural sciences and biotechnology are probably the most future-oriented technologies to achieve the objectives of the Lisbon Agenda. In 2005, the European Commission outlined the "New Perspectives on Bio-economy"; and in 2007, the European Council outlined the perspective of the development of bio-economy for the next twenty years (German Presidency, 2007). These events helped establish the concept of Bio-economy based on knowledge used in the circles shaping European development policy (McCormic, Kautto, 2013).

Since the beginning of the second decade of the twenty-first century, in 2010-2012, the European Union took steps to establish a new development strategy for 2020-2030 (Adamowicz, 2014). The basic document defining the future of Europe was a "Strategy for smart, sustainable and inclusive growth-Europe 2020", which was related to a plan to provide sustainable bio-economy (EC, 2010). The document entitled "Innovation for Sustainable Growth: Bio-economy for Europe" presented the concept of sustainable use of renewable biological sources in different areas of the economy, especially agriculture, forestry, fisheries, manufacturing, waste food, energy, materials management and other branches of industry (EC, 2010). The plan also involves the EU Framework Horizon Programme for Research and Innovation 2020 (EC 2012), which takes into account the need to increase public funding from scientific research and innovation on bio-economy. It concludes that bio-economy has become an

important area of interest of EU bodies and is associated with the implementation of various community policies and national policies of the Member States. The concept of bio-economy is being constantly supplemented and enriched with new elements.

In formulating the concept of bio-economy, the European Union included it in the sphere of strategic actions meeting the challenges of today. Implementation of one of the main strategic objectives, which is the transition of the economy's dependence on fossil fuels to make a full use of renewable energy sources and materials by integrating the activities of science, the economy, the state and civil society, can be done by the following activities (ETP, 2010).

- Acceleration of basic knowledge combination and the development of new technologies and uptake of innovation. This can be achieved through increased research, better education and implementation activities. Creating systems, network layouts and business development can play a key role.
- Development and implementation of new, adequate economic structures, an efficient risk management system and implementation of international cooperation.
- Building a solid foundation for the continuity of progress by developing research programs, encouraging innovation, improving the functioning of markets and targeting educational programs.
- Obtaining broad acceptance and social support for the implementation of the concept of bio-economy and its continuous improvement.

The new European bio-economy concept developed in the years 2011-2012 sought to overcome many of today's challenges and introduced appropriate strategic actions. Transformation of the theoretical concept of bio-economy into an efficient system of practical actions requires integrated actions of politicians,

businessmen, scientists, activists, local government, investors and other stakeholders and ordinary citizens. To accomplish this, functioning information systems, targeted educational activities, adequate systems of support and promotion, the availability of financial resources and favourable climate and social dialogue are needed. It is also necessary to implement an adequate system of organization and management in chains and networks of bio-economy as well as monitoring and evaluation. An important step was the creation of a special system of bioeconomical and biotechnological platform for knowledge called BECOTEPS. In the sphere of science, the European program for research and innovation "Horizon 2020", the European Institute of Innovation and Technology were launched. Organizational support for strategic activities is also created by the Standing Committee for Agricultural Research SCAR, Foresight conferences, through which the EU concepts of practical actions are transmitted to individual countries.

The European strategy and action plan for bio-economy up to the year 2020 assumes the implementation of various objectives that can be specified as follows (EC, 2010):

- strengthening European leadership and creativity in the field of biological sciences;
- optimizing the system of innovation and knowledge transfer;
- testing to ensure a safe, accessible and well-balanced food;
- implementing sustainable systems of rural economy and water;
- improving production and distribution of agricultural products and food;
- maintaining the competitiveness of European agriculture and food processing;
- developing low-carbon industries;
- reducing greenhouse gas emissions and waste.

Objectives specified above in conjunction with other strategic programs on innovation, natural resources, finance, research and sectoral policies (agriculture, fisheries) outlined until the year 2020 are a key element of the smart, sustainable programme, inclusive of all growth in Europe (EC, 2012). It was assumed that defining the concept of bio-economy will create new opportunities and impulses for economic growth, increase employment, enhance the environmental, economic and social sustainability of rural, coastal and industrial development.

The European strategy for the development of bio-economy in documents from 2012 was based on three pillars (EC, 2012):

- investment in research, innovation and skills in the field of bio-economy financed from EU funds, both national and private, and the search for synergies with other initiatives and politicians;
- strengthening the interaction and political coordination, as well as greater involvement of stakeholders through the establishment of the panel and the Bio-economy Observatory, and regular organization of conferences and consultations of stakeholders;
- development of markets and competitiveness in bio-economy sectors by the sustainability of primary production and conversion of waste streams into value-added products as well as through mechanisms of mutual learning in order to improve production and management.

By introducing the concept of bio-economy and its development, the European Union tried to reinforce the belief that Europe is the world leader in various areas of bio-economy and related technologies. This applies especially to biotechnology in the chemical industry, the food industry and the feed industry. However, in this regard you can observe strong competition from other highly developed countries. It was

attempted to reshape areas of different development policies and to strengthen the relations between them while implementing the concept of bio-economy. New support institutions such as the European Platform Panel and the Bio-economy Observatory are supposed to serve it. The development strategy is also made into a practical action plan. A plan for the bio-economy strategy includes main activities leading to the achievement of strategic objectives using existing programs and policies, including the common agricultural policy, regional policy, industrial, environmental, climate, energy and other policies.

Prospects for the use of the concept of bio-economy

One of the biggest challenges of the present, both in economic and political terms, facing the European countries and other countries in the world is to focus the economy on a sustainable development through the use of human-friendly and eco-friendly, innovative and efficient techniques and technologies in the use of natural resources. Using the achievements of science and technology for development purposes within the framework of sustainable production systems should include an important element of such a system like bio-economy. A number of documents of EU institutions on the European Strategy Development and currently on-going discussions and activities on the preparation of a variety of formal legal and organizational solutions that can be used by member countries have drawn attention to the validity of such concepts. One example of such actions is conferences of the Standing Committee for Agricultural Research (SCAR), where new research results on bio-economy are presented. According to the preliminary report of the Foresight group of experts presented in the spring of 2015 on SCAR conference, bio-economy has the potential to solve problems such as food security, sustainable management of resources,

reducing dependence on non-renewable resources, reducing adverse climate change, creating jobs and remaining competitive.

In 2016, the European Commission has announced a revision of the Communication of 2012 called "Innovation for Sustainable Growth; Bio-economy for Europe" (COM 2020/60), which explained the concept of European bio-economy. The new bio-economy packet in closed circulation assumes the following:

- developing environmental standards for secondary raw materials in order to facilitate their identification and increase the potential for their use in the single market;
- implementing the strategy on plastics in the economy by a closed circulation relating to the issue of recycling, biodegradability and the presence of hazardous substances in plastics and the goals of sustainable development in terms of reducing the amount of waste in the sea;
- measures to reduce food waste;
- changes concerning the characteristics of organic fertilizers and used from waste, and supporting the role of biological ingredients in fertilizers;
- promoting the re-use of waste water.

Implementation of the foregoing solutions is aimed to achieve higher rate of recycling of municipal waste and packaging waste by 2030. This will also reduce waste stream destined for disposal by 2030. A total ban on storage of sorted waste is also assumed. Building the economy in a closed circulation will have a significant influence on reducing the negative impact of the life cycle of products on the environment. This strategy will create real challenges for households and small and medium-sized enterprises.

Conclusions

The development of the concept of bio-economy and its use in building development

strategies and the implementation of economic development policies and sectoral policies both in the EU and the individual Member States and regions is essential for further activities in the following areas.

- 1) Functioning and development of agriculture, agribusiness and rural areas. Agriculture and food industries in Poland are key areas of economic impact and social development within bio-economy. Bio-economy strengthens the role of other industrial and energy sectors, which are included in development strategies.
- 2) Bio-economy is a category that is significant for the formation of specialization in regional development. Particular countries and regions have established the so-called smart development specializations among which bio-economy is clearly marked, as a whole or its particular elements.
- 3) The concept of bio-economy had a significant influence on the choice of leading directions and on the scale of supporting the research, implementation and innovation activities. At the EU level, it was reflected in the Horizon 2020 research. In Poland, a research program called Biostrateg has been launched.
- 4) An important effect of the development of bio-economy is its contribution to the creation of economic value and strengthening the competitiveness of entire countries, sectors and branches that form a complex bio-economy. The competitive relationship between the partners changes in the chains forming products of bio-economy.
- 5) Bio-economy can have an important function of integrating various economic sectors. It can also be an important factor in strengthening international integration. What is needed is research on bio-economy and conscious support of its development.

Bibliography

1. Adamowicz, M., (2014). European Concept of Bioeconomy and its Bearing on Practical use, Economic and Regional Studies Volume 7 No 4.
2. Bas Eichaut Saerates Schauten. Concept van den Biobased Economy, [http:// biobasedeconomy.nl](http://biobasedeconomy.nl)
3. BECOTEPS (2010). Bio-Economy Technology Platforms.
4. Chylek, E. K., Rzepecka, M., (2011). Biogospodarka – konkurencyjność i zrównoważone wykorzystanie zasobów, Polish Journal of Agronomy 7, pp. 3-13.
5. Chylek, E., (2012). Biogospodarka w sektorze rolno-spożywczym. Przemysł spożywczy 5, pp. 34 – 35.
6. DEFRA (2007). UK Biomass Strategy, White Policy Paper, London.
7. EC (1993). EC; Growth, Competitiveness, Employment: The Challenges and Ways Forward into the 21st Century. White Paper, COM (93) 700 Belgium.
8. EC (2000). The Lisbon European Council: An agenda of economic and social renewal for Europe: Brussels.
9. EC (2010). Bioeconomy Europe 2020. A Strategy for Smart, Sustainable and Inclusive Growth, Brussels <http://european.eu/2020>.
10. EC (2012). Innovating for Sustainable Growth: A Bioeconomy for Europe, Brussels.
11. En Route to the Knowledge-Based Bio-Economy. 2007 Cologne Paper: <http://www.bio-economy.net/reports>.
12. ETP (2011). THE EUROPEAN BIOECONOMY IN 2030 Delivering Sustainable Growth by addressing the Grand Societal Challenges.
13. Europa Bio (2011). The Bioeconomy for Europe: Innovating and Sustainability
14. European Bioeconomy Stakeholders Manifesto, (2016) Dokument będący wynikiem konferencji w dniach 12 – 13 kwietnia 2016 r. w Utrechcie, dotyczący biogospodarki.
15. German Presidency (2007). En Route to the Knowledge-Based Bio-Economy, German Presidency of the Council of the EU: Cologne, Germany.
16. Golebiewski, J., (2013). Zrównoważona biogospodarka – potencjał i czynniki rozwoju, IX Kongres Ekonomistów Polskich.
17. Hilgartner, S., (2007). Making the Bioeconomy Measurable: Politics of an Emerging Anticipatory Machinery, BioSocieties, pp.382-386.
18. Maciejczak, M., Hofreiter, K., (2013). How to define Bioeconomy, *Roczniki Naukowe SERIA, volume XXV, book 4*.
19. Martinez, J., (1998). Genomics and the World's Economy, *Science Magazine*, vol. 281no 5379 pp. 925-926.
20. McCormick, K., Kautto, N., (2013). The Bioeconomy in Europe: An Overview, *Sustainability No 5*.
21. Menard, K., Eberle, H., Schmidt, O., Vanhemelrijck, J., Viaggi, D., (2011). Assessment of the impacts of the European Bio-Based Economy, Expert Report for AG Research EU Commission, Brussels.
22. OECD (2006). The Bioeconomy to 2030: Designing a Policy Agenda, Scoping Document, Paris.
23. OECD (2009). The Bioeconomy to 2030: Designing a Policy Agenda, Main Findings, Paris.
24. Schmidt, O., Padel, S., Levidow, L., (2012). The Bio-Economy Concept and Knowledge Base in a Public Goods and Farmer Perspective, *Biobased and Applied Economics* (1) pp. 47-63.
25. The White House (2012). National Bioeconomy Blueprint, Washington DC.

DEVELOPMENT OF ENVIRONMENTAL REGULATIONS AND BENEFITS ON ENTERPRISES

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Abstract. The Porter Hypothesis is one of the most controversial views and has received a lot of attention since it was written by M.Porter in 1991. His ideas were strikingly similar to some of the environmental policies developed in Latvia since 1990's. There have been advanced market based environmental regulations implemented in Latvia, and as current data shows, it was quite beneficial to the private enterprises as well as state and municipal entities. As monitoring data for Climate Change Financial Instrument implementation have become more available there were opportunities for analysis of them and also in relation to Porter Hypothesis statements.

This research article provides analysis of the benefits to the enterprises participating in the specific environmental programme as well as public sector entities during the programme. Total impact of the programme based on the European Commission guidelines on Cost Benefit Analysis and European Investment Bank value estimates were calculated, and further research was analyzed. In addition to intangible benefits, the results show clear financial benefits to the enterprises and public sector.

Key words: Porter hypothesis, environmental regulations, entrepreneurship.

JEL code: Q50, Q51, Q58, M1

Introduction

The economy of Latvia has been in rapid development since beginning of 1990s. The same can be said about the environmental regulations. During these years there has been the continuous discussion whether the environmental regulations are having an impact on enterprises. This item has been used in wide range of conferences, discussion forums or when something is delaying construction project. But there is no clear understanding whether that is true and what quantifiable impact on enterprises is.

As the latest research regarding to this shows there are difficulties in estimating costs or benefits from environmental policy measures as there are not a sufficient data available or the data are not available at all. In the same time Latvia has reached quite high results in overall environmental performance, for example 22 place in the world in 2016 in Environmental Performance Index (Hsu *et al.* 2016).

Interestingly M.Porter in almost the same time (1991) formulated his view regarding the environmental policy and its impacts on enterprises which has since that time become known as "Porter Hypothesis". It is still controversial as a statement and has been analysed from different theoretical and empirical

viewpoints, but the analysis of his view is showing striking similarities with the opinions in Latvia regarding impact on enterprises financial results and benefits. In the same time substantial number of European level environmental regulations currently are following the ideas stated in the Porter Hypothesis.

In the latest empirical studies there was not enough information delivered on how this impact is evaluated for specific region of Central and Eastern Europe or so called "Countries in transition Economies". It is important as most of available data up to now does not include these economies. As stated by Sylvia Albrizio, Enrico Botta, Tomasz Koźluk and Vera Zipperer (2014), wider country coverage is required as currently almost all of the existing evidence uses data from developed countries.

In this article, the authors will provide an analysis of the most recent data available of a market based instruments of the environmental regulations implemented in Latvia and provide the suggestions for further research.

The authors research hypothesis states that the market based financial instruments, when looking from the Porter Hypothesis narrow approach are beneficial not only to economy as whole but also to enterprises and public sector entities.

The research will focus on the analysing of quantitative data and beneficiaries of market based environmental regulatory policy, specifically Climate Change Financial Instrument (KPFI) as monitoring information for this programme is currently providing most up to date information, year 2015 being with the most of activities providing full monitoring reports.

The monitoring data will be evaluated based on the methodology applied by the European Commission in the Guidelines to Cost Benefit Analysis and European Investment Bank value estimates.

The quantitative data analysis in this article is limited to the current data collected by Ministry of Environmental Protection and Regional Development of Latvia from the beneficiaries and enterprises implementing Climate change policy measures.

Research results and discussion

1. Theories in the background

There has been a long period of time since Michael Porter articulated his view that "Reducing pollution is often coincident with improving productivity with which resources are used". From this reasoning, Porter argued that "properly designed environmental regulation can trigger innovation that may partially or more than fully offset the costs of complying with them" (Porter, van der Linde, 1995). This has come to be known as the Porter Hypothesis. But there still are controversial views regarding Porter's idea.

Initially, the Porter Hypothesis was backed by anecdotal examples collected by the authors, without a rigorous theoretical explanation of the factors at work or any comprehensive empirical evidence – many of these were developed only subsequently (Ambec *et al.* 2013; Desrochers 2008).

As argued by Oates, first, the evidence initially provided in its support was based on small number of enterprise case studies, in which the enterprises were able to reduce both their pollution emissions and their production costs. As

such, it can hardly be generalized to the entire population of enterprises.

Second, economists would suggest that, in a perfectly competitive economy, if there are opportunities to reduce costs and inefficiencies, enterprises could identify them by themselves without the help of the government (Oates *et al.* 1995).

Porter's original concept focused on enterprise-level activity, emphasizing the potential "optimistic" aspects of gains in productivity, profitability and competitiveness gains induced by environmental regulations. Examples cited in the original work concerned mainly improvements in production processes through the development and adoption of new technologies and cost-savings. However, particularly at a more aggregate level, productivity improvements may actually come from the cut-back or outsourcing of less efficient activities and the exit of less efficient enterprises – with more general economic outcomes hinging on issues such as a swift reallocation of resources (Albrizio *et al.* 2014). Following Porter and van der Linde (1995), enterprises do not detect the potential of environmental innovations because they are "... still inexperienced in dealing creatively with environmental issues. Environmentally and economically benign innovations are not realised because of incomplete information, organizational and coordination problems. Enterprises are not able to recognize the cost saving potentials (e.g. energy or material savings) of environmental innovation so that for example Environmental Management Systems may serve as a tool to detect the lacking information."

The arguments backing Porter's Hypothesis are often behavioral - based on the idea that managers may be risk averse, myopic or rationally bounded and hence may not be able to realize all profitable investment opportunities. Other arguments include the presence of market failures, such as imperfect competition (due to

first-mover advantage or barriers to entry), asymmetric information (where "green" products are not correctly valued by consumers), R&D spill-over effects (as innovation has a public good character and leads to underinvestment), and organizational failure (where managers are able to lie about the true abatement costs in order to secure extra personal profits). Hence, in each such case, environmental regulation may potentially induce investments which turn out to be profitable *ex post* (Constantos, Hermann 2011; Hovardos, 2016).

In an attempt to better categorize empirical testing approaches, the Porter Hypothesis has been differentiated into weak, strong and narrow versions (Jaffe and Palmer, 1997):

- In the weak version of the Porter Hypothesis environmental regulation will lead to an increase in "environmental innovation", that is more innovation directed at minimizing the costs of the environmental input/output subject to regulation (as implied by Hicks 1932). An increase in "environmental" innovation may come from a pure redirection of innovation efforts, without any net increase in the latter.
- In the strong version, the costs saved from innovation and the improved production processes will outweigh compliance costs, leading to increased productivity, profitability and competitiveness.
- In the narrow version, more flexible environmental policy instruments - designed to target the outcome rather than the design of the production processes - are more likely to increase innovation and improve enterprise performance.

However, during the last 20 years, a vast literature has proposed many theoretical justifications for the Porter hypothesis. These include behavioral arguments (the interests of enterprises and managers might not align, and regulation forces managers to adopt innovations

that are profitable for the enterprise but do not increase the manager's utility) or the existence of additional market failures such as market power or knowledge spillovers (Lanoi *et al.* 2011; Ambec *et al.* 2013). Along with these theoretical developments, there has been a large amount of the empirical researches works investigating the validity of the Porter hypothesis in practice.

According to Dechezlepretre and Sato (2014) and Visser (2015) the result of current state of research on environmental regulations and impact on enterprises can be finalized into following:

- environmental regulations make a small difference to productivity and employment;
- environmental regulations only marginally affect international competitiveness;
- the benefits of environmental regulations often vastly outweigh the costs;
- environmental regulations induce innovation in green technologies;
- switching to green technologies can have economy-wide benefits.

As they and Rexhauser and Rammer (2014) as well as von Weizsacker *et al.* (2009) argue, a key area for the future research is to identify where environmental regulations can be strengthened to deliver clear social benefits, in terms of health or new technologies, with little risk for reducing competitiveness. Because policies can affect sectors differently, this should be assessed on a sector-by-sector basis, depending on the abatement opportunities available and the level of competition the sector is exposed to. For each sector, policies will need to be tuned to balance the policy goals with the multiple impacts of environmental regulations on pollution, employment, trade, productivity and innovation.

2. Porter hypothesis. A case for Latvia

There has been important development of environmental legislation in Latvia during the last 15-20 years. As it was mentioned earlier there is

a coincidence that basis for the Porter Hypothesis was developed as Latvia started to develop market economy and all regulations in the same time. Substantial efforts were made to develop environmental regulations according to the best available examples from Western European countries. Alongside with development of environmental regulations some interesting market based instruments were created according to the European Union and the Kyoto Protocol guidelines.

As stated by the United Nations (UNFCCC:2, 1998): "Policy makers can use insights from empirical analysis to evaluate environmental regulations against their objectives". This information is particularly useful with often intense political and lobbying pressures governments face when formulating environmental regulation (Albrizio *et al.* 2014). For example, the Kyoto Protocol states that "the Parties strive to implement policies and measures in such a way as to minimize adverse effects, including the adverse effects of climate change, effects on international trade, and social, environmental and economic impacts on other Parties, especially developing country Parties..." (UNFCCC:3, 1998).

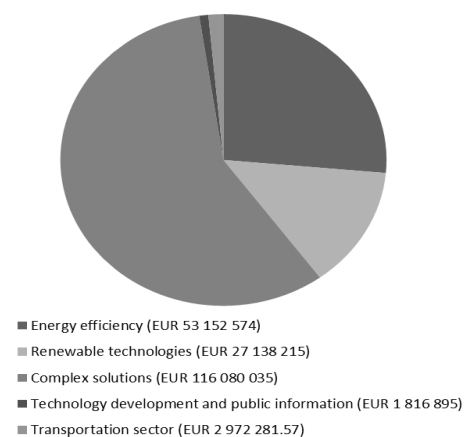
For the most of time this new set of regulations for Latvia was taken as given. There were no specific analysis as data for impact on enterprises and industries were missing. Estimates for impact were analysed based on available examples from Western European countries provided by the EU experts. So, the different EU wide environmental policies were applied but evaluation of the data was not done sufficiently. Only now after long period of time we are seeing sufficient ex post data from enterprises and industries (Atstaja *et al.* 2012).

To implement Kyoto Protocol in national legislation, Latvian Law on Participation of the Republic of Latvia in the Flexible Mechanisms of the Kyoto Protocol was adopted in 08.12.2007. It relates to a narrow version of empirical

approaches according to Jaffe and Palmer (1997), as there are set targets but not set limits. The purpose of this Law was to promote the prevention of climate change, adaptation to the consequences caused by climate change and to facilitate the fulfilment of the commitments for the reduction of greenhouse gas emissions assigned to the Republic of Latvia in the Kyoto Protocol (Cabinet of Ministers of Latvia, 2007).

As it is shown in the Table 1, initial estimate for total amount of financial gain to the Latvian state budget would be at 153.8 million EUR for total programme period, but according with the information provided by Ministry of Environmental Protection and Regional Development (MEPRD) in 2016, the exact amount of revenue to the Latvian state budget for subsequent implementation was 208 million EUR. (MEPRD, 2016).

There were in total 9 contracts signed from 2009 till 2015 for sale of total of approximately 40 million of assigned amount units (as named and described in the law) and the received almost 202 million EUR were invested in projects according with the goals of the programme.



Source: MEPRD report, 2016

Fig. 1. Sectors of KPFI programme implementation activities 2007-2015

In 2016, there were 3 full periods of monitoring of project results and as the data were provided by MEPRD on each and specific project, an evaluation of impact to enterprises and economy level was made.

Table 1

Latvian State budget income and expenditure initial estimate from implementation of KPFI (2007-2012), thous.EUR

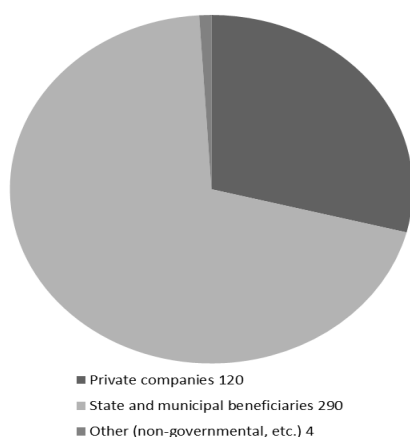
Budget position	Current year 2007	2008	2009	2010	Average for next 5 years after current year
1	2	3	4	5	6
Change in state budget income	0	39840	49801	49801	39481
Change in state budget expenditure	0	171	24189	49801	39481

Source: authors recalculation based on Annotation to the Law on Participation of the Republic of Latvia in the Flexible Mechanisms of the Kyoto Protocol (as adopted on 08.12.2007)

According to the latest Information report for 2015 provided by MEPRD in April 2016, there were in total 414 implemented projects in 16 different KPFI activities from 2009 till 2015. These do not include special activity to support small scale renewable technology to private housing sector with 2266 separate project implementation contracts signed, as they have different reporting requirements.

Basic information collected is estimated tonnes CO₂ emissions equivalent avoided (t CO₂e) during the year in each beneficiary of the programme (in this case 2015).

Overall structure of KPFI programme beneficiaries by number of participants is shown below in Fig. 2.



Source: Authors calculation based on MEPRD 2016 report

Fig. 2. Beneficiaries of KPFI programme activities 2007-2015

As data shows there were in total 120 private enterprises participating in this programme and the represented all range of businesses in Latvia starting from small sized enterprises till some of largest as for example electricity giant

Latvenergo. Full monitoring information is provided for 90 enterprises out of 120. This provides us with representation of data related to the Porter hypothesis views.

Major share of participants is representing public sector. That includes mostly state level and municipal level educational, social and healthcare institutions. The data provided in the monitoring report shows that not all beneficiaries have provided data on emission reductions, so out of 414 the amount of reduction of CO₂e is not provided for 73 beneficiaries, partly related to low emission transportation activity and its different reporting requirements. There should be some further attention to all beneficiaries of the programme to provide all monitoring data in next reports. In addition cross evaluation of data consistency should be developed.

3. Estimated impacts from the KPFI programme

The KPFI programme provided a number of benefits to participants; most of them can be named but not financially estimated. As mentioned earlier the environmental regulations induce investments in green technologies but switch to them provides economy with wide benefits. The specific benefits identified during KPFI programme are availability of financial support, possibility to substitute old inefficient technology, improve energy efficiency in buildings for public sector and many more. The enterprises gained access to resources, knowledge, know-how, improved human resource in relation to efficiency and effectiveness, most

importantly from authors view – improved their business model and gained some marginal advantage over the other market participants. There is an opportunity for further research how and in what amount they have gained advantage over the other enterprises.

There were also some really practical benefits to small and medium size enterprises, as one of the private beneficiaries mentioned opportunity to invest in new technology instead of buying used one without support from the programme.

To evaluate financial impact of KPFI programme author takes into account the value of CO₂ emission reduction what can be estimated according to methodology provided by European Commission in "Guide to Cost-Benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020 (Guide)". As stated by Corina Cretu, the European Commissioner for Regional Policy: "Evidence-based and successful policy requires making investment decisions based on objective and verifiable methods. This is why the Commission has been continuously promoting the use of Cost-Benefit Analyses for major infrastructure projects above 50 million EUR. For the first time, in the 2014-2020 period, the basic rules of conducting CBAs are included in the secondary legislation and are binding for all beneficiaries (European Commission:11, 2014)."

According to the methodology provided in Guide (European Commission:62, 2014) t CO₂e emissions should be multiplied by a unit cost expressed in EUR/tonne. It was suggested to use the values illustrated in Table 2, for the central scenario, going from EUR 25 per tonne of CO₂e in 2010 and then assuming a gradual increase to EUR 45 per tonne of CO₂e until 2030. As stated in the Guide - due to the global effect of global warming, there is no difference between how and where in Europe greenhouse gases (GHG) emissions take place, and this applies to all countries. However, the cost factor is important as it was estimated that emissions in future years

will have greater impacts than emissions today (European Commission: 63, 2014).

Guide has provided data on value of GHG (in tonnes of CO₂e) reduction estimate. It was based on European Investment Bank (EIB) special analysis report (EIB, 2013) where data and methodology from major EIB supported projects were analysed.

Table, 2

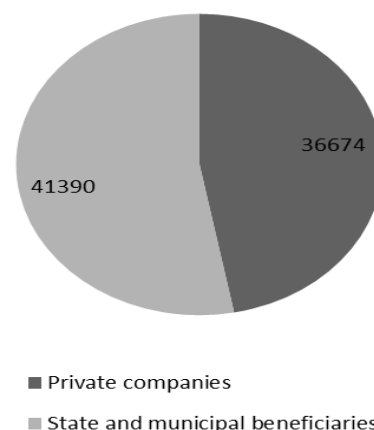
Unit cost estimates of different scenarios for calculation of GHG emissions for Cost Benefit Analysis needs, EUR

Scenarios	Value 2010 (Euro/t CO ₂ e)	Annual adders 2011 to 2030
High	40	2
Central	25	1
Low	10	0.5

Source: Guide 2014, EIB 2013

As data show, unit cost estimate for GHG emission reduction (in tCO₂e) was calculated at 50/30/12.5 EUR for 2015.

Authors then calculated total amount of emission reduction by private enterprises and state and municipal beneficiaries in year 2015 as seen in Fig. 3



Source: Authors calculation based on MEPRD 2016 report

Fig. 3. GHG Emission reductions per sectors of beneficiaries in 2015, tCO₂e

Data shows that the private enterprises implemented 90 out of 414 projects (21.7 %). When looking at the reduction of tCO₂e, their share is increasing to 47.0 % out of total.

As the amount of emission reduction for year 2015 has been established, the value of benefits can be calculated.

Table 3

Value of benefits to private enterprises and public sector from CO₂ reduction in 2015, EUR

Scenarios	Value 2015 (Euro/t-CO ₂ e estimate)	Value of benefits by private companies	Value of benefits by public sector
High	50	1 83 37 14	2 06 94 99
Central	30	1 10 02 28	1 24 16 99
Low	12,5	45 84 29	51 73 75

Source: authors calculation based on Guide, 2014, EIB, 2013 and MEPRD, 2016

As the Table 3 results show, the implementation of CO₂ emission reduction is providing a substantial amount of benefits, if looking at Central estimate – 1.1 million EUR to private enterprises and 1.2 million EUR to public sector in a single year.

As monitoring reports for 2016 and following year will be available, new data will provide additional insight into the long-term benefits of the KPFI programme.

Authors' research suggests that there are clear benefits from implementation of market based environmental regulations and further research on the topic will provide additional benefit quantification to enterprises based on more detailed analysis of results provided by KPFI programme.

Bibliography

Journal paper with author(s)

1. Atstaja, D., Dimante, D., Livina, A., (2012). Public Activities in Developing Green Economy: Case Studies in Latvia, ISSN 1691-3078, Proceedings of the 2012 International Conference "ECONOMIC SCIENCE FOR RURAL DEVELOPMENT", Jelgava, LLU EF, 26-27 April 2012.
2. Constantatos, C., Herrmann, M., (2011). Market inertia and the introduction of green products: can strategic effects justify the Porter Hypothesis? *Environ. Resour. Econ.* 50, 267–284.
3. Desrochers, P., (2008). Did the invisible hand need a regulatory glove to develop green thumb? Some historical perspective on market incentives, win-win innovations and the Porter Hypothesis? *Environ. Resour. Econ.* 41,519–539.
4. Hovardos, T.,(2016). Two paradoxes with one stone: A critical reading of ecological modernization. *Ecological Economics* 130 (2016), p. 1–7.
5. Jaffe, A.B. and Palmer, K.,(1997). Environmental Regulation and Innovation: A Panel Data Study. *The Review of Economics and Statistics*, 79(4), pp.610-619.

Conclusions, proposals, recommendations

- 1) Up till now there have been difficulties estimating costs or benefits from different environmental regulations in Latvia as there were not sufficient data available or data were not available at all.
- 2) Alongside with development of environmental regulations several market based instruments were created according to the European Commission guidelines. KPFI programme was one of them.
- 3) From 2009 till 2015 aprox. 40 million assigned amount units were sold and state budget received 202 million EUR what were invested in KPFI projects, including 414 large and medium size projects
- 4) In addition to intangible benefits, the estimate for benefit from emission reductions was developed based on the EC Guidelines and EIB estimates.
- 5) The research shows the benefit of CO₂ reduction for private enterprises and public sector based on monitoring data for 2015. Further research would provide estimates of other benefits to enterprises.
- 6) Further research needs to address all market based instruments and comparison to the other countries, what have implemented similar programmes.

6. Lanoie, P., Lucchetti, J., Johnstone, N., Ambec, S., (2011). Environmental policy, innovation and performance: new insights on the Porter Hypothesis. *J. Econ. Manag. Strateg.* 20, p. 803-842.
7. Porter, ME (1991) America's green strategy. *Sci Am* 264(4), p.168
8. Porter M.E., van der Linde, C., (1995) Toward a new conception of the environment-competitiveness relationship. *J Econ Perspect* 9(4), p.97-118.
9. Rexhäuser, S., Rammer, C., (2014). Environmental innovations and firm profitability: unmasking the Porter Hypothesis. *Environ. Resour. Econ.* 57, p.145-167.

Books

10. Visser, W. (2015). Sustainable frontiers:unlocking change through business leadership and innovation. p.46-67.
11. von Weizsäcker, E., Hargroves, K., Smith, M., Desha, C. and Stasinopoulos, P. (2009) Factor 5: Transforming the Global Economy through 80 % Increase in Resource Productivity, Earthscan, UK and Droemer, Germany, p.120-155.

Internet sources

12. Albrizio, S., Botta, E., Koźluk, T., Zipperer, V., (2014), *Do Environmental Policies Matter for productivity growth? Insights from new cross-country measures of environmental policies*, OECD, ECO/WKP. Retrieved: [https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP\(2014\)72&docLanguage=En](https://www.oecd.org/officialdocuments/publicdisplaydocumentpdf/?cote=ECO/WKP(2014)72&docLanguage=En). Access: 17.12.2016.
13. Ambec, S., Cohen, M.A., Elgie, S., Lanoie, P.,(2011) *The Porter Hypothesis at 20: Can Environmental Regulation Enhance Innovation and Competitiveness?*, RFF DP 11-01. Retrieved: <http://www.rff.org/files/sharepoint/WorkImages/Download/RFF-DP-11-01.pdf>. Access: 07.01.2017.
14. Dechezleprêtre, A., Sato, M., (2014), The impacts of environmental regulations on competitiveness. Policy brief; The Grantham Research Institute on Climate Change and the Environment at the London School of Economics and Political Science and Global Green Growth Institute, p.4-22. Retrieved: <http://www.greengrowthknowledge.org/resource/impacts-environmental-regulations-competitiveness>. Access: 15.12.2016.
15. European Commision, (2014) Guide to Cost-Benefit Analysis of Investment Projects. Economic appraisal tool for Cohesion Policy 2014-2020. Retrieved: ec.europa.eu/regional_policy/sources/docgener/studies/pdf/cba_guide.pdf. Access: 04.01.2017.
16. European Investment Bank, (2014). European Investment Bank Induced GHG Footprint. The carbon footprint of projects financed by the Bank. Methodologies for the Assessment of Project GHG Emissions and Emission Variations. Version 10.1. p.28-35. Retrieved: http://www.eib.org/attachments/strategies/eib_project_carbon_footprint_methodologies_en.pdf. Access: 04.01.2017.
17. Hsu, A. et al. (2016). 2016 Environmental Performance Index. New Haven, CT: Yale University. Retrieved: <http://epi.yale.edu/reports/2016-report>. Access: 15.12.2016.
18. Law On Participation of the Republic of Latvia in the Flexible Mechanisms of the Kyoto Protocol (as adopted on 08.12.2007.) Retrieved: www.vvc.gov.lv/.../Flexible_Mechanisms_of_the_Kyoto_Protocol.doc. Access: 04.01.2017.
19. Ministry of Environment and Regional Development of Latvia, (2016). Informatīvais ziņojums „Par Klimata pārmaiņu finanšu instrumenta darbību 2015. gadā”. Retrieved: www.varam.gov.lv/in_site/tools/download.php?file=files/text/KPFI/lik/... Access: 04.01.2017.

GREEN GOVERNANCE PRINCIPLES IN THE DEVELOPMENT OF ENVIRONMENTAL EDUCATION INFRASTRUCTURE

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Abstract. Green governance principles entails perception of the most basic premises of economic, political, and legal orders, as well as cultural orders. It addresses local context and social diversity in structuring social and economic activity and environmental problems that requires understanding of values in social and economic thought to account for nature and social well-being. Environmental education infrastructure integrates basic analysis, critical thinking, and instructs people to evaluate different sides of an environmental issues in order to make necessary every day choices.

The aim of the paper is to investigate interdisciplinary approach of the green governance principles in the local context and discover development of environmental education infrastructure in Latvia. The paper examines the green governance principles reflecting theoretical approach described by Weston B. H., Bollier, Biermann F., Adger N., Jordan A. and environmental education infrastructure theoretical approaches by various scholars Leopold A., Carson L.R., Naess A., Brudtland G.N., Palmer G.N.,J. and Stevenson R.B., Brody M. in order to analyse green governance principles development in the context of environmental education infrastructure integration. As such, the term "environmental education infrastructure" is seldom encountered in the sociological or economic theoretical discourse; therefore, the paper will provide common understanding of environmental education as broader view of environmental governance.

Conclusion of the paper states the green governance principles (green governance collaboration principle green governance sustainability principle, green governance collaboration principle and green governance universal paradigmatic principle) emergence in environmental education infrastructure throughout common and joint action and sustainably based green governance at the local government level in Latvia.

Key words: green governance, green governance principles, green infrastructure, environmental education.

JEL code: Q 58

Introduction

The need for environmental governance to address problems of the Earth's climate challenges or to continue to solve ecosystem services exists on a large scale. By the entry into force of the high-aspiration of the Paris Agreement in 2016, it is provided that governments agree with legally binding limits to global temperature rises and commitments on curbing carbon emissions under the agreement. Green governance principles are essential in order to succeed the commonly agreed goals by governments as well as local governments.

Whilst there are clear differences in definition and interpretation of green governance or environmental governance principles, there are many areas of agreement and consensus. To some extent, environmental education infrastructure can be the basis for some interesting, but largely intellectual debate, which

is surely more important to ensure organisations at levels working towards common and agreed goals in relation to the shared environmental concerns.

Since different disciplines also focus on different sets of benefits provided by green governance and environmental education infrastructure, the current paper will concentrate on a multi-disciplinary approach describing social and economic activity and environmental concerns related with local governments. Green governance principles and sustainable development implementation should be based on local level solutions and initiatives designed with and by the local government. Local level solutions and initiatives become important if we talk about implementation of renewable energy and energy efficiency measures, promoting mobility, innovation etc. local green governance.

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The **research question** explores – whether green governance principles conjunct with environmental education infrastructure in the local context in the European Union and Latvia.

The **aim of the paper** is to investigate interdisciplinary approach of the green governance principles and discover development of environmental education infrastructure in the local context in the European Union and Latvia.

The **tasks of the paper** are following:

- 1) define green governance and green governance principles;
- 2) reveal environmental education infrastructure;
- 3) investigate green governance principles' conjunction with environmental education infrastructure in the local context.

The **research methods** are based on case study research method as a source of theoretical insight that tends to embrace a range of research designs that use governance as an exogenous factor in political environment. Case itself is important for what it reveals about the phenomenon and for what it might represent.

The paper examines the information sources and theoretical discussions regarding the green governance principles reflecting theoretical approach described by Weston B. H., Bollier, Biermann F., Adger N., Jordan A. and environmental education infrastructure construct by various scholars Leopold A., Carson L.R., Naess A., Brudtland G.N., Palmer G.N., J. and Stevenson R.B., Brody M. The research findings are discussed with an emphasis on the analysis of each theoretical construct in synthesis of analyse of green governance principles and environmental education infrastructure integration throughout EU Eco-Management and Audit Scheme (EMAS) study and European Commission report on supporting the Implementation of Green Infrastructure capacity building, training and education in relation to

green infrastructure application to local government level.

Research results and discussion

1. Defining green governance and green governance principles

Defining of green governance principles requires a theoretical foundation of "governance" concept and to reveal "green governance" construct. Green governance and related issues have gained significance in the field of applied social sciences. The concept of governance can be defined in a variety of ways and there is no consensus among academics regarding its core elements (Kersbergen K., Waarden F., 2004; Biermann F., 2010, Adger N., Jordan A., 2009). Kersbergen K. and Waarden F. define governance as "systems of rule, as the purposive activities of any collectivity, that sustain mechanisms designed to ensure its safety, prosperity, coherence, stability, and continuance". However, for Biermann F. refers to a "...new forms of regulation that go beyond traditional hierarchical state activity. It usually implies some form of self-regulation by societal actors, private-public cooperation in the solving of societal problems, and new forms of multilevel policy" (Biermann F., 2010).

Most academics recognize governance as multidimensional and highly contested term. Indeed, many expert views go beyond regulation, government and law, they recognize governance for sustainability, global environmental governance, human development and environmental governance (Adger N.W., Jordan A., Biermann F., Weston B., Bollier D.). By Adger N.W. and Jordan A., governance is related with governance of societies in ways that facilitate sustainability and is likely to be a hugely complicated and politically contested undertaking. Also Delmas M.A. and Young O.R. refer to sustainability and green governance interrelation "shifting the discourse from the conventional idea of environmental protection to

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the new – and still contested – idea of sustainable development that intensifies the growing need for governance" (Delmas M.A., Young O.R., 2009).

Indeed, sustainability is an environmental issue, while it goes beyond measures and regulatory interventions of market responses to keep systems of rule as the purposive activities of any collectivity.

As the global economy and international politics progress (entry into force of the high-aspiration Paris Agreement in 2016), the way it interacts with the social and environmental spheres becomes increasingly evident to society. As such, theorists tend to perceive governance within the concept of green governance (Biermann F., Weston B., Bollier D.). In these studies, green governance elements can be identified to provide the basis for establishing constructs for the collective governance of common goods.

Weston B. and Bollier D. recognize that the collective governance is a necessary instrument of change for a State/Market world order that is failing to act as a responsible steward of our planet (Weston B.H., Bollier D., 2015). From the local to the international level, agency, within the concept of green governance, is not restricted to states and governments, but encompasses the participation of a myriad of public, private and non-state actors (Biermann F., 2010). In Biermanns F. view, the elements can be identified and provide the basis for establishing constructs for the collective governance of common goods or, in other words, green governance.

The concept of green governance provides understanding of integration of actors in the decisions and actions of a group. As such, organized groups develop collective solutions to common resource problems. Actors' involvement and actions of organized group is the basis of all

collective action, since governance must propose actions which promote involvement through non-financial means.

Weston B. and Bollier D. argue that an expanding Commons Sector can help provide an alternative to both state and market. It would provide vernacular law governance dedicated to equitable and sustainable use of resources — what they call "green governance." Instead of private owners free to do things with their property that harm the wider community and environment, or governmental authorities imposing rigid rules and often arbitrary commands, the principles of human rights and environmental sustainability would be built into the basic rules governing the commons and would be applied by people who have a direct interest in their protection (Weston B. H., and Bollier D., 2013).

Furthermore, Weston B. H., and Bollier D. did explained the basic framework of green governance from the Law of Commons perspective that are characterised as law and policy that support rights based on ecological governance (green governance) and developed three distinct interrelated fields - general internal governance principles; macro-principles and policies and legal institutional structures and policies (Weston B. H., and Bollier D., 2015).

According to Ostrom E., any group which has to become organized to obtain collective benefits will discover that there is a minimum organizational cost that must be met, regardless of whether the group has a low-level of formal organization or an informal agreement (Ostrom E, 1990). He designed core design principles, first published in 1990, which remain the most solid foundation for understanding the internal governance of commons as a general paradigm.

Academics Poteete, Janssen, and Ostrom E. summarized and elaborated the key factors enabling self-organized groups to develop

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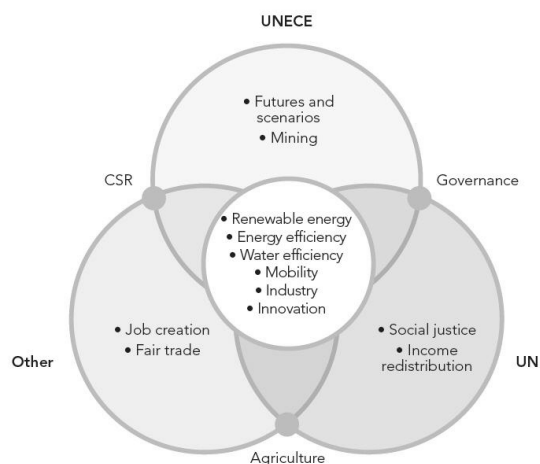
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collective solutions to common-pool resource problems at small to medium scales. Among the most important are the following:

- 1) reliable information is available about the immediate and long-term costs and benefits of actions;
- 2) the individuals involved see the resources as important for their own achievements and have a long-term time horizon;
- 3) gaining a reputation for being a trustworthy reciprocator is important to those involved;
- 4) individuals can communicate with at least some of the others involved;
- 5) informal monitoring and sanctioning is feasible and considered appropriate;
- 6) social capital and leadership exist, related to previous successes in solving joint problems (Bollier D., Helfrich E., 2012).

Any common action cultivates trust and reciprocity and therefore enhances its chances of stable collective management. However, constitutional rules must be seen as fair and respectful. To this end, environmental common rules must embody the values of human dignity.

In the international organizations' view, sustainability, governance and green governance concept relates with institutional arrangements and multilateral environmental agreements as well as environmental performance reviews. There are clearly unresolved issues around the definition and understanding of key terms. Figure below shows how some of these definitional issues overlap from the perspective of the UNECE, the United Nations and other institutions representing Governance, Agriculture and CSR (Corporate Social Responsibility and environmental reporting) interaction.



Source: EEA, 2011 (Green Economy, 2016)

Fig. 1. Defining governance in the context of the Green Economy

Figure illustrates interpretation of governance with some key organisations' assessments in the context of the green economy. However, whilst different countries and organisations define the green economy, green governance and resource efficiency differently, this should not be a reason for inaction but could be the basis for further dialogue.

The key principles of green governance and sustainable development underlying integration of environmental, social, and economic concerns into all aspects of decision making. It is concept of integration that distinguishes green governance and sustainability from other forms of policy. According to the green governance principles, the following characteristics might be recognized:

- 1) sustainable development and collaboration principle;
- 2) collaboration governance principle;
- 3) universal paradigmatic principle of integration and systematization (Dernbach, J. C., 2003).

In order to strengthening the green governance principles' implementation, it requires policy makers and practitioners at local governance level to support knowledge based methods, for instance, knowledge sharing, dissemination of best practices, better

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compliance, awareness raising campaigns. Due to the wide dimension of environmental themes, like climate change, waste management, energy efficiency, CO₂ emissions, the green governance becomes institutionalised within organisational fields, more complex and fragmented (Dernbach, J. C., 2003). Nevertheless, the aim of green governance is to improve the environment essentials in different sectors - buildings, water, transport, public health, industry, climate, rural abandonment and energy.

After compiling and analysing the aspects of green governance construct and their respective theoretical references, furthermore will follow the analysis of environmental aspects and theoretical concepts linking environmental education infrastructure. In order to do so, the last section describes exploratory case study regarding green governance principles' conjunction with environmental education infrastructure in the local context.

2. Understanding environmental education infrastructure

Revealing environmental education infrastructure combines "environmental education" that is recognized by various scholars (A. Leopold, L.R. Carson, Arne Naess, G.N. Brudtland G.N., J.Palmer) and "green infrastructure" as multi disciplinary construct that is encountered in various political documents mostly deliver by the European Environmental Agency.

As such, environmental education is a relatively new and unique field of practice and study recognized as interrelation of the environmental movement combining an ecological orientation with a learning paradigm to provide a vigorous educational approach to environmental concerns (Palmer J., 2003). Indeed, environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges, develops the necessary skills and

expertise to address the challenges, and fosters attitudes, motivations, and commitments to make informed decisions and take responsible action (UNESCO, Tbilisi Declaration, 1978). Environmental education refers to organized efforts to teach about how natural environments function and, particularly, how human beings can manage their behaviour and ecosystems in order to live sustainably.

The previous analysis revealed construct of green governance that relates with decision-making process recognizing the environmental values and norms. According to this statement, the theoretical definition of environmental education regarded as most appropriate revealing aspects of the environmental education infrastructure "environmental education is a process of recognizing values and clarifying concepts in order to develop skills and attitudes necessary to understand and appreciate the interrelatedness among man, his culture and his biophysical surroundings. Environmental education also entails practice in decision-making and self-formulating of a code of behaviour about issues concerning environmental quality" (Stevenson R.B., Brody M., 2014). Environmental education for society and economical sustainability situates local knowledge about practical and theoretical considerations of environment within indigenous people's social movements.

The second component of environmental education infrastructure requires understanding of term "green infrastructure" that is not widely recognised and is seldom encountered in theoretical studies but can be recognized in documents of international agencies (mostly deliver by the European Environmental Agency).

As such, green infrastructure is defined as a strategically planned network of natural and semi-natural areas with other environmental features designed and managed to deliver a wide

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range of ecosystem services such as water purification, air quality, space for recreation and climate mitigation and adaptation. While it is also noted that a network of healthy ecosystems is needed, since it provides cost-effective alternatives to traditional "grey" infrastructure and offers many other benefits for both EU citizens and biodiversity (Communication from the Commission, 2013). Therefore, the environmental education infrastructure offers opportunities for the socio-economic development of local communities. It connects national parks, nature parks and biosphere reserves at the local government's level.

The term "green infrastructure" has been adopted by the various designs. The term is used for a network of green features that are interconnected and therefore bring added benefits and are more resilient. Another common feature is the aim to either protect or develop such networks (The concept of green infrastructure, 2011).

Different disciplines also focus on different sets of benefits provided by green infrastructure.

The focus of the term "green infrastructure" is on the development and protection of networks of green, natural features. Green infrastructure is not only about connecting ecosystems *per se*, but also about strengthening them and their services — which can be done by (re-) connecting measures, but also by improving the landscape's permeability (which implicates different ecosystems).

There are three approaches how green infrastructure can be related with education.

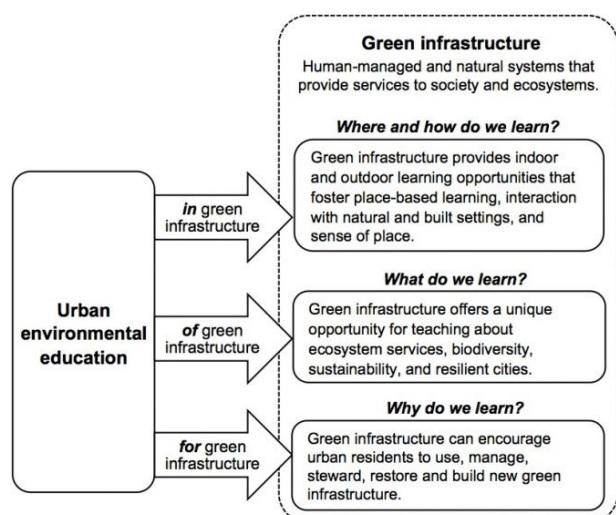
1) Education in green infrastructure refers to the rich opportunities for place-based education in cities. Here we discuss opportunities for using green infrastructure in classroom and after school activities and deepening student contact with and attachment to their local environment.

2) Education of green infrastructure refers to the vast learning opportunities provided by infrastructure projects in cities, where ecosystem services are entangled with human development and can teach fundamental lessons about systems thinking, sustainability, and resilience.

3) Education for green infrastructure focuses on the need for increased public education regarding the benefits of green infrastructure, which could increase public support, management, and stewardship of present and future green infrastructure projects (The concept of green infrastructure, 2011).

The figure Nr.2 below describes green infrastructure as human-managed and natural systems that provide services to society and ecosystems. It asks the main questions – *where and how do we learn? what do we learn? why do we learn?*

The figure No.2 is drafted by the Nature of cities initiative, which provides contribution from around the world, fundamentally multidimensional experts including scientists and practitioners.



Source: The nature of cities, 2016

Figure 2. Urban environmental education in, of, and for green infrastructure

Green infrastructure studies provide a broad array of human and ecosystem services in areas of food, energy, security, climate regulation,

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water management, education, and aesthetics. One of the local green governance aspects is related to the education that is based on green infrastructure development principles.

3. Green governance principles conjunction with environmental education infrastructure in the local context

The research conducted adopted an exploratory perspective. It is based on case study research method as a source of theoretical insight that tends to embrace a range of research designs that use governance as an exogenous factor in political environment. Case itself is important for what it reveals about the phenomenon and for what it might focus on contemporary events within an active context (Yin, R.K. 2009). The paper's research questions explore – *whether green governance principles conjunct with environmental education infrastructure in the local context in the European Union and Latvia?*

The paper examined theoretical discussions regarding the green governance principles and environmental education infrastructure construct; therefore, the research findings will be discussed with an emphasis on the analysis of each theoretical construct in synthesis of analysis of green governance principles and environmental education infrastructure integration throughout EU Eco-Management and Audit Scheme (EMAS) study application at local government level and European Commission report on supporting the Implementation of Green Infrastructure capacity building, training and education in relation to green infrastructure (European Commission report, 2015). In order to attain the aim of the paper, the authors analysed Eco-Management and Audit Scheme (EMAS) supported in scope of the project "Innovative approach in EMAS II implementation in municipalities" study results (Innovative approach, 2007), which was carried out in local governments in Latvia. The EMAS project will be used as environmental education

infrastructure development instrument and reveal implementation of the green governance principles.

In order to describe implementation of green infrastructure education, the authors referred to recently published European Commission report on supporting the Implementation of Green Infrastructure capacity building, training and education in relation to green infrastructure. It underlines integrating green infrastructure into key policy areas, for instance energy, transport, waste management improving the knowledge base and encouraging innovation in relation to green infrastructures, and assessing opportunities for developing environmental education infrastructure. From the green governance perspective, environmental education infrastructure comprises identification of initiatives that already exist across the Member States and educational institutions.

The local governments are responsible for safeguarding the environment, only a few of them implement a truly systematic approach, i.e. take measures that create environmental awareness. However, the measures may be unrelated to the green governance approach or provide an efficient environmental policy: the introduction of improvements in the fullest possible extent of policy implementation.

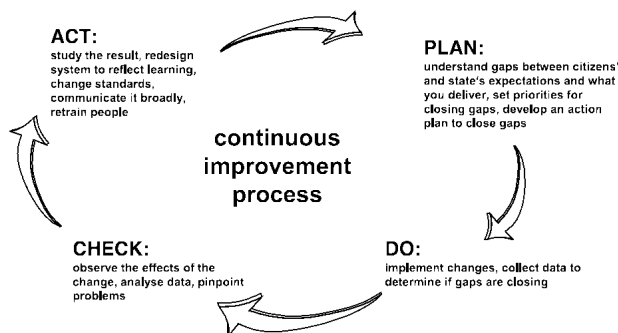
Green governance development process includes – environmental awareness, environmental activities, environmental management, continuous improvement process.

In order to implement a continuous green governance, development process requires commitment, operational structure and routine control. Furthermore, continuous improvement process entails planning, doing, checking and acting.

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Source: *Innovative approach*, 2007

Figure 3. **Continuous improvement process**

If green governance development is implemented in a systematic way, it can be referred to environmental education infrastructure since acting phase includes study the results, redesigning system to reflect learning, change standards, communicate it broadly and retain people. Therefore, the first *green governance sustainable development and collaboration principle* emerges throughout continuous green governance improvement process.

Local governments have issues in common. As such, they are responsible for a clean and safe living space for their citizens, they have to follow a number of procedures, they tend to have limited resources for business and civil society to meet their needs. The EU Eco-Management and Audit Scheme (EMAS) is a management instrument developed by the European Commission for municipalities and other organizations to evaluate, report, and improve environmental performance. The environmental performance is necessary to introduce an environmental education infrastructure. Despite differences in the local governments, there are many co-operation and exchanges of experience regarding green governance development (for instance, public awareness-raising campaigns on environmental themes; campaigns; application for joint projects aimed at improving the environment). Neighbouring local governments join forces in order to implement green

governance principles development throughout environmental education infrastructure (for instance, learn from each other and share EMAS implementation experiences and solutions, learn more about the differences and similarities of their members). Green governance offers practical support in integrating sustainability principles into local policies and actions and can be recognized as *green governance collaboration principle* (for instance, throughout EMAS network that is dedicated to local governments). However, by signing up to the Covenant of Majors initiative, local governments commit to taking the necessary energy efficiency and renewable energy measures (Covenant of Mayors). Therefore, it entails contribution to the dissemination of environmental knowledge and awareness through sector aims as well as raise awareness among the general public. Acknowledging of human actions and influence on nature and its processes is essential for local government institutions to be capable of working respectfully and coordinated, for example, waste management services in North Vidzeme Region (coordination in among regional local governments) including waste collection, sorting, transportation, recycling and disposal in an environmentally friendly way at local level (The North Vidzeme Region initiative).

The green governance sustainability principle in local context reflects value of the benefits that nature provides to human society and mobilises investments to sustain and enhance them. It also helps avoid relying on infrastructure that is expensive to build when nature can often provide cheaper, more durable solutions. Sustainability ensures operational directions, which interact and supplement each other for higher efficiency, self-sufficiency and sustainability. Manufacturing of the ecologically renewable energy and growing of vegetables is one of the "Getlini EKO" technological and environmentally friendly landfill

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examples in Latvia. Landfill is based on jointly established Riga and Stopini local governments' initiative and manages to be the largest municipal solid waste landfill in the Baltic States (The Riga and Stopini Municipalities).

European Commission report on supporting the Implementation of Green Infrastructure capacity building, training and education in relation to green infrastructure supports the need for harmonization among standards at local government level:

- the potential for including or strengthening the concept and principles of green infrastructure in the different standard categories (performance, procedure, methodology);
- the interoperability between technical standards applied in different project phases (planning, design, and construction) (European Commission report, 2015).

The *green governance universal paradigmatic principle* of integration and systematization reflects as cluster approach. Effective and just environmental protection is best secured via *universal paradigmatic principle* as rights-based green governance, or operational from local to global and administered according to principles rooted in respect for nature and fellow human beings. The emission reduction and energy efficiency targets already are set by the EU and entered into force of the high-aspiration of Paris Agreement in October 2016 that is relevant and enforceable at signatory countries. The pragmatic approach is based on the principle of protecting and enhancing nature and natural processes. It has ties with agriculture, forestry, nature, water, marine and fisheries, regional and cohesion policy, climate change, transport and energy.

Conclusions, proposals, recommendations

Research findings reinforce the different definition of green governance constructs that impacts environmental education infrastructure.

The research question (whether green governance principles conjunct with environmental education infrastructure in the local context in European Union and Latvia) was discovered throughout green governance principles and was embedded in the environmental education infrastructure in Latvia. The answer of research question constitutes complex algorithm that was divided in 3 parts (discovering green governance and green governance principles; environmental education infrastructure and investigated green governance principles conjunction with environmental education infrastructure in the local context). With this in mind, it was observed that green government principles can be referred to dissemination of environmental knowledge and awareness through sector aims and raise awareness among the general public in local governments context. During the research analysis, all 3 principles for green governance were established that are considered fundamental in order to set up a green governance collaboration principle in local governments in Latvia.

Conclusions regarding governance and green governance

In accordance with theoretical discussion, most academics recognize governance as multidimensional and highly contested term.

Green governance elements can be identified to provide the basis for establishing constructs for the collective governance of common goods (such as environment and sustainability).

Overall, green governance principles address local context and social diversity in structuring social, economic activity and environmental problems that require understanding values in social and economic thought to account for nature and social well-being.

Sustainability and green governance concepts relate with institutional arrangements and

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multilateral environmental agreements as well as environmental performance reviews.

For strengthening the green governance principles' implementation, it is necessary for policy makers and practitioners to support knowledge based methods, for instance knowledge sharing, dissemination of best practices, better compliance, awareness raising campaigns at local governance level.

Conclusions regarding environmental education infrastructure

Construct of green governance relates with decision-making process recognizing the environmental values and norms.

In accordance with theoretical discussions, environmental education and its supporting infrastructure increase opportunities for the socio-economic development of local communities.

Green infrastructure studies provide a broad array of human and ecosystem services in areas of food, energy, security, climate regulation, water management, education, and aesthetics.

Academics agree that there are considerable differences in among - environmental education *in*; environmental education *of*; and environmental education *for* green infrastructure.

Conclusions regarding research part of the paper

Construct of environmental education infrastructure is referred in various policy supporting documents and examples in Latvia and the European Union.

Bibliography

Journal paper with author(s)

1. Biermann, F., (2010). Earth System Governance: a Research Framework. *International Environmental Agreements: Politics, Law and Economics*, Volume 10, pp.277-298.
2. Dernbach, J. C., (2003). Achieving Sustainable Development: The Centrality and Multiple Facets of Integrated Decisionmaking. *Indiana Journal of Global Legal Studies*, pp.247-285.
3. Kersbergen, K., Waarden, F. (2004). 'Governance' as a Bridge between Disciplines: Cross-disciplinary Inspiration Regarding Shifts in Governance and Problems of Governability, Accountability and Legitimacy. *European Journal of Political Research*, Volume 43, pp. 143-171.
4. Green Economy. (2016) Europe's Environment an Assessment of Assessments. *European Environmental Agency*. Volume 3, pp. 132.
5. The Concept of Green Infrastructure and its Integration into Policies Using Monitoring Systems (2011). *EEA Technical report*. No 18/2011.

If green governance is implemented in systematic way, it can refer to environmental education infrastructure and it includes environmental awareness, environmental activities, environmental management, continuous improvement process.

The paradigm of green governance is compelling because of environmental values, norms and rights at all levels starting from global, European Union, national and local governance level.

The green governance perspective of environmental education infrastructure comprises identification of initiatives (knowledge sharing, dissemination of best practices, better compliance, awareness raising campaigns) that already exist across European Union Member States.

The green governance principles (*green governance collaboration principle, green governance sustainability principle, and green governance universal paradigmatic principle*) emerge in environmental education infrastructure throughout common and joint action and sustainable planning at the local government level in Latvia and the European Union.

The Riga and Stopini Municipalities, „Getlini EKO” LTD. Retrieved: www.getlini.lv

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²Tel.: + 00 371 26300427, Larisa.Brokane@llu.lv

³Tel.: + 00 371 29441961, Baiba@zemgalei.lv

6. Weston, B. H., Bollier, D. (2015). Green Governance: Ecological Survival, Human Rights and the Law of the Commons. *Journal of Environmental Law*, Volume 27, pp.373-376.
7. Weston, B. H., and Bollier, D. (2013). Toward a Recalibrated Human Right to a Clean and Healthy Environment: Making the Conceptual Transition. *Journal of Human Rights and the Environment*, Vol. 4 No. 2, pp. 116-142.

Books

8. Adger, N., W., Jordan, A., (2009). Governing Sustainability. New York: Cambridge University Press. p. 54.
9. Bollier, D., Helfrich, E. (2012). The Wealth of the Commons: A World Beyond Market and State. Amherst, Massachusetts: Levellers Press. p.462.
10. Delmas, M.A., Young, O.R. (2009). Governance for the Environment. New Perspectives. New York: Cambridge University Press. p. 54.
11. Magali, A. Delmas, Oran R. Young (2009). Governance for the Environment: New Perspectives. New York: Cambridge University Press. pp. 12-41.
12. Ostrom, E. (1990). Governing the Commons: The Evolution of Institutions for Collective Action. Cambridge: Cambridge University Press.
13. Palmer, J. A. (2001). Fifty Key Thinkers on Environmental Education. Routledge, UK. p. 101.
14. Palmer, J., Neal, P. (2003), The Handbook of Environmental Education. Routledge, UK., p.32, p. 101, p.160.
15. Stevenson, R.B., Brody, M., Dillon, J., Wals, A.E.J. (2014). International Handbook of Research on Environmental Education. New Yor: Routledge, pp.592.
16. Yin R.K. (2009).Case study research: Design and methods. Los Angeles, CA: Sage.

Internet sources

17. Cole, L., McPhearson, T., Herzog, C., Russ, A. (2016). Accessing Urban Environmental Education Opportunities Via Green Infrastructure. New York: the nature of cities. Retrieved: www.thenatureofcities.com/2016/07/03/accessing-urban-environmental-education-opportunities-via-green-infrastructure/ ;
18. UNESCO, Tbilisi Declaration, (1978). Retrieved: www.gdrc.org/uem/ee/EE-Tbilisi_1977.pdf;
19. European Commission (2013) Communication from the Commission: Green Infrastructure (COM(2013) 249 final), 2013. Retrieved: http://eur-lex.europa.eu/resource.html?uri=cellar:d41348f2-01d5-4abe-b817-4c73e6f1b2df.0014.03/DOC_1&format=PDF
20. European Commission (2015). Supporting the Implementation of Green Infrastructure. Final Report. Retrieved: http://ec.europa.eu/environment/nature/ecosystems/docs/green_infrastructures/GI%20Final%20Report.pdf
21. Significant environmental risk identification Latvian municipalities 2014 - 2020 financial programming period, for the identification of activities for support. (2014), SIA Eiropprojekts. Retrieved: www.varam.gov
22. Covenant of Mayors, Retrieved: http://www.covenantofmayors.eu/IMG/pdf/covenantofmayors_text_en.pdf
23. The North Vidzeme Region initiative, "ZAAO" LTD. Retrieved: www.zaao.lv

¹Tel.: + 00 371 26747436, Janis.Kusis@llu.lv

²Tel.: + 00 371 26300427, Larisa.Brokane@llu.lv

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SELECTION OF GREENHOUSE GAS EMISSION-REDUCING MEASURES WITH ANALYTICAL HIERARCHY PROCESS APPROACH: A CASE STUDY FROM LATVIAN CROP PRODUCTION SECTOR

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Abstract. The Latvian agriculture has achieved remarkable progress with regard to crop production over the past decade, which has resulted in constantly growing greenhouse gas (GHG) emissions from agriculture. Currently, the agricultural sector is the second largest source of GHG emissions, accounting for 21.5% of the total GHG emissions in the country, and the key source of GHG emissions is direct nitrous oxide emissions from soil, which are largely the result of nitrogen applied. Such trends indicate that without additional measures Latvia cannot reach its GHG emission targets set internationally. In this paper, authors aim to select measures that have potential to reduce the GHG emissions from the Latvia's crop production sector by using Analytical Hierarchy Process (AHP) approach. Within the hierarchical structure of decision-making process, four factor groups affecting implementation of measures were evaluated: economic, social, environmental and technological factors. The study results indicated that the potential to reduce emissions from crop production sector is limited by technology as technological factors play the most important role in the process of implementation of GHG emission-reducing measures. Study results showed that reduction of direct N₂O emissions can be achieved through several alternatives from which, according to experts' rating, the most important is such GHG emission reducing measures that promote accurate management of nitrogen circulation and introduction of an organic management system.

Key words: GHG, emissions, measures, AHP, crop, sector.

JEL code: Q01, Q54

Introduction

Climate change is one of the defining challenges of the 21st century, along with the global population, poverty alleviation, environmental degradation and global security (Maslin, 2013). There is strong scientific evidence which shows that the current climate change is caused largely by the increased concentration of carbon dioxide (CO₂) in the atmosphere emitted through human activities (The National Academy of Science, 2010; EPA, 2014). It has been estimated that agricultural activities are one of the major greenhouse gas (GHG) emitters behind such sectors as transport and industrial processes (UNEMG, UNEP/GRID-Arendal, 2008). After regaining its independence, Latvia has been actively involved in reducing global climate change. However, since 2006, along with an increase in economic activity, GHG emissions from Latvia's agricultural sector have tended to increase; besides, the agricultural sector is the second largest source of GHG emissions, in 2014 accounting for 21.5% of the total GHG emissions

in the country (Latvia's National Inventory Submission, 2015). Such changes in GHG emissions from agriculture in Latvia indicate that without additional measures Latvia cannot reach its GHG emission targets set internationally as one of the EU strategic goals is to introduce low carbon farming in practice.

In order to identify appropriate GHG emission-reducing measures to be introduced in Latvia's agriculture, it is important to determine the key sources of GHG emissions from agriculture in Latvia. According to Latvia's National GHG emissions Inventory Report (Latvia's National Inventory Submission, 2015), one of the main sources of GHG emissions from the agricultural sector are nitrous oxide (N₂O) emissions from soil - in 2014, it comprised 53.6% of the total agricultural emissions. One of the key sources of N₂O emissions are application of nitrogen (N) fertilisers that in 2014 comprised 24% of the total N₂O emissions. The use of N is essential in the production of crops, however during the period 2005-2014 the direct N₂O emissions from

N fertilisers has risen by 8%, and agricultural production trends in Latvia allow forecasting that the use of N fertilisers is going to increase in the future too, which unfortunately creates negative external effects, i.e. N₂O emissions.

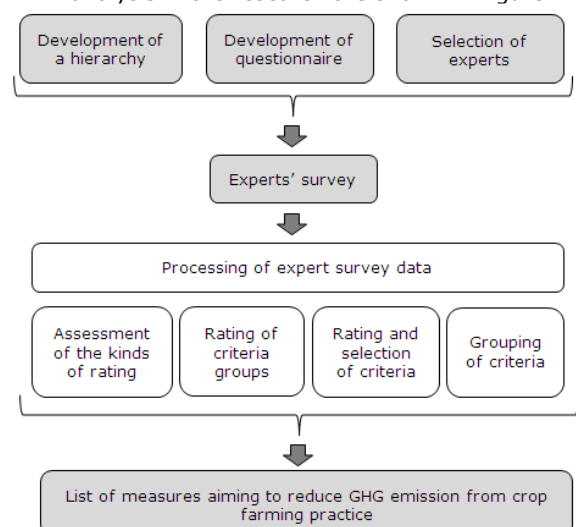
Such situation analysis sets aim for this study - to select measures that have potential to reduce the GHG emissions from the Latvia's crop production sector by using Analytical Hierarchy Process (AHP) approach. To achieve the aim, two specific research tasks were set: to develop hierarchy pyramid with appropriate levels; to assess kinds of rating regarding factors and group of GHG emission reduction measures in crop farming. There can be found several approaches used for selection of GHG emission-reducing measures; however, international research studies that employed the AHP for designing GHG emission reduction policies (Konidariand, Mavrakis, 2007) and analysing climate change adaptation measures (Choy et al., 2012; Sposito, 2006; Varela-Ortega, 2013) have proved that the AHP may be employed for similar problems researched, and it can be a useful method for academic research in selecting GHG emission reduction measures in the crop sector. To achieve the set aim of this research, the authors have used the publications and studies of foreign and Latvian scientists, legislation, reports and recommendations. The research authors widely have applied generally accepted research methods in economics, i.e. monographic descriptive method, analysis and synthesis methods, as well as multidimensional factor analysis to study the problem elements. In order to carry out multidimensional factor analysis 6 experts were involved in survey. The selection criteria for experts were as follows: 1) expertise and education (agriculture, climate change, economics, social science, technologies and natural sciences) and 2) affiliation with an institution associated with agriculture.

Research results and discussion

The main focus of this study is to employ the experience and knowledge of experts in order to comprehensively assess potential obstacles to introducing selected GHG emission reduction measures in agriculture. Data acquired in a survey of the experts were processed using AHP approach developed by American mathematician T. Saaty (1981). The AHP is a multi-criteria decision-making method for complicated problem situations and, in combination with quantitative and qualitative analyses, helps scientifically justify decisions made. The AHP is a mathematically justified method, and it allows acquiring unbiased results based on experts' subjective ratings. In view of the complicated environment, in which GHG emission reduction measures have to be introduced, by means of the AHP it is possible to:

- divide a complicated and unstructured problem into components;
- use expert knowledge and ratings to identify factors, criteria for priorities and causal associations;
- acquire scientifically justified results.

The stages of preparation and implementation of an AHP analysis in the research are shown in Figure 1



Source: author's construction

Fig. 1. Application of the AHP to rate GHG emission reduction measures

The adaptation of AHP algorithms to rate GHG emission reduction measures for the crop sector in the national economy of Latvia involved the development of a hierarchy pyramid consisting of four levels:

- at Level 1 of the hierarchy, an objective was set: introduction of GHG emission reduction measures in crop farming;
- at Level 2, the experts rated economic, social, environmental and technological factors influencing the achievement of the objective;
- at Level 3, the experts determined the significance of criteria influencing each factor in relation to the objective to be achieved.

The following criteria were used to rate **economic factors**: available support funding of the EU Common Agricultural Policy; change in the number of jobs on agricultural holdings; economic sustainability of agricultural holdings; financial possibilities of agricultural holdings and effects of GHG emission reduction measures on farm output. **Social factors** were rated employing the following criteria: change in the density of rural areas; cooperation among agricultural holdings; effects of social and public organisations; build-up of knowledge by owners/managers of agricultural holdings; and amounts of taxes paid by agricultural holdings to the local government. **Environmental factors** were rated employing the following criteria: potential reduction of GHG emissions; enhancement of soil qualitative characteristics; enhancement of water qualitative characteristics; ecological sustainability of agricultural production and the reproduction of live organisms and species. **Technological factors** were rated employing the following criteria: availability of new technologies; utilised agricultural area managed by the farm; professional knowledge; existing technology and the build-up of knowledge.

- At Level 4, the experts were suggested five alternatives to solve the problem. The alternatives were developed by grouping the GHG emission reduction measures by way of achieving the reduction effect.

The **1st potential alternative** – accurate management of nitrogen circulation, which may be achieved by: precision fertiliser application; introduction of integrated farming; direct incorporation of fertilisers into soil; application of nitrification inhibitors; fertilisation planning and soil liming. The **2nd potential alternative** – fixation of nitrogen, which may achieved by: increasing the area under papilionaceous plants; papilionaceous intercrops (nitrogen fixation); green manure crops sown in black fallow land; increasing the productivity of biomass crops. The **3rd potential alternative** – storage of carbon in soil, which may achieved by: enhancing physical and chemical properties of soil; removing a limited amount of crop residues from the field; conservation tillage and the maintenance of amelioration systems. The **4th potential alternative** – intensive development of organic farming. The **5th potential alternative** – production intensity reduction, which may achieved by: introducing permanent grasses in organic soils; establishing plantations of fast-growing tree species in agricultural areas.

Priority vectors and criteria significance coefficients were calculated by means of a calculation model developed in the MS Excel program using the Web-HIPRE (Mustajoki, Hamalainen, 2000) methodology. The application of the AHP involved the following sequential steps:

- defining the general objective to solve the problem and identifying factors influencing the achievement of the objective;
- simulating potential alternatives for the achievement of the objective and performing a pairwise analysis of the factors, criteria and

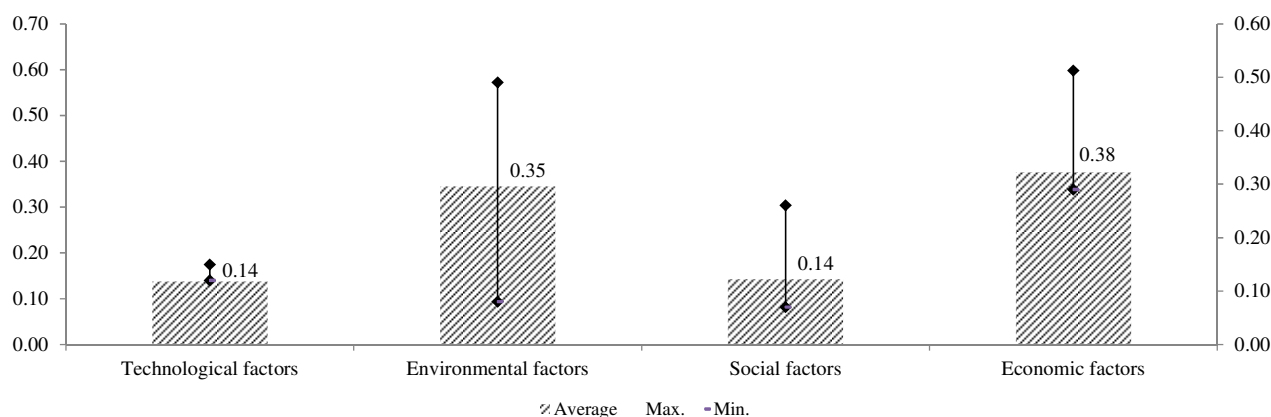
sub-criteria in relation to each criterion at the previous level of the hierarchy. The experts' judgements are expressed numerically on a 9-point scale;

- identifying priorities to acquire an overall priority for each alternative.

A relative significance coefficient was calculated for every element of the hierarchy; the coefficient shows the degree of significance or importance relative to every higher-level element (Saaty, 2006).

In the context of GHG emission reducing measures, it has been proved that the relationship between agricultural activities and GHG emissions is complex, as the level, extent

and nature of agricultural activities affect the amount of GHG emissions (Mulatu et al., 2016). It has been also stated that agricultural systems must be resilient and able to adapt to change by maintaining economic, ecological and social benefits (National Sustainable Agriculture Coalition, 2009). Thus, in this study authors tried to understand which of four factor groups - economic, social, environmental or technological factors - are the most important and determine implementation of GHG emission-reducing measures at farm level. Expert ratings of the factor groups for the introduction of GHG emission-reducing measures are summarized in Figure 2.



Source: author's calculations based on experts' survey

Fig. 2. Expert ratings of the factor groups for the introduction of GHG emission-reducing measures

Figure 2 shows that the ratings of the environmental and economic factor groups given by the experts were relatively similar, prioritising the economic factors (0.38). However, the dispersion was quite large in respect to the environmental factors, which indicated that the experts' opinions considerably differed in terms of their significance. The highest agreement among the experts was observed for the significance of technological factors (0.14), which was indicated by the small dispersion of their ratings. It means that implementation of GHG emission reducing-measures associates with such fundamental question: *Does introduction of measure associates with availability of new technologies? Does size of utilised agricultural*

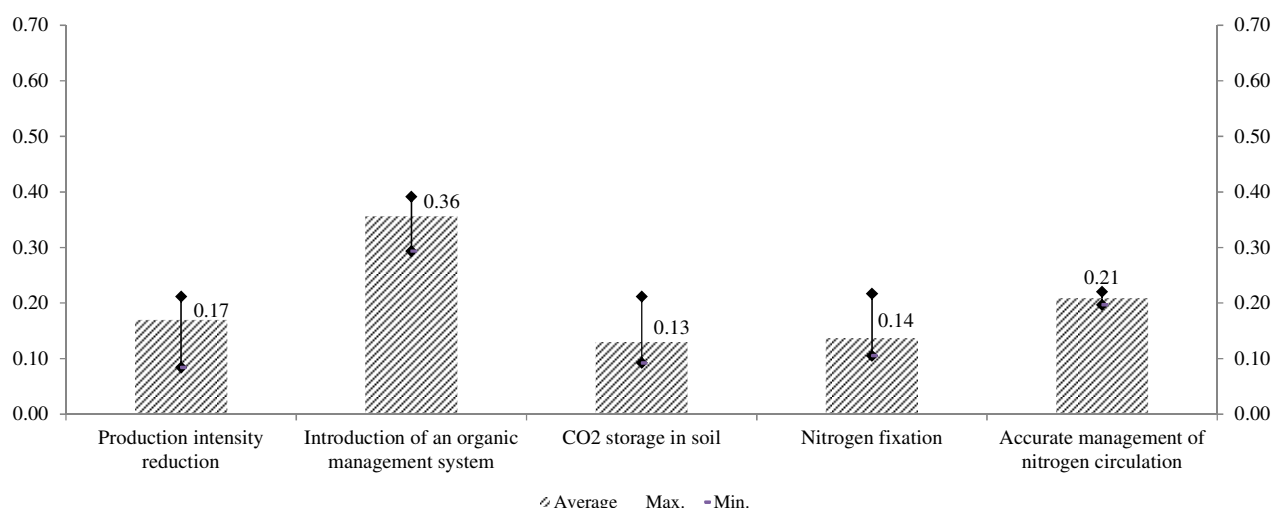
area managed by the farm limits introduction of measure? Does it require professional knowledge?

In order that the author can identify which of the alternative groups of GHG emission reduction measures, based on the experts' ratings, may be considered as suitable for Latvia's crop sector, the experts' ratings were analysed according to all the selected criteria. Figure 3 reflects the experts' ratings.

As regards the alternative groups of GHG emission reduction measures, there was no high agreement among the experts in relation to the measures whose introduction was associated with production intensity reduction, the introduction of an organic management system, nitrogen fixation

and CO₂ storage in soil. This means that the experts had diverse opinions. The lowest overall rating was given to the third group of GHG emission reduction measures – 'CO₂ storage in soil' (0.13). The second lowest overall rating was given to the measure group 'nitrogen fixation'.

The experts had the highest agreement on the measure 'introduction of an organic farming system'; however, as shown by Figure 3, this measure was given the most contradictory ratings.



Source: author's calculations based on experts' survey

Fig. 3. Expert ratings of GHG agricultural emission reduction measures according to all the criteria

The experts had the highest agreement on the measure group 'accurate management of nitrogen circulation'. The authors would like to stress that the experts' ratings of this measure group were very similar, and one can assert that the experts were unanimous, which indicates the need to develop an effective land resource management system, including the application of fertilisers.

Figure 3 shows that the highest agreement among the experts was observed for the necessity for the accurate management of nitrogen circulation. Taking into account the current development trends of Latvian agricultural farms, authors reveal that special focus should be drawn on the following measures.

- Precision fertilizer application - a set of concerted activities that involve the use of the newest technologies (the GPS, the GIS, sensors, software, applications, specially equipped fertiliser spreaders etc.) in planning fertiliser application rates and in fertiliser

spreading. The key advantages are as follows: 1) increase in crop output is provided through variable fertiliser application rates; 2) financial savings, as field areas with sufficient crop nutrients are not over-fertilised; 3) environment-friendly practices, as the fertiliser crops are not able to absorb does not produce N₂O emissions that are released into the environment. If introducing this measure, fertiliser savings can reach 15-80%.

- Direct incorporation of fertilisers in soil - the implementation of the measure is based on the introduction of specific fertiliser direct incorporation technologies on the farm, e.g. deep incorporation (15-20 cm in depth) and direct incorporation (injections at the depth of 5-8 cm). This measure is mainly suitable for the incorporation of liquid manure in both arable land and pastures.
- Application of nitrification inhibitors - nitrification inhibitors slow down the process of nitrification of fertilisers, thus reducing the

pace at which nitrates are reduced to nitrous oxide (N_2O). This, in its turn, increases the effectiveness of N absorption, as the period during which N is in absorbable condition ($\text{NH}_4\text{-N}$) is longer.

- Fertilisation planning - is based on the knowledge of physical and chemical properties of soil and involves performing soil tests, designing a fertilisation plan and its practical implementation as well as calculating the balance of N, which play an important role in efficient farming. The key purpose of the measure is to ensure optimum crop fertilisation, as the lack of basic elements can reduce crop growth and yields, while the unabsorbed amount of N results in economic and environmental losses, as N_2O emissions are produced.
- Liming acidic soils - most nutrients can be better absorbed by crops if soil reaction is 6.5 pH. For this reason, liming acidic soils results in more effective use of fertilisers, which increases crop yields and reduces N_2O emissions measured per unit of produce; the liming also enhances the structure of soils and the biological activity of the soils.

Conclusions, proposals, recommendations

- 1) Study results showed that crop sector is important player in Latvian GHG emission reducing strategy and the key focus has to be placed on such GHG emission-reducing measures that decrease direct N_2O emissions from the use of N fertilisers.

Bibliography

1. Choy, D.L., Serrao-Neumann, S., Crick, F., Schuch, G., Sano, M., Van Staden, R., Sahin, O., Harman, B., Baum, S. (2012). Adaptation Options for Human Settlements in South East Queensland – Supplementary Report, unpublished report for the South East Queensland Climate Adaptation Research Initiative, Griffith University
2. EPA (2014). *Overview of Greenhouse Gases*. Retrieved: <http://www.epa.gov/climatechange/ghgemissions/gases/co2.html> Access: 25.01.2017.
3. Konidari, P., Mavrakakis, D. (2007). A Multi-criteria Evaluation Method for Climate Change Mitigation Policy Instruments. *Energy Policy*, 35(12), p. 6235-6257.
4. *Latvia's National Inventory Submission* (2015). Retrieved: http://unfccc.int/national_reports/annex_i_ghg_inventories/national_inventories_submissions/items/8812.php. Access: 10.01.2017.
5. Maslin, M. (2013). Beyond the Science: Facing the Challenge of Climate Change. Retrieved: <http://climatica.org.uk/beyond-the-science-facing-the-challenge-of-climate-change> Access: 12.01.2017.

- 2) In this study, AHP method was applied for selection of GHG emission-reducing measures where four factor groups affecting implementation of measures were evaluated: economic, social, environmental and technological factors. According to experts' ratings, technological factors play very important role in the implementation process of GHG emission-reducing measures.
- 3) Reduction of direct N_2O emissions can be achieved through several alternatives from which, according to experts' rating, the most important is such GHG emission reducing measures that promote accurate management of nitrogen circulation and introduction of an organic management system. Such considerations let authors to reveal that special focus should be drawn on the following measures: precision fertilizer application; direct incorporation of fertilisers in soil; application of nitrification inhibitors; fertilisation planning; liming acidic soils; and introduction of an organic farming system.

ACKNOWLEDGEMENTS.

This research was carried out with generous funding by the Government of Latvia within the National Research Programme 2014 - 2017 project 'Value of the Latvia's ecosystem and climate dynamic impact on those - EVIDEnT' sub-project 3.2. 'Analysis of GHG emissions from agricultural sector and economic assessment of GHG emissions mitigation measures'.

6. Mulatu, D.W., Eshete, Z.S., Gatiso, T.G. (2016). The Impact of CO₂ Emissions on Agricultural Productivity and Household Welfare in Ethiopia. A Computable General Equilibrium Analysis. Retrieved: <http://www.efdinitiative.org/sites/default/files/publications/efd-dp-16-08.pdf> Access: 23.01.2017.
7. Mustajoki, J., Hamalainen, R.P. (2000). Web-HIPRE: Global Decision Support by Value Tree and AHP Analysis. *INFOR* 38(3): 208-220
8. National Sustainable Agriculture Coalition (2009). Agriculture & Climate Change: Impacts and Opportunities at the Farm Level. Retrieved: http://sustainableagriculture.net/wp-content/uploads/2008/08/nsac_climatechange policypaper_final_2009_07_161.pdf Access: 23.01.2017.
9. Saaty, T.L. (1981). The Analytic Hierarchy Process: Planning, Priority Setting, Resource Allocation. New York: McGraw-Hill Book company, p. 287.
10. Saaty, T.L. (2006). Fundamentals of Decision Making and Priority Theory with the Analytic Hierarchy Process. Vol. VI of the AHP series. Pittsburgh: RWS Publications, 478 p.
11. Sposito, V., (2006) A Strategic Approach to Climate Change Impacts and Adaptation. *Applied GISAdmin*, 2(3), pp. 23.1-23.26.
12. The National Academy of Science (2010). Advancing the Science of Climate Change. Retrieved: <http://dels.nas.edu/resources/static-assets/materials-based-on-reports/reports-in-brief/Science-Report-Brief-final.pdf> Access: 23.01.2017.
13. UNEMG, UNEP/GRID-Arendal (2008). *Kick the habit. A UN guide to climate neutrality*. Retrieved: http://www.grida.no/files/publications/kick-the-habit/kick_full_lr.pdf Access: 26.01.2017.
14. Varela-Ortega, C., Blanco-Gutierrez, I., Esteve, P., Bharwani, S., Downing, T.E., Fronzek, S. (2013). Analyzing Climate Change Adaptation in the Agriculture and Water Sectors: Screening Risks and Opportunities. In: IX Congreso de Economía Agraria, p. 25. Retrieved: https://www.researchgate.net/publication/261444787_Analyzing_climate_change_adaptation_in_the_agriculture_and_the_water_sectors_Screening_for_risks_and_opportunities Access: 27.01.2017.

INNOVATION SYSTEMS APPROACH AND SUPPORT ELEMENTS FOR INNOVATION IN AGRICULTURE

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Abstract. The formation and development of innovations is unimaginable without some particular system. Innovation systems approaches may be classified as national, regional and sectorial, and individual system elements may be analysed as well. A national innovation system has been created in Latvia, yet no such a system has been established at the level of individual industries of the national economy. The research aim is to develop an innovation systems approach model for the agricultural industry in Latvia and to assess financial support elements. The national innovation system creates prerequisites for a favourable environment for innovation in the country. Three key sectors are distinguished by the innovation systems approach model for the agricultural industry: 1) farmers; 2) national institutions; 3) service, involved institutions and agents. A number of factors hindering cooperation among institutions affect the creation and introduction of innovations in the agricultural industry. Although support elements are available, they are not exploited sufficiently.

Keywords: innovation systems approach, agricultural industry, financial support elements.

JEL code: O13; O31

Introduction

The development pace and effectiveness of innovation processes are determined by the economic environment where the innovation system is implemented and innovative activities take place. The innovation systems approach focuses on interaction among various governance levels in innovative development. Even though the innovation systems approach does not considerably change at various governance levels – the governance and the innovation system may not be evaluated independently of each other, as the government plans the innovation system and implements its policy by harmonising the national, regional, sectorial, public and private interests. The research **aim** is to develop an innovation systems approach model for the agricultural industry in Latvia and to assess financial support elements. The innovation systems approach model was developed for the agricultural industry in Latvia. The financial support elements for innovation were assessed from the perspective of their use and popularity by interviewing entrepreneurs that were engaged in the bioeconomic sector, which was also represented by agricultural enterprises. Both conventional sources of finance for agriculture: bank loans, leasing etc. and custom-made

resources such as, for example, the European Business Support Network, the Horizon 2020 programme etc. are available as support elements for the introduction of innovations.

There are several elements, institutions and actors involved in the process of creating, adapting and exploiting innovations that forms a system known as an innovation system. The term "innovation system" has been rather widely used recently, it can be defined as a network of organisations focused on bringing new products, new processes and new forms of organization into economic use, together with the institutions and policies that affect their behaviour and performance (Enhancing Agricultural ..., 2006). Nowadays, the innovation systems approach is widely used in describing relations among heterogeneous agents in various sectors, including agriculture.

Research results and discussion Innovation systems approach

The innovation systems approach emerged in the mid-1980s as a Schumpeterian perspective that drew significantly from the literature on evolutionary economics and system theory (Speilman, 2005; Agwu et al., 2008). This approach was primarily linked with industry, as it emerged in the times of a rapid industrialisation.

The innovation system may be researched both through the territorial dimension, at national and regional levels, and through the structural dimension, which focuses on individual system elements.

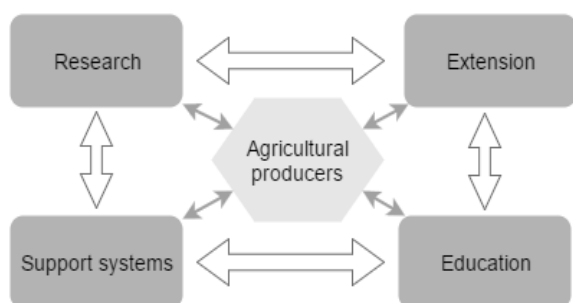
In the late 1980s and early 1990s, researchers B.Lundvall and K.Freeman focused on innovation at national level, examining distinctions among countries; in the result, they created a term **national innovation system**, which was explained as a set of institutions that jointly or individually contributed to the development and distribution of new technologies. National infrastructure, human capital and the diversity of institutions are the factors within a country that explain the differences in international competitiveness and economic growth across countries (Lundvall, 2007; Dimza, 2003). Not a single industry or some particular factor but an entire range of them, which synergistically contribute to innovation in the country as a whole, are reflected within the context of the national innovation system. However, the term **regional innovation system** was introduced along with policy makers focusing on regional competitiveness, popularising systemic local knowledge and researchers having found that a region's specific and informal norms, just like the regular face-to-face interaction of social agents, not only promote fast information exchange and the creation of new knowledge but also could serve as an initiator for innovation (Neimanis, 2013). An innovation support policy made at regional level, to a great extent, depends on opportunities and constraints in a particular region (Road maps and, 2011). The key element of regional investment potential is local enterprises and their capability to engage in the innovation process. If some specific industry has been developed in a region, the innovation potential of the region could be potentially strengthened based on the industry, as it has

built up competences and experience. One of the most essential specifics in the context of infrastructure is a region's financial autonomy that involves both public funding and private financing. From the perspective of public funding, it is important whether there are opportunities for a region to financially support risky private innovation projects. A region's autonomy may take the form of, for example, centrally administered funding systems available at regional level. Regions might also have a tax collection opportunity that provides that they can use the tax revenue to foster innovation processes in their territories (Cooke et al., 2000). The scientific literature also refers to the term **sectorial innovation system**, which, just like the terms national innovation system and regional innovation system, does not have a single definition and explanation. The dynamics of a sectorial innovation system is characterised by knowledge and learning, technologies and agents as well as interaction among the agents (Malerba, 2004). A sectorial innovation system views individuals, enterprises (producers of goods and services), research and educational institutions (creators and disseminators of knowledge), financial institutions (banks, investors), international, national and local administrative institutions and nongovernmental and other organisations, the activity of which may be attributed to a particular industry, as social agents (Neimanis, 2013). An examination of the classifications of sectorial elements by the authors shows that NACE and ISIC are considered to be actually ones of the most well-known classifications of economic activity. Industries may be also classified by technological level, yet such a classification should be employed if dealing with specific problems.

In its simplest form, an innovation system has three elements: 1) an organisation and individuals involved in generating, diffusing, adapting and using new knowledge; 2)

interactive learning that occurs when organisations engage in these processes and the way that leads to new products and processes (innovation); 3) institutions – rules, norms and conventions, both formal and informal – that govern how these interactions and processes take place (Anandajayasekeram, 2011, Horton 1990; North 1995).

In agriculture, innovation systems are tied together with knowledge systems forming Agriculture Knowledge and Innovation Systems (AKIS). The AKIS concept has been developed out of the old AKS (Agricultural Knowledge Systems) concept that originated in the 1960s in scholarly work on agricultural advice and extension. That system was driven by an interventionist agricultural policy that sought to coordinate knowledge and innovation transfer in order to accelerate agricultural modernisation. In many countries, this was reflected in a strong integration of public research, education and extension bodies, often under the control of the Ministry of Agriculture. In the 1970s, an "I" was added to the AKS: "agricultural knowledge and information systems" (AKIS). This addition was linked to the increased attention to information, probably also in connection with the large scale introduction of computers. The term AKIS popped up in policy discourses at the OECD and FAO. Later and rather silently the "I" was redefined in Innovation: Agricultural Knowledge and Innovation systems (EU SCAR, 2012).



Source: authors' construction based on Rivera, 2005

Fig 1. Agricultural Knowledge and Innovation Systems (AKIS) model

The AKIS model shown in Figure 1 displays the relations among the AKIS actors. Ideally, there should be a flow of information among all actors mutually sharing the knowledge and developing innovation. It should be stressed that the bottom-up approach is important – catching the ideas from the grass-roots level and developing ready to-use and practical innovations in line with the needs of the agricultural producers is an important aspect of spreading knowledge and innovation in agriculture and characterises the modern approach to AKIS.

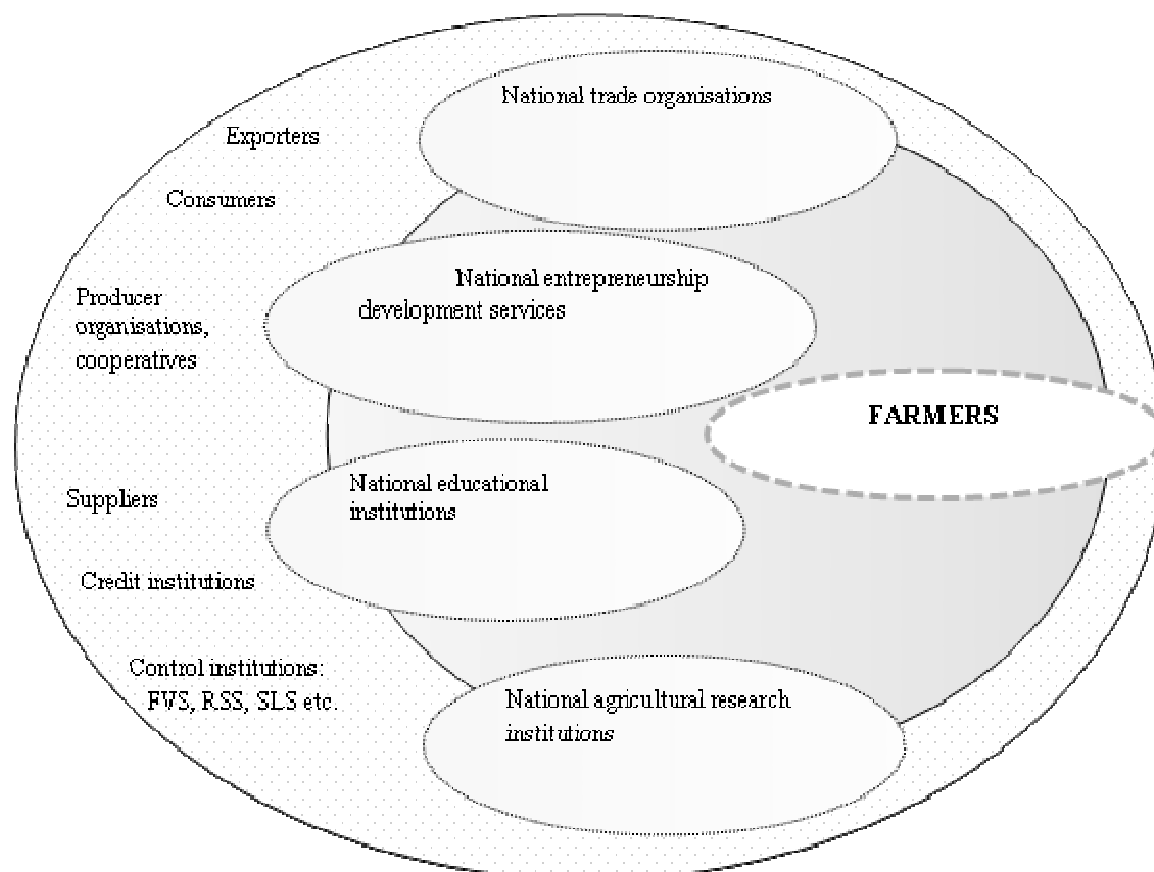
The development pace and effectiveness of innovation processes are determined by the economic environment where the innovation system is implemented and innovative activities take place. In the present research, the authors have developed an innovation system for the agricultural industry based on the National Innovation System of Latvia and the Innovation System of the EU as well as the Agricultural Knowledge and Innovation Systems model, which is presented in Figure 2. A uniform agricultural innovation system has not been developed in Latvia before; the system allows interaction among a number of elements. The model deals with cooperation among scientists, researchers, farmers and support and control institutions aimed at achieving common objectives and tackling problems.

A number of findings could be made if assessing cooperation among farmers, scientists and advisors in the process of creation of innovations in Latvia. The developed innovation system approach model for agriculture distinguishes three sectors where:

- 1) farmers represent the goods sector and are the key implementers of innovations in the forms of goods, services and processes;
- 2) educational, scientific and research institutions represent the sector of national institutions – products developed by means of applied research could be commercialised. This sector

includes also national trade organisations and entrepreneurship development service organisations as well as the Latvian Rural Advisory and Training Centre (LLKC), the Investment and Development Agency of Latvia etc.;

3) service, involved institutions and agents constitute the third sector, the objective of which is to encourage, control and advise innovation implementers – farmers.



Notes: FVS – the Food and Veterinary Service; RSS – the Rural Support Service; SLS – the State Land Service

Source: authors' construction based on the National Innovation System of Latvia, the Innovation System of the EU and the AKIS model

Fig 2. Innovation system approach model for the agriculture of Latvia

The EU and the legal framework for national policies represent the activity background as well as the basis for all the three sectors of the model. Government policy is the provider of a favourable legal environment, support mechanisms and instruments for innovative activity.

An element of innovation infrastructure in Latvia – the scientific and research sector – is a centralised system, in which research institutes are the structures of universities. University scientists mainly deal with fundamental sciences, while research institutes mainly focus on applied research, including the creation and development

of innovative products, processes etc. Not only the awareness of the need for innovation but also the process of creation of innovations shift from research institutions to agricultural enterprises; at the same time, the role of researchers in providing the process of creation of innovations does not become less important. For example, a researcher develops a disease-resistant variety of wheat, while advisors and support organisations (LLKC Ltd, the Latvian Organic farming Association etc.) makes such a new innovative product known by demonstrations and other ways and, accordingly, farmers start trying the variety. In the opinion of the authors, such an

approach to the creation of innovations is ineffective, as there is a possibility that such an innovative product is not going to be introduced in entrepreneurship practices; in addition, such a model for the introduction of innovations does not promote cooperation. Consequently, entrepreneurs and researchers can work independently from one another, thereby becoming relatively isolated groups, which contradicts the model. It is important to share knowledge during the process of creation and introduction of innovations.

Support elements available for innovation in agriculture

A range of support instruments for innovative activity is available in Latvia to promote the development and introduction of innovations (Pieejamie atbalsta instrumenti..., 2016); the instruments may be used by enterprises engaged actually in a number of industries. Further, the authors give a summary of the support mechanisms. The European Business Support Network provides advice on foreign markets and urgent EU matters; selection of potential cooperation partners; advice on EU support programmes; international technology transfer; advice on innovation matters. Entrepreneurs are offered enterprise income tax (EIT) relief for investing in new technological equipment aimed at raising productivity, as well as EIT deductions are applied to investments in research and development. The development finance institution Altum offers a comprehensive range of financial instruments for various needs at all enterprise development stages: start-up programmes; micro-credit programmes; loans for investment in infrastructure; mezzanine loans; SME growth programmes; support for holding training; seed, start-up and venture capital funds, e.g. , *Imprimatur Capital* – a seed and start-up capital fund; *BaltCap* – a Latvian venture capital fund; *Fly Cap* – a venture capital fund; *Expansion Capital* etc. The mentioned funds

provide financing for development and early-stage financing for innovative micro-, small and medium technology enterprises with international growth potential. One of the highly valued support instruments for the development of innovations is the **European Union research and innovation programme Horizon 2020**. The EU financial mechanism, whose purpose is to ensure the EU's global position in research, innovation and technology, promotes growth in Europe and contributes to employment.

To identify how actively the available support instruments are used and whether entrepreneurs are aware of them, the authors conducted a study by interviewing 33 entrepreneurs whose enterprises were engaged in the bioeconomic sector, i.e. in the economic activity in which an essential role is played by products and raw materials of natural origin. Enterprises engaged in the agricultural industry, the innovation system model for which was described above, also belong to this kind of enterprises. The most popular financial instruments were financing available through investment measures of the Rural Development Programme (RDP) administered by the Rural Support Service as well as bank loans and leasing services. From among the support instruments for innovation, services provided by the development finance institution Altum were popular, and one in three entrepreneurs interviewed had used it and were partly satisfied with this institution's services. However, the venture capital funds and the research and innovation programme Horizon 2020 were unused opportunities for introducing innovations, as only one entrepreneur out of all of them had used a venture capital fund and also one used the Horizon 2020 programme, while none of them had used services provided by the European Business Support Network. At the same time, when the entrepreneurs were asked what was necessary to make their enterprises grow faster and introduce innovations, their reply was

that the most important factor was the availability of finance for their business expansion and development. It means that entrepreneurs wish more financial resources for their business and they are aware that this could help introduce innovations and develop their enterprises, while at the same time they rarely use specially designed financial mechanisms intended for this purpose and are reluctant to find out more about the mechanisms.

Conclusions, proposals, recommendations

- 1) The national innovation system creates prerequisites for a favourable environment for innovation, while at regional level the system could stimulate the development of a particular industry by means of the kinds of support that are concentrated at the regional level. Under the conditions in Latvia, the national-level innovation system is more appropriate because the country's territory is not large enough to establish a separate regional system.
- 2) The set of elements integrated in the innovation systems approach model for the agricultural industry of Latvia is sufficient and optimal. However, the current approach to the creation of innovations, where the awareness of the need for innovation and the process of creation of innovations shift from fundamental

sciences and research institutions to agricultural enterprises, does not promote cooperation among agents; consequently, a new good or service might not be introduced in production and the financing attracted might be wasted.

- 3) A number of financial instruments for innovative activity are available in Latvia, yet entrepreneurs whose enterprises are engaged in the bioeconomic sector use the instruments rarely, while at the same time being aware that additional financing in particular is what could help them develop innovations at their enterprises. Formally, financial instruments are available, yet there are considerable problems in their application, which will be examined in further research studies by the authors.

Acknowledgement.

The paper was supported by National Research Programme 5.2. "Economic Transformation, Smart Growth, Governance and Legal Framework for the State and Society for Sustainable Development - a New Approach to the Creation of a Sustainable Learning Community (EKOSOC-LV)", project No. 5.2.2. "The Development of Innovation and Entrepreneurship in Latvia in Compliance with the Smart Specialization Strategy".

Bibliography

1. *Agricultural Knowledge and Innovation Systems in Transition – a reflection paper*. (2012). Standing Committee on Agricultural Research (SCAR) Collaborative Working Group AKIS. 121 p. Retrieved: http://ec.europa.eu/research/bioeconomy/pdf/ki3211999enc_002.pdf. Access: 09.01.2017.
2. Agwu, A.E., Dimelu, M.U., Madukwe, M. (2008) Innovation System Approach to Agricultural Development: Policy Implications for Agricultural Extension Delivery in Nigeria: Review. *African Journal of Biotechnology*, Vol. 7 (11), pp. 1604-1611. Retrieved: https://www.researchgate.net/publication/228659895_Innovation_system_approach_to_agricultural_development_Policy_implications_for_agricultural_extension_delivery_in_Nigeria. Access: 09.01.2017.
3. Anandajayasekeram, P. (2011). *The Role of Agricultural R&D within the Agricultural Innovation Systems Framework*. Conference working paper, developed for the ASTI/IFPRI-FARA Conference, 40 p. Retrieved: <http://www.asti.cgiar.org/pdf/conference/Theme4/Ananda.pdf>. Access: 09.01.2017.
4. Cooke, P., Boekholt, P., Todtling, F. (2000). *The Governance of Innovation in Europe. Regional Perspectives on Global Competitiveness*. Pinter, London and New York, pp. 34-35.
5. Dimza, V. (2003). *Inovācijas pasaule, Eiropa, Latvijā (Innovations in the World, Europe and Latvia)*. Rīga: Latvijas Zinatnu akadēmijas Ekonomikas institūts, p. 205.
6. *Enhancing Agricultural Innovation: How to Go Beyond the Strengthening of Research Systems*. (2006). The International Bank for Reconstruction and Development / The World Bank, 135 p. Retrieved: http://siteresources.worldbank.org/INTARD/Resources/Enhancing_Ag_Innovation.pdf. Access: 09.01.2017.

7. Horton, D.E. (1990). *Assessing the Impact of International Research: Concepts and Challenges*. In: Echeverria, R.G. (ed.) *Methods for Diagnosing Research System Constraints and Assessing the Impact of Agricultural Research*. ISNAR, The Hague, The Netherlands.
8. Lundvall, B.A. (2007). *National Innovation System: Analytical Focusing Device and Policy Learning Tool*. Retrieved: <https://www.google.lv/#q=Lundvall%2C+Bengt+%E2%80%93+Ake.+National+Innovation+System:+Analytical+Focusing+Device+and+Policy+Learning+Tool.+Working+Paper.+Swedish+Institute+for+Growth+Policy+Studies.+2007.+Pp.+10.%2C+19>. Access: 03.12.2016.
9. Malerba, F. (2004). *Sectoral Systems of Innovation: Concepts, Issues and Analyses of Six Major Sectors in Europe*. Retrieved: https://books.google.lv/books?hl=lv&lr=&id=I9tFuaE7S4UC&oi=fnd&pg=PP1&dq=Sectoral+systems+of+innovation:+basic+concepts&ots=_7Gg_mo4r4&sig=PrV5fslpkDQiqDHJ6iom73wGRx4&redir_esc=y#v=onepage&q=Sectoral%20systems%20of%20innovation%3A%20basic%20concepts&f=false. Access: 09.01.2017.
10. Neimanis, M. (2013). *Mijiedarbība inovācijā mazajos un vidējos uzņēmumos meža nozarē Latvijā (Interaction in Innovation at Small and Medium Enterprises of the Forest Industry in Latvia)*. Retrieved: http://www.szf.lu.lv/fileadmin/user_upload/szf_faili/Petnieciba/promocijas_darbi/Matiss%20Neimanis_2013.pdf. Access: 03.01.2017.
11. *Regional Innovation systems: Engage Today to Shape Tomorrow FTA*. (2014). Retrieved: <https://ec.europa.eu/jrc/en/event/site/fta2014/programme/panel-session/regional-innovation-systems>. Access: 25.12.2016.
12. *Road Maps and Smart Policy Mixes for Regional Innovation* (2011). OECD. Retrieved: http://www.keepeek.com/Digital-Asset-Management/oecd/urban-rural-and-regional-development/regions-and-innovation-policy/road-maps-and-smart-policy-mixes-for-regional-innovation_9789264097803-6-en#page1. Access: 08.01.2017.
13. Vitola, A. (2015). *Inovācijas rīcībpolitikas kombināciju iezīmes daudzlīmeņu pārvaldes sistēmā: Baltijas jūras reģiona valstu gadījums (Specifics of Combinations of Innovation Action Policies in the Multilevel Governance System: the Case of Baltic Sea Region Countries)*. Retrieved: http://www.szf.lu.lv/fileadmin/user_upload/szf_faili/Petnieciba/promocijas_darbi/Vitola_Anete.pdf. Access: 08.12.2016.

DEVELOPMENT OF RENEWABLE ENERGY POLICY IN LATVIA

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Abstract. The research analyses the role and results of production of renewable energy sources (RES) in Latvia. The government has promoted the use of RES by biomass cogeneration and power plants as well as biogas cogeneration plants by means of various support policy instruments. Consequently, the electricity output from RES comprised 51 % of the total electricity output in 2014 and, on average, 48 % in the period 2011-2014. Although the support policy for RES use fostered the development of this industry in Latvia, a number of restrictions were imposed in recent years – a 10 % subsidised electricity tax (SET) rate was applied to taxable income from electricity production from RES in 2014 and a decision was made in 2016 to differentiate the mandatory procurement component (MPC) in 2018. The research aim is to analyse trends in the development of RES in Latvia. To achieve the aim, the following specific tasks were set: 1) to give insight into the situation in the field of RES in Latvia, placing a particular focus on electricity generated from the RES; 2) to analyse the most important RES policy developments in Latvia; 3) to assess the RES support policy implementation results for electricity generation from the RES and to outline an expected RES policy in the EU beyond 2020. The research has found that the greatest threats to RES use are an imprudent policy of the government of Latvia, which could create incomprehension among the public and an unstable and unpredictable business environment. However, EU policy softening regarding RES can influence the EU's leading role in the field of the RES. For this reason, the positive effects from RES use – energy efficiency, environmental protection and regional development – could decrease in the future.

Keywords: renewable energy source, electrical energy, support system, policy.

JEL code: Q28, Q42.

Introduction

Renewable energy is a kind of energy that does not depend on resource deposits on the Earth. No non-renewable natural resources are depleted and no harm is done to the environment if generating this kind of energy. Renewable energy is produced from renewable energy sources that are impossible to deplete, e.g. solar, wind, hydro- and wave power and geothermal energy, as well as biomass and biogas that are produced from, for example, waste or manure. Renewable energy sources are an alternative to fossil fuel (European Parliament, 2016).

In the last 20 years, concerns about climate change, environmental sustainability and security have increased in the world. Despite the fact that renewable energy is currently expensive, the use of it minimises emissions that are produced by the conventional energy sector, thereby making a negative impact on the environment (Wu Q., Zhou J., Liu S., et al., 2016). An agreement has been reached in the world to reduce greenhouse gas emissions by 80-90 % until 2050 (Pfenninger S., Keirstead J., 2015). In addition to the above-

mentioned, it is considered how to replace fossil fuel, as its deposits are being depleted in the world (Lin J.H., Wu J.H., Lin H.J., 2016). Accordingly, a decision has been made in the EU and elsewhere in the world to reform the energy sector and increase the proportion of RES in the total consumption of energy (Sahovic N., Pereira da Silva, 2016). In 2012 in the world, renewable energy accounted for approximately 19 % in the total final energy consumption; most of the energy was generated by means of modern technologies, yet a significant share was comprised by conventional energy from biomass. In the last decade, the generation of solar and wind energy sharply increased in the world (by 42 % and 27 %, respectively). In 2012, the global installed renewable energy capacity was 1440 gigawatts (GW), of which 21.7 % or 312 GW were installed in the EU Member States. The installed electric capacity of RES power plants in the EU increased from 170 GW in 2005 to 312 GW in 2012 (an increase of 84 %) (Scarlat N., Dellemand J.F. et al., 2015). According to expert forecasts, RES will contribute to 50 % of the

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global energy consumption in 2040 (Sari A., Akkaya M., 2015).

Latvia has introduced a national support mechanism to promote renewable energy use – mandatory procurement and guaranteed payments for the installed electric capacity. In Latvia, costs arising from supporting electricity produced from RES or in high efficiency cogeneration are covered by all final electricity consumers proportionally to their electricity consumption, as the mandatory procurement component (MPC) is integrated in the price on electricity (Energetikas attīstības pamatnostādnes..., 2016). For this reason, a part of the public is dissatisfied with the fact that RES producers are too generously supported, which negatively influences households and businesses in Latvia. The present research focuses on the results of electricity production from RES, as this industry is important for Latvia. The *research aim* is to analyse trends in the development of RES in Latvia. To achieve the aim, the following *specific tasks* were set: 1) *to give insight into the situation in the field of RES in Latvia, placing a particular focus on electricity generated from the RES*; 2) to analyse the most important RES policy developments in Latvia; 3) to assess the RES support policy implementation results for electricity generation from the RES and to outline an expected RES policy in the EU beyond 2020.

Research hypothesis: recent year changes in the RES policy could hinder the development of the RES in Latvia.

Research methods employed: analysis and synthesis, logical construction, monographic, statistical analysis.

Research results and discussion

1. RES production in Latvia

RES production requires large initial investments (to establish a facility), while its variable and facility maintenance costs are relatively low. According to the research study Development of an Investment Decision Tool for

Biogas Production from Agricultural Waste (Kerellas S., Boukis I., Kontopoulus G., 2009), establishing a facility involves also high costs for the development the facility: research, project development and necessary permits. These costs make up about 11 % of the total cost. The investment payback period could reach even nine years and it depends on the total cost, the investment needed for the establishment of a facility and the market price on the final product (Kerellas S., Boukis I., Kontopoulus G., 2009; Amigun B., Blottnitz H., 2010; Rubins M., 2014).

In the opinion of the authors, three most important renewable energy production effects are as follows.

- 1) A lower CO₂ and other GHG emission level, and a smaller negative impact of manure and biological waste on the environment. For example, if biogas is produced from manure or biological waste, these inputs are processed and do not create threats to the environment.
- 2) A smaller amount of imported energy and a higher proportion of RES in the total energy balance. The expansion of renewable energy production allows reducing the imports of electricity and gas. It is of great importance for small countries such as Latvia from the perspective of sustainable development.
- 3) Regional development – increases in incomes and the number of jobs in rural areas. For example, biogas production is an opportunity for farms to earn extra revenue. Large biogas, biofuel or other renewable energy facilities can promote the creation of jobs in rural areas. If renewable energy is produced from biomass, it contributes to agricultural production and the use of the unfarmed area (European Parliament, 2016; Energetikas attīstības pamatnostādnes..., 2016; Rubins M., 2014).

In Latvia, electricity production from RES is an important industry. In 2015, hydropower plants (HPP) comprised the highest proportion of

electricity production, of which 98.2 % were HPPs with an electric capacity of more than 10 megawatts per hour (MW h⁻¹). In the period 2011-2015, the installed electric capacity of HPPs rose by 1 % or 13 MW h⁻¹ (Table 1), which was caused by a 12 % increase in the segment of HPPs with a capacity from 1 to 10 MW h⁻¹. In 2015 compared with 2011, the proportion of HPPs in the distribution of installed electric capacity of RES power plants for Latvia declined by 7 %, which indicated that the installed electric capacity of other kinds of RES power plants increased at a faster pace. In the period of analysis, the greatest relative increase was observed for biomass cogeneration and power plants, 1220 %, or 61 MW h⁻¹, as the capacity of biomass cogeneration and power plants comprised only 5 MW h⁻¹ (0.3 % of the total capacity of RES power plants) in 2011. The second fastest increase was observed for biogas cogeneration facilities – 140 % or 35 MW h⁻¹. A considerable increase in generation capacity was reported for also wind power plants (92 % or 32

MW h⁻¹). In 2011, the capacity of biogas, wind and biomass power and cogeneration plants accounted for a range of only 0.3 % to 2.2 %, while in 2015 it made up more than 3 % in each position. This may be explained by the fact that the pace of increase in the capacity of biogas and biomass power and cogeneration plants was faster than that for wind power plants. The fast increase pace in electrical capacity may be explained by the RES policy implemented in Latvia, i.e. the measures introduced: mandatory procurement and guaranteed payment for the electric capacity installed. In the period 2011-2015, an increase in the total electric capacity of RES power plants accounted for 9 % or 142 MW h⁻¹. In the period of analysis, the total relative increase was not greater due to the high proportion of HPPs and the small relative increase in the capacity of HPPs. The construction of new large HPPs is not planned in Latvia. For this reason, any increase in electric capacity is possible if increasing the capacity of biomass, wind and biogas RES plants.

Table 1

Electric capacity of renewable energy power plants in Latvia in 2011-2015, MW h⁻¹

Kind of renewable energy plants	2011	2012	2013	2014	2015	Δ from base year, %	Distribution, %	
							2011	2015
Hydro power plants	1576	1576	1589	1590	1589	1	96.0	89.0
Wind power plants	36	59	67	69	69	92	2.2	3.9
Biomass cogeneration and power plants	5	23	55	63	66	1220	0.3	3.7
Biogas cogeneration plants	25	43	53	58	60	140	1.5	3.4
Total	1642	1701	1764	1780	1784	9	100	100

Source: authors' calculations based on the Central Statistical Bureau, 2016a

The amount of electricity produced greatly depends on the performance of the HPPs on the River Daugava, which generated 926 GW or 32 % less electricity in 2014 compared with 2013. This was determined by an untypically low river water flow rate (Latvenergo, 2014). In 2015, the output of electricity decreased even more, and the total decrease equalled 36 % (Table 2). Therefore, the HPPs accounted for a 12 % lower proportion in the distribution of electricity generated from RES,

while the situation could change in water rich years. In 2015, the proportion of electricity generated by biogas cogeneration plants and biomass cogeneration and power plants was higher (14.4 %) than that for wind power plants (3.6 %). Since the values of installed capacity of cogeneration and power plants for both kinds of renewable sources are similar, one can find that wind power plants perform less efficiently, as they generate only a small proportion of the

electricity produced. If excluding the HPPs, an increase in the amount of electricity generated by the other RES power plants was 385 % in the period 2011-2015, which was due to a considerable 2808 % increase in the amount of electricity produced by biomass cogeneration and power plants. The increase was caused by national and EU financial support for RES. In the period 2011-2015, the total output of electricity

decreased by 16 % owing to the introduction of the subsidised electricity tax (SET), as support for cogeneration electricity was reduced, and it was economically efficient to decrease electricity generation at the Riga Thermal Power Stations (Latvenergo, 2014). In the distribution of total electricity output, RES made up 51 % in 2014 and, on average, 48 % in the period 2011-2014, which proved the large role of the RES in Latvia.

Table 2

Electricity output from renewables in Latvia in 2011-2015

Kind of renewable energy plants	2011 GW	2012 GW	2013 GW	2014 GW	2015 GW	Δ from base year, %	Arithmetic mean	Distribution, %	
								2011	2015
Hydro power plants	2887	3707	2912	1993	1860	-36	2672	93.9	82.0
Wind power plants	71	114	120	141	147	107	118	2.3	3.6
Biomass cogeneration and power plants	13	65	215	319	378	2808	198	0.4	6.1
Biogas cogeneration plants	105	223	288	350	392	273	272	3.4	8.3
Total power output from RES	3076	4109	3535	2803	2777	-10	3260	100.0	100.0
Total output from RES, HPPs excluded	189	402	623	810	917	385	588	-	-
Total output	6 095	6 168	6 209	5 140	**	-16*	5903	-	-
Annual electricity consumption	6191	6848	6576	6583	6461	4	6532	-	-
Power output from RES as a % of total power consumption	44.71	44.89	48.75	51.09	**	14*	48	-	-

* change (2014/2011); ** No data

Source: authors' calculations based on the Central Statistical Bureau, 2016a, 2016b

2. Most important developments in the RES policy of Latvia

In 2016, the Cabinet of Ministers of the Republic of Latvia approved the Guidelines for Energy Sector Development 2016-2020 that determine the policy made by the government of Latvia, the key principles and objectives of the policy and priorities for the energy sector in the period 2016-2020 (Ministry of Economics, 2016a). The situation has changed in the strategic planning of the power sector in Latvia and the Baltics (Energetikas attīstības pamatnostādnes..., 2016).

The policy document defines the key objective of the energy policy made in Latvia – to enhance the competitiveness of the national economy, along with implementing government policies on other industries through contributing to secure supplies, the formation of prices on energy resources and energy under the free market and competition as well as sustainable energy

production and consumption (Energetikas attīstības pamatnostādnes..., 2016; Saeima, 2012). To contribute to the sustainability of the energy sector, it is envisaged implementing activities aimed at raising the proportion of "green energy", reducing GHG emissions and contributing to efficient energy use, which involves the following activities – revising and designing support mechanisms for RES use. The National Development Plan of Latvia for 2014-2020 has set an objective to increase the proportion of RES in the total consumption of energy, focusing on competitive energy prices. The policy objectives – increasing the proportion of RES and achieving a competitive energy price – could be contradictory; therefore, the government has to find a solution to the problem, i.e. how to increase support for RES without contribution to higher energy prices for producers (Saeima, 2012).

The Guidelines for Energy Sector Development 2016-2020 (2016) set the following RES-related targets to be achieved in 2020: the proportion of energy from the RES in the gross final energy consumption has to be 40 % (37.1 % in 2013); the proportion of energy from the RES in the gross final energy consumption by transport has to be 10 % (3.1 % in 2013). The Sustainable Development Strategy of Latvia until 2030 (2010) sets a target to provide half of the total final energy consumption in the country from RES in 2030. The strategy stresses that if using RES, extra opportunities for growth would be created in the fields of regional development, local entrepreneurship and employment, while increasing energy security and improving the import-export balance.

According to the Guidelines for Energy Sector Development 2016-2020 (2016), the next challenge regarding RES for Latvia is to reform the support system (exemption from the electricity tax for RES and cogeneration, reduced excise tax rates for fuels with high biofuel contents), so that it is oriented not only towards achieving the RES target but also reducing the negative effect on economic growth and household incomes.

In the opinion of the authors, the potential effects on biogas producers as well as the fact whether the expected changes could be predicted in advance have to be seriously assessed before making any amendments in the legislation. It would be advised to shift to the feed-in-premium system for the purpose of fostering biogas production in Latvia and to allocate the financial support for RES for the purpose of efficient use of thermal energy generated by biogas facilities to effectively control the effects of financial support on electricity tariffs for final consumers. This would reduce the dependence of Latvia on imported energy and contribute to environmental protection. After considering research studies and discussions, the government has to introduce a

support system (feed-in tariffs) for producers that is designed according to inputs used and their kind and the amount of thermal energy used, so that the producers can make adequate profits (when making new contracts); the tariffs have to be set based on in-depth research studies on RES production profitability in Latvia.

The Subsidised Electricity Tax Law (2013) stipulates that the SET is applied to taxable revenues made from 1 January 2014 to 31 December 2017, yet the Ministry of Economics plans to prolong the tax period.

RES producers were not able to predict the introduction of the SET when made their decisions on starting up their business; it also stopped their plans to further develop their facilities. A number of small biogas producers might face serious profitability problems owing to the SET, as they were not informed about the mentioned tax before making a decision on starting up their business (Rubins M., 2014). For this reason, in the authors' opinion, the SET has to be abolished or at least the producers having the lowest profitability have to be immediately exempted from the tax. The sustainability of RES in Latvia is going to be ensured if the government finds ways how to limit the support effect on the price on electricity for final consumers. Otherwise, it has been proved one more time that entrepreneurs do not have a predictable legal and business environment in Latvia.

Besides, it is envisaged that Latvia will differentiate the mandatory procurement component (MPC) for electricity in 2018. In 2016, the MPC depended on the amount and price of electricity purchased within the scope of mandatory procurement in the previous year. The MPC size is affected by the natural gas price, the electricity price at the exchange and electricity consumption. The higher the natural gas price, the greater the MPC size; however, the higher the electricity price and/or electricity

consumption, the smaller the MPC size (Ministry of Economics, 2016b, 2016c, 2016d).

In the authors' opinion, the MPC size is very important for RES producers, as an economically reasonable MPC ensures a fair price for final consumers. This would create a more positive attitude of the public to RES and decrease pressure to limit the further expansion of the RES in Latvia. It is expected that owing to the current energy policy, the maximum MPC is going to be reached in 2017. However, if granting new permits for electricity production from RES is not restarted, the MPC size is going to decrease from 2018 onwards. In 2008, the calculated MPC was equal to 8.0 EUR MWh⁻¹, while from 1 April 2010 it was 16.3 EUR MWh⁻¹. The MPC increased to 1.75 EUR MWh⁻¹ in 2012 and to 26.9 EUR MWh⁻¹ in 2013. Compared with 2008 when the MPC was introduced, it increased by 1.89 EUR MWh⁻¹ or 3.3 times (Energetikas attīstības pamatnostādnes..., 2016). In view of the declining competitiveness of producers under high electricity prices and of interests of poor individuals, the Cabinet accepted a conceptual report "Complex Measures for Electricity Market Development" (2015), which set the MPC at 26.79 EUR MWh⁻¹ for the period until 2019. This decision has to avoid an electricity price hike due to the MPC. In order for RES producers to receive a premium on top of the electricity price, which is calculated based on feed-in tariffs, it was decided to compensate for the gap between the real MPC and the one approved by the Cabinet from SET and value added tax revenues and Latvenergo dividends. In addition, amendments to the legal acts regulating the MPC were made in 2015 to prolong the moratorium beyond 1 January 2016, during which the Ministry of Economics (MoE) would not grant new rights to receive national support for RES production (Energetikas attīstības pamatnostādnes... 2016; Ministry of Economics, 2016e).

However, in November 2016, the Saeima of the Republic of Latvia made a decision to review the MPC system. Accordingly, the MPC at a rate of 26.79 EUR MWh⁻¹ is going to remain until the end of 2017 instead of until 2019 as it was decided earlier. In accordance with the 2016 amendments to the Electricity Market Law, which will be in force from 1 September 2017, the costs that are comprised of payments for the electric capacity installed, are covered by all final electricity consumers in Latvia, and these costs are divided between the power transmission and consumption groups in proportion to the fixed part of revenue from the system's services, thereby compensating the public electricity trader for feed-in expenditures. The new MPC rate will be in force from 1 January 2018 (Grozījumi elektroenerģijas tirgus..., 2016; Elektroenerģijas tirgus likums, 2005). This means that in 2018 the MPC is divided into two parts based on: 1) the amount of electricity consumed; 2) the connection capacity requested. The Ministry of Economics believes that the reform will ensure a competitive electricity price for energy-intensive enterprises in the European region, which stimulates the competitiveness of the manufacturing sector and reduces the MPC effect on the variable costs of manufacturing enterprises (Ministry of Economics, 2016d). In Latvia, according to the MoE data, the MPC rate paid by enterprises is the fourth highest in the EU. For this reason, the MPC rate has to be differentiated, so that a lower MPC rate is paid by the enterprises and households that have an efficient power supply (Ministry of Economics, 2016b).

According to the estimates made by the MoE, the MPC rate for households is going to decrease if the consumption of electricity from a single-phase supply is less than 75 kWh (kilowatt-hours) per month. Protected consumers (poor families, large families or families who care for children with disabilities, persons with group I

disabilities who use electricity for their own needs), which consume less than 75 kWh, are compensated for an increase in the electricity price (the increase of the MPC rate) (Ministry of Economics, 2016b, 2016f). A fee for a single-phase connection is set at EUR 1.28, while for a three-phase, 20 A (amperes), connection it is EUR 4.78; so, the difference in the fee for households having a single-phase and a three-phase, 20 A, connection equals EUR 3.50 regardless of the amount consumed. If 100 kWh are consumed, an electricity bill decreases by EUR 0.43.

Table 3

Changes in monthly bills for households after the differentiation of the mandatory procurement component in Latvia, EUR, VAT excluded

Consumption, kWh per month	0	50	75	280	600
Single-phase power	1.28	0.43	0.00	-3.50	-8.96
Three-phase power	4.78	3.93	3.50	0.00	-5.46

Source: Ministry of Economics, 2016

In the segment of enterprises, the MPC decreases if connection efficiency (real consumption to maximum consumption for the particular connection) is 13 % for an 0.4 kV power connection and 16 % for a connection starting with 6 kV. The MoE emphasises that manufacturing enterprises will get more competitive by means of this reform. In the authors' opinion, the current MPC mechanism is fair, as the MPC is added to the cost of a kilowatt-hour; therefore, everyone has an opportunity to use efficient and energy-saving electrical appliances and to reduce the MPC effect in this way. By setting a higher MPC rate for households saving on electricity, the government actually encourages consumers to consume more electricity. This could hinder households from using power-saving electrical appliances, as such appliances are more expensive than less energy-efficient ones. On the contrary, the government

should conduct an extensive campaign aimed at encouraging energy-saving. The reform should be also simulated to identify the effects on the amount of electricity consumed by households. A potential increase in electricity consumption will reduce the positive RES effects: lower energy dependence and environmental protection.

According to the Latvian Agricultural Organisation Cooperation Council, farmers do not comprehend why the amendments to the law had to be passed in a hurry. There are serious concerns that the decision was not thought out enough, and it can result in an inadequate electricity price, which is uncompetitive in Europe, for small and medium producers in rural areas in future (Leta, 2016).

In the authors' opinion, the MPC reform can provide a partly positive economic effect, as production costs will decrease for energy-intensive enterprises. The idea to differentiate the MPC rate for enterprises according to connection efficiency is supportable.

Further calculations have to be done – to identify the MPC effect on the competitiveness of large enterprises as well as on small enterprises, especially agricultural ones. If the MPC reform makes some industries more competitive, whereas other ones face considerable competitiveness problems, the reform is not the right solution. The government should not foster the development of energy-intensive industries, as it can increase the country's dependence on energy imports. A better idea would be to reduce the MPC rate for the enterprises meeting certain criteria, e.g. using equipment that is highly energy-efficient or employing a certain number of employees with special needs and poor persons. This would contribute to socially responsible entrepreneurship in Latvia.

The Ministry of Economics has submitted an EU support programme for improving energy efficiency and using RES in centralised heat supply in 2017 and onwards for approval. The

total budget of the support programme is EUR 53 million. Heat supply enterprises are eligible for the support programme, and the aid intensity is expected to be up to 40 %. The available amount of public funding per project submitter may reach EUR 8 million. The programme expects to achieve the following results: modernisation of heat-producing facilities running on renewable energy sources and an increase in the capacity of the facilities for centralised heat supply to 70 MW; an additional capacity of the facilities running on renewable energy sources – 28 MW; an estimated annual reduction in GHG emissions – 30 454 CO₂ equivalent tonnes (Ministry of Economics, 2016f).

3. EU RES policy and the legal regulation after 2020

The EU has the leading role in the production of renewable energy sources. Of the total number of registered patents on renewable energy

sources, 40 % belongs to the EU. In 2012, 44 % of the global output of electricity from RES (hydropower excluded) was associated with the EU Member States, and this industry employed 1.2 million people (European Parliament, 2016).

Every EU Member State is responsible for designing its national renewable energy action plans. The information of the action plans allows concluding that the amount of electricity generated from RES in 2020 will be more than two times greater than in 2005 (Scarlat N., et al., 2015). In the result of a targeted policy of the EU, the output of electricity from RES increased by 15 % in the period 2012-2015 and could increase by 34 % in the period 2015-2020 (Table 4). It proves the effectiveness of the current RES policy implemented in the EU, as the output of electricity from the RES increases at a fast pace.

Table 4

Electricity production from renewable energy sources in the EU in 2011-2015, PJ (petajoules)

Kind of energy	2012	Expected output		Distribution, %			Δ from base year (2015/2012), %	Δ from base year (2020/2015), %
		2015	2020	2012	2015	2020		
Hydro	1182	1278	1331	17.8	16.7	13.0	8	4
Geothermal	46	83	150	0.7	1.1	1.5	80	81
Solar	336	347	634	5.1	4.5	6.2	3	83
Marine	2	3	23	0.0	0.0	0.2	50	667
Wind	715	1109	1760	10.8	14.5	17.2	55	59
Heat pumps	288	305	514	4.3	4.0	5.0	56	69
Bioenergy	4057	4510	5841	61.3	59.2	56.9	11	30
Total RES	6626	7635	10253	100.0	100.0	100.0	15	34

Source: authors' calculations based on Scarlat N., Dellemand J.F. et al., 2015

It is envisaged that by 2020 the proportion of HPPs in the distribution of output of electricity generated from RES is going to decrease (from 18 % to 13 %), while the proportion of wind power plants will sharply increase (by 6.4 %). It is also envisaged that the proportion of conventional bioenergy will decrease from 61 % in 2012 to 57 % in 2020. It is expected that the proportion of geothermal, solar, heat pump and marine energy in the distribution of output of electricity generated from RES will increase as well. It is envisaged that in the period 2012-2020, the amount of electricity from marine power will sharply increase (by 667 %). A

considerable increase in the output of electricity from solar energy (83 %) and geothermal (81 %) is expected as well.

The European Parliament emphasises that it is necessary to give investors a clear vision of the RES policy in the EU after 2020. According to the European Commission's (EC) communication "Energy Roadmap 2050" (2011), the proportion of energy from RES has to be at least 30 % by 2030. The EC also points out that if no corrective measures are taken, the consumption of energy from RES will decline after 2020. After the EC published the Green Paper "A 2030 Framework for Climate and Energy Policies" (2013) in March

2013, the EC, contrary to the previously expressed position, proposed setting no new targets for every Member State individually in its 2014 communication "A Policy Framework for Climate and Energy in the Period from 2020 to 2030" (2014); instead, a target was set at EU level – 27 % of the total energy consumption would have to be provided from renewables.

The EU stresses that achieving the targets set for every Member State with regard to GHG emissions will contribute to the fast development of the energy sector. The change in the course is intensively discussed with the European Council and the European Parliament. A potential change or softening of the policy may be explained by the growing criticism of RES, e.g. biogas and bioenergy. For example, the biogas and bioenergy industries are criticised for their contribution to food price increases that, in their turn, lead to the deterioration of food quality. A number of research investigations concluded that biogas contributed to land rent increases (Guenther-Lubbers W., et al., 2016). In the authors' opinion, such a conclusion is not correct because biogas or any other kind of RES are not to blame for food price or land rent increases – the problem is the inability of policy makers to find a way how to promote the development of the RES and avoid the negative effects. For example, one can set a higher feed-in tariff on electricity generated from manure, biological waste or biomass acquired from an area that has not been farmed for 5 or 10 years. In a similar way, one can rebut criticism of the other kinds of RES, e.g. increases in electricity price for final consumers if a Member State introduced feed-in premiums or tariffs.

In the opinion of the authors: 1) electricity tariffs have to be made economically reasonable by diversifying purchase prices on biogas produced from various inputs, thereby determining an adequate profit as well as allowing a higher profit from the inputs making

positive impacts on the environment, e.g. manure, biological waste and sewage; 2) an optimum support system has to be implemented. For example, feed-in premiums that allow controlling the effects of support for the industry on the final electricity tariff. The government has to set the maximum amount of financial support. In this way, one can calculate the size of a premium per kilowatt-hour of electricity under such a support system. Electricity producers that have applied for financial support schemes are eligible for the premium, yet the financial support is paid to the producers that first applied for it (Denina A., 2008). One can conclude that the current EU RES support policy is effective, and it is very important that the EU continues implementing it and sets an ambitious target for next years, providing particular sources of finance for this purpose not only at Member State level but also at EU level – through establishing a common budget –, which would allow continuing co-funding the construction of new RES facilities in Latvia and other EU Member States. A new target should be set for every Member State and financial measures should be taken to increase the proportion of RES.

Conclusions, proposals, recommendations

- 1) RES are important for the economy of Latvia, as their proportion in the total output of electricity was equal to 51 % in 2014 and on average 48 % in the period 2011-2014. If excluding the HPPs, an increase in the amount of electricity generated by the other RES power plants was 385 % in the period 2011-2015, which was due to a considerable 2808 % increase in the amount of electricity produced by biomass cogeneration and power plants. The increase was caused by national and EU financial support for RES.
- 2) Despite the positive aspects of the use of RES – energy efficiency, environmental protection and regional growth –, the government of Latvia seeks to limit electricity production

from the RES through setting various restrictions: a) a higher MPC rate for households that save on electricity; b) the SET that creates an unpredictable business environment. This means that the hypothesis put forward has been proved.

- 3) The further development of RES is going to be determined by the EU policy implemented after 2020, and it is very important that the EU continues the current policy and sets an

ambitious target for next years, providing particular sources of finance for this purpose not only at Member State level but also at EU level – through establishing a common budget –, which would allow continuing co-funding the construction of new RES facilities in Latvia and other EU Member States as well as establishing a support system that allows controlling the effects of support for this industry on the final electricity tariff.

Bibliography

- Amigun, B., Blottnitz, H. (2010). Capacity-cost and Location-cost Analyses for Biogas Plants in Africa. Cape Town: University of Cape Town, 7. p. Retrieved: <http://www.sciencedirect.com/science/article/pii/S0921344910001655> Access: 03.12.2016.
- Central Statistical Bureau (2016a). Elektriska jauda un sarazota elektroenerģija no atjaunīgiem energoresursiem (Electric Capacity and Electricity Generated from Renewables) Retrieved: http://data.csb.gov.lv/pxweb/lv/vide/vide___ikgad___energetika/EN0090.px/table/tableViewLayout2/?rxid=9777f82b-9f68-475c-9a33-a05b0175b0b5. Access: 23.12.2016.
- Central Statistical Bureau (2016b). Atjaunīgo energoresursu, kokogļu un atkritumu ražošana, imports, eksports un patēriņš (Central Statistical Bureau. Production, Imports, Exports and Consumption of Renewables, Charcoal and Waste). Retrieved: www.csb.gov.lv/statistikas-temas/metodologija/atjaunojamo-energoresursu-kokoglu-imports-ekspo-37142.html+&cd=3&hl=lv&ct=clnk&gl=lv. Access: 23.12.2016.
- Denina, A. (2008). Atjaunojamo energoresursu izmantošanas atbalsta shēmas Eiropa un to ekonomiskā efektivitāte. Zinatniskais raksts (Support Scheme for the Use of Renewable Energy Sources in Europe and their Economic Efficiency. Research paper). In: University of Latvia Proceedings. Vol. 737 Economics, VII. Rīga: University of Latvia. pp. 88-100.
- Elektroenerģijas tirgus likums. LR likums (Electricity Market Law of the Republic of Latvia) (2005). Retrieved: <http://likumi.lv/doc.php?id=108834>. Access: 07.01.2017
- Enerģētikas attīstības pamatnostādnes 2016.–2020.gadam (Guidelines for Energy Sector Development 2016-2020)(2016). Retrieved: <http://tap.mk.gov.lv/lv/mk/tap/?pid=40342629&mode=mk&date=2016-02-09> Access: 22.12.2016.
- European Commission (2011). Energy Roadmap 2050. Brussels, 15.12.2011 COM(2011) 885 final. 20 p. Retrieved: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2011:0885:FIN:EN:PDF> Access: 14.01.2017
- European Commission (2013). Green Paper. A 2030 Framework for Climate and Energy Policies. Brussels, 27.3.2013 COM(2013) 169 final, p. 16. Retrieved: file:///C:/Users/Lietotajs/Downloads/COM_2013_169_EN_ACTE_f.pdf Access: 14.01.2017.
- European Commission (2014). A Policy Framework for Climate and Energy in the Period from 2020 to 2030, Brussels, 22.1.2014 COM(2014) 15 final, p. 18. Retrieved: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=COM:2014:0015:FIN:EN:PDF> Access: 14.01.2017.
- European Parliament (2016). Renewable Energy Sources. Retrieved: http://www.europarl.europa.eu/ftu/pdf/lv/FTU_5.7.4.pdf Access: 05.01.2017
- Grozījumi Elektroenerģijas tirgus likuma (Amendments to the Electricity Market Law) (2016). Retrieved: <https://www.vestnesis.lv/op/2016/241.17> Access: 07.01.2017.
- Guenther-Lubbers W., Bergmann, Theuvsen L. (2016). Potential Analysis of the Biogas Production - as Measured by Effects of Added Value and Employment. Retrieved: <http://www.sciencedirect.com/science/article/pii/S0959652616302499>. Access: 07.01.2017.
- Kerellas, S., Boukis, I., Kontopoulou, G. (2009). Development of an Investment Decision Tool for Biogas Production from Agricultural Waste. Athens: National Technical University of Athens, 2009. 10. p. Retrieved: <http://www.sciencedirect.com/science/article/pii/S1364032109002822>. Access: 05.12.2016
- Latvenergo (2014). Latvenergo koncerna nerevidētie 2014. gada rezultāti (Unaudited Latvenergo Concern Performance Results for 2014). Retrieved: http://www.latvenergo.lv/lat/Jaunumi/preses_relizes/7384-latvenergo-koncerna-nerevidetie-2014-gada-rezultati. Access: 07.01.2017.
- Leta (2016). LOSP: OIK reformas atliksana draud ar neadekvātu elektrības cenu mazajiem ražotājiem. 2016.gada 5. novembris (LAOCC: Postponing the MPC Reform to Result in an Inadequate Electricity Price for Small producers. 5 November 2016). Retrieved: http://www.delfi.lv/bizness/biznesa_vide/losp-oik-reformas-atliksana-draud-ar-neadekvatu-elektribas-cenu-mazajiem-razotajiem.d?id=48128683 Access: 05.12.2016
- Lin, J.H., Wu, J.H., Lin, H.J. (2016). Successful Experience of Renewable Energy Development in Several Offshore Islands. Retrieved: <http://www.sciencedirect.com/science/article/pii/S1876610216310980>.

17. Ministry of Economics of the Republic of Latvia (2016a). MK apstiprina Enerģētikas attīstības pamatnostādnes 2016.-2020.gadam (Cabinet Approves the Guidelines for Energy Sector Development 2016-2020). Retrieved: <https://em.gov.lv/lv/jaunumi/8391-mk-apstiprina-enerģētikas-attīstības-pamatnostādnes-2016-2020-gadam> Access: 12.01.2017.
18. Ministry of Economics of the Republic of Latvia (2016b). OIK reforma - solis preti rūpniecībai Latvijā (MPC Reform – a Step towards Manufacturing in Latvia). Retrieved: <https://www.em.gov.lv/lv/jaunumi/12062-oik-reforma-solis-preti-rupniecībai-latvijā> Access: 05.01.2017.
19. Ministry of Economics of the Republic of Latvia (2016c). Saeima atbalsta OIK reformu ražotnes uzņēmumu konkurētspējas celšanai (Saeima Supports the MPC Reform for raising the Competitiveness of Manufacturing Enterprises). Retrieved: <https://www.em.gov.lv/lv/jaunumi/12749-saeima-atbalsta-oik-reformu-ražotnes-uzņēmumu-konkurētspējas-celšanai> Access: 05.01.2017.
20. Ministry of Economics of the Republic of Latvia (2016d). Tautsaimniecības padome atbalsta OIK reformas nepieciešamību rūpniecības uzņēmumu konkurētspējas celšanai (National Economy Council Supports MPC Reforms to Increase the Competitiveness of Manufacturing Enterprises). Retrieved: <https://www.em.gov.lv/jaunumi/12238-tautsaimniecības-padome-atbalsta-oik-reformas-nepieciešamību-rupniecības-uzņēmumu-konkurētspējas-celšanai> Access: 05.01.2017.
21. Ministry of Economics of the Republic of Latvia (2016e). Veicināt energoefektivitāti un vietējo AER izmantošanu centralizētāja siltumapgādē (Promoting Energy Efficiency and Domestic RES Use for Centralised Heating). Retrieved: https://em.gov.lv/lv/es_fondi/atbalsta_pasakumi_2014_2020/veicināt_energoefektivitāti_un_vietējo_aer_izmantošanu_centralizētāja_siltumapgādē/ Access: 05.01.2017.
22. Ministry of Economics of the Republic of Latvia (2016f). Atbalstam centralizētās siltumapgādes energoefektivitātes paaugstināšanai un vietējo AER izmantošanai bus pieejami 53 miljoni eiro (EUR 53 Million to be Available for Enhancing Centralised Energy Efficiency and Domestic RES Use). Retrieved: <https://www.em.gov.lv/lv/jaunumi/11644-atbalstam-centralizētās-siltumapgādes-energoefektivitātes-paaugstināšanai-un-vietējo-aer-izmantošanai-bus-pieejami-53-miljoni-eiro> Access: 05.01.2017.
23. Ministry of Economics of the Republic of Latvia (2016g). OIK reforma un provizorisks ietekme (MPC Reform and the Provisional Effects). Retrieved: https://www.em.gov.lv/lv/nozares_politika/enerģijas_tirgus_un_infrastruktura/oik_reforma_un_provizorisks_ietekme/ Access: 07.01.2017.
24. Par konceptuālo ziņojumu "Kompleksi pasākumi elektroenerģijas tirgus attīstībai" (Conceptual report "Complex Measures for Electricity Market Development") (2015). Retrieved: <http://likumi.lv/ta/id/276625-par-konceptuālo-ziņojumu-kompleksi-pasākumi-elektroenerģijas-tirgus-attīstībai>. Access: 07.01.2017.
25. Pfenninger, S., Keirstead, J. (2015) Renewables, Nuclear, or Fossil Fuels? Scenarios for Great Britain's Power System Considering Costs, Emissions and Energy Security. Retrieved: <http://www.sciencedirect.com/science/article/pii/S0306261915005656>. Access: 14.01.2017.
26. Rubins, M. (2014). Biogāzes ražošanas finansiālo aspektu analīze (Analysis of the Financial Aspects of Biogas Production). BA School of Business and Finance, Riga, p. 114.
27. Saeima of the Republic of Latvia (2010). Latvijas ilgtspējīgas attīstības stratēģija līdz 2030.gadam (Latvija 2030). 2010.gada jūnijs (Sustainable Development Strategy of Latvia until 2030 (Latvia 2030) June 2010). p. 100. Retrieved: <http://www.pkc.gov.lv/nap2020/latvija2030>. Access: 11.11.2016
28. Saeima of the Republic of Latvia (2012). Nacionālās attīstības plāns 2014-2020.gadam. 2012. gada decembris (National Development Plan of Latvia 2014-2020. December 2012) p. 69. Retrieved: <http://www.pkc.gov.lv/par-nap2020>. Access: 11.11.2016.
29. Sahovic, N., Pereira da Silva (2016). Community Renewable Energy - Research Perspectives. Retrieved: <http://www.sciencedirect.com/science/article/pii/S1876610216316629> Access: 14.01.2017.
30. Sari, A., Akkaya, M. (2015). Contribution of Renewable Energy Potential to Sustainable Employment. Retrieved: <http://www.sciencedirect.com/science/article/pii/S1877042816310771> Access: 14.01.2017.
31. Scarlat, N., Dellemand, J.F., Monforti-Ferrario, F. et al. (2015). Renewable Energy Policy Framework and Bioenergy Contribution in the European Union – An overview from National Renewable Energy Action Plans and Progress Reports. Retrieved: <http://www.sciencedirect.com/science/article/pii/S1364032115006346>. Access: 07.01.2017.
32. Subsidētās elektroenerģijas nodokļa likums. LR likums (Subsidised Electricity Tax Law of the Republic of Latvia) (2013). "Latvijas Vestnesis", 232 (5038), 27.11.2013.
33. Wu, Q., Zhou, J., Liu, S. and others (2016). Multi-objective Optimization of Integrated Renewable Energy System Considering Economics and CO₂ Emissions. Retrieved: <http://www.sciencedirect.com/science/article/pii/S1876610216315594> . Access: 14.01.2017.

THE ENVIRONMENTAL CONSEQUENCES OF CROP STRUCTURE CHANGES IN POLAND

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Abstract: The aim of the study was a comparison of nitrous oxide emissions (N₂O) from cultivation of selected crops in Poland in the years 2005-2015. The analyses included maize, sugar beet, rape and potato. The cultivation areas of these plants in the analysed period have been changed, among other things as a result of the implementation of a regulation governing production of biofuel in the European Union (EU). The calculation of N₂O emissions was performed according to the Tier 1 method of the IPCC using the BioGrace calculator based on the farm data of 2015 year. The total N₂O emissions expressed in kg N₂O per hectare were as follows: maize – 4, rape – 4.17, sugar beet – 4.3 and potato – 5.89. Direct N₂O fluxes amounted to 3.09, 3.33, 3.23 and 4.3 kg N₂O ha⁻¹, respectively for maize, sugar beet, rape and potato. It was found that growth of maize and rape cultivation area increased N₂O emissions by 98 and 72 %, respectively. Whereas decline of sugar beet and potato area decreased N₂O emissions by 37 and 49 %. The implementation regulations on environmental protection in Poland caused decreased N₂O emissions from 4.7 to 4.4 kg N₂O ha⁻¹, which means 10 % drop from analysed crops area.

Key words: nitrous oxide emissions, IPCC methodology, agriculture.

JEL code: Q580

Introduction

Nitrous oxide (N₂O) is a potent greenhouse gas due to its global warming potential about 298 times greater than carbon dioxide in 100 year horizon and average lifecycle of 114 years (IPCC, 2006). In 2014, in Poland N₂O emissions from agricultural soils amounted to 45.2 kt CO₂ eq, which accounted for 68.2 % of the total N₂O emissions (Olecka et al., 2016). The rate of nitrate fertilizers applied is one of the main factors affecting the N₂O emissions (Syp and Faber, 2012). The Intergovernmental Panel on Climate Change (IPCC), Guidelines for National Gas Inventories (IPCC, 2006) and the Good Practice Guidance (IPCC, 2000) provides methodology for estimating N₂O emissions from soils which could be performed under three Tiers characterised by different level of complexity. Tier 1 applies the default emissions factors provided by IPCC. Tier 2 uses national emission factors presenting local pedo-climatic conditions; and Tier 3 methods are based on model simulations or in situ measurements. The most common practice is using Tier 1 methodology. However, the IPCC guidelines recommend using higher Tiers if possible.

The research aim was to assess the environmental consequences of crops structure changes in Poland. To achieve the aim, the following specific research tasks were set:

- to assess N₂O emissions from cultivation of selected crops in Poland in the years 2005-2015;
- to identify crop structure changes in analysed period;
- to present the influence of crop structure changes on N₂O emissions from agricultural soils.

In the present study, the Tier 1 method was applied to calculate direct and indirect N₂O emissions from soil. The direct N₂O emissions were calculated as a 1 % of nitrogen (N) inputs such as mineral and organic fertilizers, and crop residues. The indirect emissions included emissions from the volatilizations, leaching and runoff of N inputs. All calculations were done by the BioGrace calculator ver. 4d (www.biograce.net), which has been recognised by the European Commission for demonstrating compliance with sustainability criteria for biofuels. The recognition is valid until June 2018 (EU, 2013). The following data are required by

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the BioGrace tool: fresh crop, straw yields, humidity (%) and N input. The analyses were performed for following crops: maize, sugar beet, rape and potato. All listed crops are important in Polish agriculture as food for human consumption. Maize is the basic source of feedstock for ruminates and an important component of poultry feed. In recent years, it is also used for the energy production (ethanol and biogas). Rape is used not only as food but also as a component for the production of biofuel. Sugar beet and potatoes are mainly used in human diet. From 2004, in accordance with the Common Agricultural Policy in Poland sugar market is regulated by production quotas, a minimum beet price and trade mechanisms.

In order to show changes in environment, the N₂O emissions were calculated for 2005, 2010

and 2015 years. Data corresponding area, yields and production of analysed crops were obtained from Central Statistical Office (CSO, 2006-2016). Data referring to crop productions of 2015 come from a farm located at Zakrzow (51°22'N, 22°05'E), which participates in the agri-environmental programme. The farm is considered as a representative of Poland. Production data of analysed crops are presented in Table 1. All the crops were cultivated in accordance with Good Practice Guidance. The production technology of all crops in 2015 is assumed to be the same in 2005 and 2010. Therefore, the data from 2015 were used to estimate N₂O emissions in 2005 and 2010.

Research results and discussion

Table 1

Data on the crop production on the farm

No	General information	Crop			
		Maize	Sugar beet	Rape	Potatoe
1.	Crop yield - fresh matter (kg)	9500	50000	3500	25000
2.	Crop yield - dry matter (kg)	5890	12500	3045	6250
3.	Humidity (%)	38	75	13	75
4.	Nitrogen in synthetic fertilizers (kg N ha ⁻¹ yr ⁻¹)	141	138	136	70
5.	Nitrogen in crop residues (kg N ha ⁻¹ yr ⁻¹)	55	74	70	54
6.	Nitrogen in organic fertilizers (kg N ha ⁻¹ yr ⁻¹)	0	0	0	150

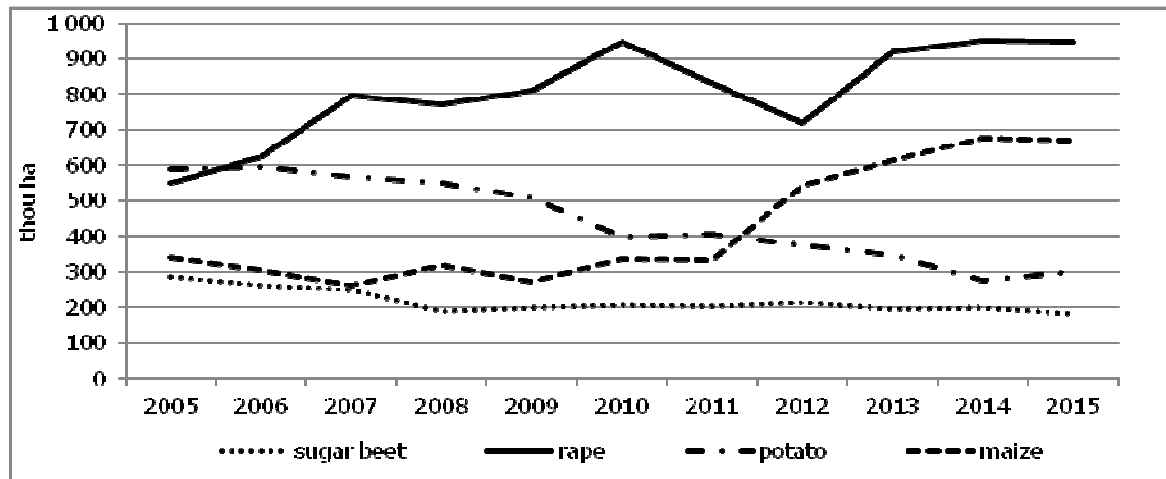
Source: authors' calculations based on the farm survey

Table 2

N₂O emissions of different crops in kg N₂O per hectare and per kg dry matter

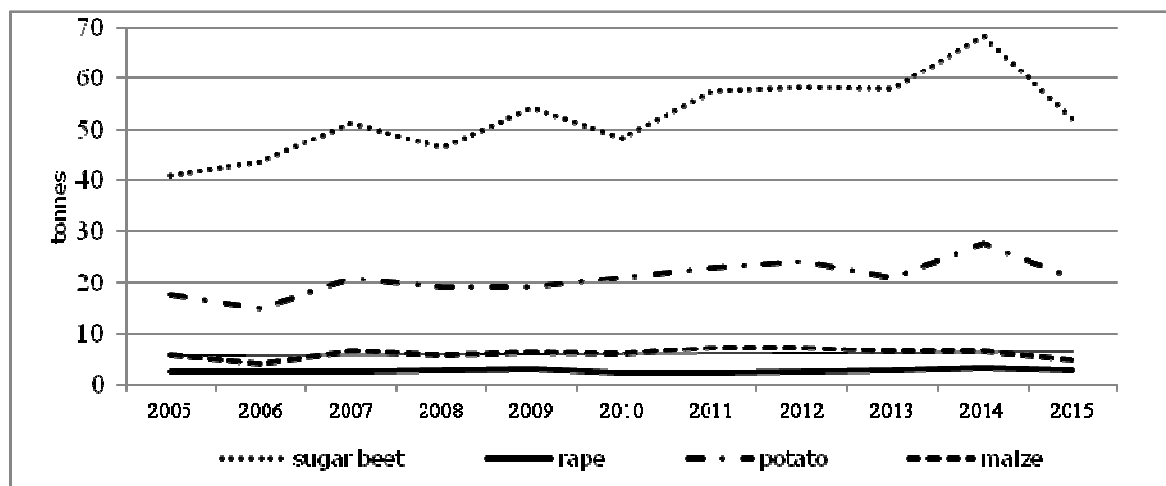
No	N ₂ O Emissions	Crop			
		Maize	Sugar beet	Rape	Potato
1.	Direct N ₂ O emissions (kg N ₂ O ha ⁻¹ yr ⁻¹)	3.09	3.33	3.23	4.30
2.	Indirect N ₂ O emissions (kg N ₂ O ha ⁻¹ yr ⁻¹)				
3.	N ₂ O from atmospheric deposition of N	0.22	0.22	0.21	0.62
4.	Emissions of N ₂ O from nitrate leaching	0.69	0.75	0.73	0.97
5.	Total N ₂ O emissions (Direct+Indirect)				
6.	kg N ₂ O ha ⁻¹ yr ⁻¹	4.00	4.30	4.17	5.89
7.	kg N ₂ O kg dm ⁻¹ yr ⁻¹	0.68	0.34	1.37	0.94

Source: authors' calculations based on the farm survey



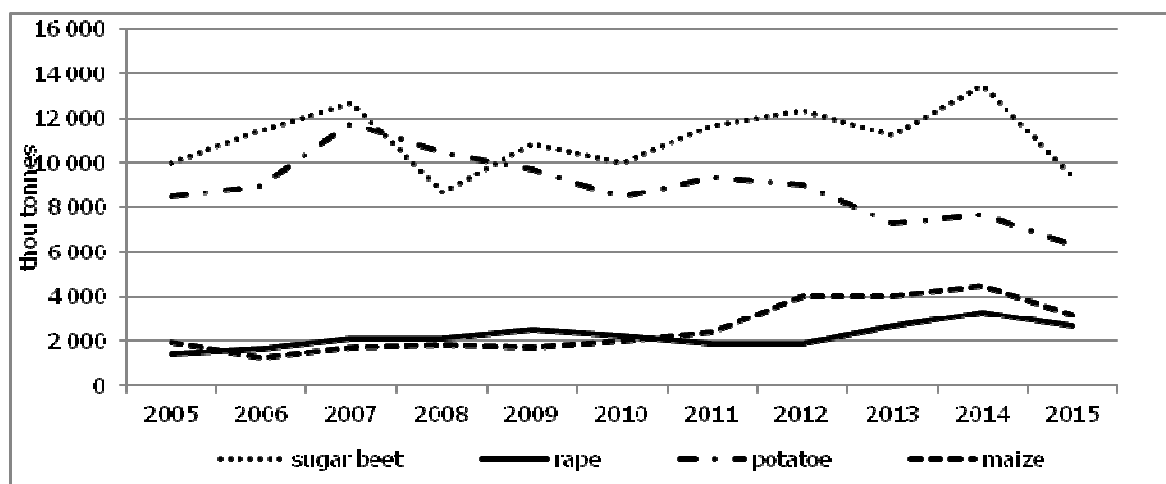
Source: authors' calculations based on the CSO (2005-2015)

Fig. 1 Cultivation area of sugar beet, rape, potato and maize in Poland in 2005-2015, in thou ha



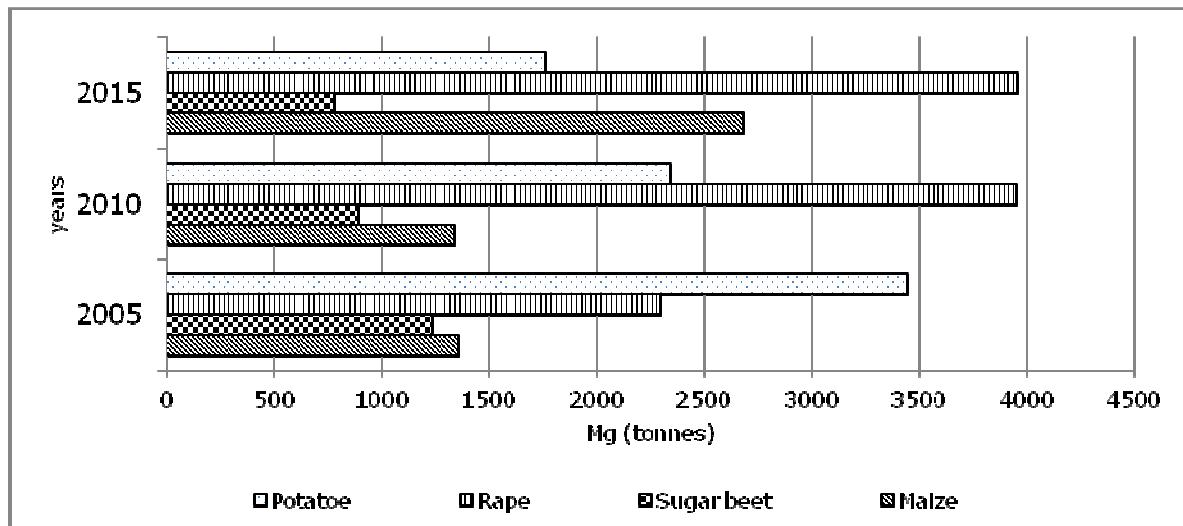
Source: authors' calculations based on the CSO (2005-2015)

Fig. 2 Crop yields of rape, maize, sugar beets and potato in Poland in 2005-2015, in tonnes



Source: authors' calculations based on the CSO (2005-2015)

Fig. 3 Production of rape, maize, sugar beets and potato in Poland in 2005-2015, in thou tonnes



Source: authors' calculations based on the farm survey

Fig. 4 N₂O emissions of rape, maize, sugar beets and potato in Poland in 2005-2015, in tonnes

Table 3

Cultivation area, total and average N₂O emissions in Poland in 2005-2015

No	Items	2005	2010	2015	Changes in % (2005=100)
1.	Total cultivation area (thou ha)	1763.9	1887.4	2097.8	118
2.	Total N ₂ O emissions (Mg N ₂ O)	8331516	8525268	9173343	110
3.	Average N ₂ O emissions (kg N ₂ O ha ⁻¹)	4.7	4.5	4.4	92.6

Source: authors' calculations based on CSO and farm survey

From 2005 to 2015, the maize and rape cultivation areas have increased respectively by 98 and 72 %. Whereas in Europe during 2005 to 2014, maize and rape cropping grew by 35 and 67 % (FAOSTAT). Area under rape cultivation has increased annually from 2005 to 2010, and now remains at a constant level. The exception was the 2012 year, when due to the winter frost the area of rape cultivation decreased. The sudden increase in maize cultivation is recorded from 2011. The growth was the result of implementation of the renewable energy directive (RED) (Directive 2009/28/EC), which requires the use of at least 10 % renewable fuel in the transport sector by 2020. In addition, RED contains sustainability criteria for biofuel production concerning the reduction of greenhouse gas (GHG) emissions by 35 % when biofuel is used, compared to fossil fuel, and further reduction to 50 % in 2017. This Directive didn't have influence on the increase of rape area cultivation because in Poland the growth of its

cultivation area has occurred earlier. In Poland, there is not possible to allocate more area under cropping rape because of the soil requirement of this plant. The growth of maize and rape cultivation areas resulted in a decrease in potato and sugar beet areas in Poland by 49 and 37 %, respectively. In Europe, declines of cropping areas of these crops were lower and amounted to 20 and 26 %, respectively for sugar beet and potato (FAOSTAT). However, because of implementation of new crops varieties and improving technology, from 2005 the yields of analysed crops have increased. The yield growths in Poland between 2005 and 2014 were as follow: sugar beet – 67, potato – 58, rapeseed –31 and maize – 15 % (Figure 2). In Europe, yield increases were much lower than in Poland and amounted to 31, 28, 4 and 10 %, respectively for sugar beet, potato, rapeseed and maize (FAOSTAT). In 2015, in Poland due to the drought, the yields were lower than long-term averages. An increase in lineage and yields of

maize and rape resulted in crop production growth in Poland respectively by 130 and 126 %, whereas in Europe only by 50 and 74 % (Figure 3) (CSO, FAOSTAT). The high increase of sugar beet yields offset drop in cultivation area that enlarged harvest by 35 and 5 %, respectively in Poland and Europe. However, in potato production, high yields didn't reward drop in acreage and crops were lower in Poland and Europe by 9 and 5 %, respectively. In 2015, in the analysed farm crop yields were higher than country averages (Table 1 and Figure 2). The applications of N fertilizers in maize, sugar beet and rape were at similar level of 140 kg N ha⁻¹ because the farm participated in the agri-environmental programme. The N rate in rape cultivation was by 40-60 kg N ha⁻¹ lower than in other farms which did not participate in this programme. In potato cultivation, N was applied in organic fertilizers as manure and in synthetic fertilizers. The N₂O emissions calculated for all crops are expressed in kg N₂O per ha per year (kg N₂O ha⁻¹yr⁻¹) and kg N₂O per kg dry matter per year (kg N₂O kg dm⁻¹yr⁻¹). Despite the application of the similar rate of N fertilizer, there are differences in the N₂O emissions (Table 2). The N₂O emissions per hectare, ranked from the highest to the lowest, were as follows: potato, sugar beet, rape and maize. The shares of direct N₂O emissions in total N₂O emissions amounted to 77 % for maize, sugar beet and rape, whereas for potato – 73 % (Table 2). The direct N₂O emissions in the analysed farm were higher (3.09-4.30 kg N₂O ha⁻¹) than average N₂O emission calculated for the territory of Poland (2.29 kg N₂O ha⁻¹) in the period of 1960-2009 (Nyckowiak et al., 2014). The difference in emissions values come from using average data of N application in Poland. In our study, the N rate was around 140 kg N ha⁻¹, whereas average rate for Poland was 58 kg N ha⁻¹ (1970-2009). N₂O emissions per kg dry matter ranged from 0.34 to 1.37, respectively for sugar beet and

rape. In performed research, the direct N₂O emission, from rape cultivation amounted to 3.23 kg N₂O ha⁻¹ and was lower compared to 3.55 kg N₂O ha⁻¹yr⁻¹ predicted by Walter et al. (2014) and 3.78 kg N₂O ha⁻¹yr⁻¹ forecasted by Syp et al. (2016). The differences in emissions were related to different N fertilization rates. In our study the N dose was 136 kg N ha⁻¹ versus 200 kg N ha⁻¹yr⁻¹ (Walter et al., 2014) and 180 kg N ha⁻¹yr⁻¹ (Syp et al., 2016). The annual N₂O emissions from maize cultivation in our research amounted to 4 kg N₂O ha⁻¹ whereas average for Poland – 2.8 kg N₂O ha⁻¹ (Krasuska et al., 2013). Similarly as in rape differences in the emissions are the result of various N fertilization rates. It confirms that N-fertilization rate is a significant factor for the N₂O emissions. However, the studies performed by Dufosse et al. (2013) present that the soil type and soil water content were the main stress factors in sugar beet cultivations. The average N₂O emissions for Picardy region in France from the IPCC Tier 1 method amounted to 4.16 kg N₂O ha⁻¹, however it ranged from 1.26 to 12.56 kg N₂O ha⁻¹. Our estimation of N₂O emissions (4.30 kg N₂O ha⁻¹ yr⁻¹) from sugar beet cultivation was very similar to their average. According to Flessa et al. (1995), annual N₂O emission rates from arable soils can range from below 0.1 up to 150 kg ha⁻¹, but are generally lower than 5 kg N ha⁻¹. Freibauer and Kaltschmitt (2003) stated that the emissions from European cropland soils are generally below 3 kg N ha⁻¹, and emissions higher than 10 kg ha⁻¹ are an exception. The values of all N₂O emissions in our study were in agreements with these assumptions. Within years 2005-2015, changes in crop structure had an impact on N₂O emissions in Poland. The upward trend in N₂O emissions was recorded in maize and rape cultivation, whereas downward trend was recorded in sugar beet and potato (Figure 4). The N₂O emissions from maize and rape cultivation increased by 98 and 72 %, respectively. Whereas, the drops of N₂O

emissions by 37 and 49 % were recorded respectively for sugar beet and potato. These values are equal to the growth of cultivation area because the emissions calculated using Tier 1 method present a linear correlation between N input and N₂O emissions. During 2005-2010, the total area of analysed crops increased by 18 %, while the total N₂O emission from their cultivation increased by 10 % (Table 3). The average N₂O emission decreased from 4.7 to 4.4 kg N₂O ha⁻¹. The presented data show that implementation of regulations on environmental protection caused a decrease in N₂O emissions in Poland between 2005 and 2015.

Conclusions, proposals, recommendations

- 1) Directive on the promotion of the use of energy from renewable sources had an important impact on structural changes in Polish and European agriculture.
- 2) Structural changes in Polish agriculture caused the decrease of N₂O emissions from agricultural soil.
- 3) In the analysed period, the highest increase of cultivation area was recorded for maize.

However, if an increase in maize cultivation area should, in future, take place as rapidly as until now, it would associate with a risk of negative impact on the environment.

- 4) Due to the high demand for maize in many farms, it is grown in monoculture. Such a method of cultivation in order to achieve high yields in the long run can result in higher demand for nitrogen and thereby increase the N₂O emissions.
- 5) Plant cultivation without the organic fertilizers (manure) causes a decrease of carbon sequestration, which declines the soil quality and affects the growth of GHG emissions.
- 6) There is a concern that strong need for maize by the bio-industry could increase its prices and limit its use as an ingredient in animal feed.

Acknowledgements

The studies have been supported by Multiannual Research Programme 2.6: Analysis of the possibilities for the reduction of GHG, ammonium and nitrates emissions from agriculture in the perspective of 2030 and 2050.

References:

1. BioGrace. (2015). BioGrace Calculation Rules – version 4d. <http://biograce.net/home>. Access: 05.01.2017.
2. Central Statistical Office. (2006-2016). *Statistical Yearbook of Agriculture*. Warsaw. Poland.
3. Dufosse, K., Benoit, G., Drouet, J.L., Bessou C. (2013). *Using agroecosystem modelling to improve the estimations of N₂O emissions in the life-cycle assessment of biofuels*. Waste Biomass Valor, No. 4, pp. 593-606.
4. European Union.(2009). *Directive 2009/28/EC of the European Parliament and of the Council of 23 April 2009 on the Promotion of the use of Energy from Renewable Sources and Amending and Subsequently Repealing Directives 2001/77/ EC and 2003/30/EC*. Official Journal of the European Union, No. 140, pp.16-62.
5. European Union. (2013). *Commission Implementing Decision of 30 May 2013 on Recognition of the 'BioGrace GHG calculation tool' for Demonstrating Compliance with the Sustainability Criteria under Directives 98/70/EC and 2009/28/ EC of the European Parliament and of the Council*. Official Journal of the European Union, No. 147, pp. 46-47.
6. Faostat. (2006-2016). <http://www.fao.org/faostat/en/#data/QC>. Access: 11.01.2017
7. Flessa, H., Dorish, P., Besse, F. (1995). *Seasonal variation of N₂O and CH₄ fluxes in differently managed soils in southern Germany*. Journal of Geophysical Research, No. 109, pp. 23115-23124.
8. Freibauer, A., Kaltschmitt, M. (2003). *Controls and models for estimating direct nitrous emissions from temperate and sub-boreal agricultural soils in Europe*. Biogeochemistry, No. 63, pp. 93-115.
9. Intergovernmental Panel on Climate Change. (2000). *Good Practice Guidance and Uncertainty Management in National Greenhouse Inventories*. In: Tichy M. Bentley S (eds). online: <http://www.ipcc-nggip.iges.or.jp/public/gp/english/>. Access: 05.01.2017.
10. Intergovernmental Panel on Climate Change. (2006). *IPCC Guidelines for National Greenhouse Gas Inventories* (Eds Eggleston, S., Buendia, L., Miwa, K., Ngara, T., Tanabe, K.), Agriculture, Forestry and Other Land Use, Vol. 4, IGES, Japan.
11. Krasuska, E., Faber, A., Pudelko, R., Jarosz, Z., Borzecka-Walker, M., Kozyra, J., Syp A. (2013). *Emission saving opportunities for corn cultivation for ethanol in Poland*. Journal of Food, Agriculture & Environment, Volume 11, pp. 2050-2053.

12. Nyckowiak, J., Lesny, L., Merbold, L., Niu, S., Haas, E., Kiese, R., Butterbach-Bahl, K., Olejnik, J. (2014). *Direct N₂O Emission from Agricultural Soils in Poland between 1960 and 2009*. Regional Environmental Change, No. 14, pp. 1073-1082.
13. Olecka, A., Bebkiewicz, K., Debski, B., Jedrysiak, P., Kanafa, M., Kargulewicz, I., Rutkowski, J., Skoskiewicz, J., Wasniewska, S., Zasina, D., Zimakowska-Laskowska M., Zaczek, M. (2016). *Poland's National Inventory Report 2016*, National Centre for Emission Management, Poland.
14. Syp, A., Faber, A. (2012). *Zastosowanie modelu DNDC do symulacji plonow roslin i oceny wpływu zmian na srodowisko w zmieniajacych sie warunkach klimatycznych i roznych systemach uprawy*. Roczniki Naukowe SERiA, Volume 14, No. 5, pp. 183-187.
15. Syp, A., Faber, A., Kozak M. (2016). *Assessment of N₂O emissions from rapeseed cultivation in Poland by various approaches*. International Agrophysics, No. 30, pp. 501-507.
16. Walter, K., Don, A., Fus, R., Kern, J., Drewer, J., Flessa, H. (2014). *Direct nitrous oxide emissions from oilseed rape cropping-a meta-analysis*. Global Change Biology Bioenergy, No. 7, pp. 1260-1271.

FOOD AND BIOENERGY – EVIDENCE FROM POLAND

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Abstract. The goal of the article is to evaluate whether production of modern biofuels in Poland competes with food production. CSO and AMA data have been used in the analysis. The data in question refers to the area of arable land in Poland, yields and livestock as well as renewable energy production structure and quantity and production of biodiesel, bioethanol and agricultural biogas. Data concerning quantity of raw materials used for production of the agricultural biogas have been accessed from AMA. Data for 2005-2015 have been collected. Production of bioenergy based on agricultural raw materials has significantly increased. From 2005 to 2015, it increased from 5 to 42 TJ. Approximately 92 % of bioenergy from agricultural sources are bioethanol and biodiesel produced from the first generation of raw materials, the production of which is in direct competition with food production. The share of biogas was 8 % only. Waste constituted over 70 % in the raw materials used to produce biogas. The area of production of energy crops has reached 8 % of arable land in 2015 from 1.5 % in 2005. It means that in Poland production of bioenergy from agricultural sources competes with food and feed production and its further increase is not desirable. Actions focused on the increased use of the second generation raw materials for energy production and decreased use of food raw materials should be taken.

Key words: bioenergy, bioethanol, biodiesel, biogas, food–energy competition.

JEL code: Q16, Q20, Q42

Introduction

Increased demand for energy in the world becomes a reason to search for new energy sources. Additionally, it is expected that new energy sources will create lower emissions as well as they will be renewable sources. The energy coming from renewable sources includes energy of water, wind, sun, geothermal and bio fuels. In some applications, e.g. in transport liquid biofuels, it has become the only substitute for fossil fuels. The biofuels production opportunities have been known for many decades so far, but their production on industrial scale became cost-effective only when crude oil prices increased to very high levels and when low emission economy concept started to be followed. Production of fuels is considered one of the most important directions for development the modern concept of bioeconomics.

Bioenergy draws on a wide range of potential feedstock materials: forestry and agricultural residues and wastes of many sorts, as well as material grown specifically for energy purposes. The raw materials can be converted to heat for use in buildings and industry, to electricity, or into gaseous or liquid fuels, which can be used in transport, for example. This degree of flexibility

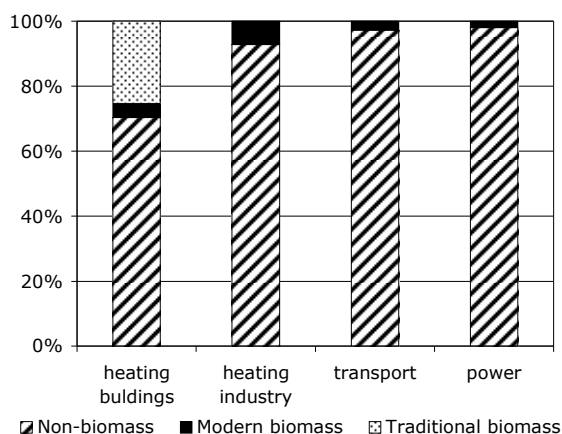
is unique amongst the different forms of renewable energy.

The most commonly used conversion methods – combustion of fuels to produce heat or electricity; anaerobic digestion to produce methane for heat or power production; and the conversion of sugary and starchy raw materials to ethanol, or of vegetable oils to biodiesel – all are well-established and commercial technologies. A further set of conversion processes – for example, the production of liquid fuels from cellulosic materials by biological or thermo chemical conversion processes, such as pyrolysis – are at earlier stages of commercialisation or still under development.

The bioenergy share in total global primary energy consumption has remained relatively steady since 2005, at around 14 %, despite a 24 % increase in overall global energy demand between 2005 and 2015 (REN21, 2016).

Solid biomass represents the largest share of biomass used for heat and electricity generation, whereas liquid biofuel represents the largest source in the transport sector (Fig. 1).

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Source: (REN21., 2016)

Figure 1. Shares of biomass in final energy consumption by end-use sector, 2014

Only 10 % of the total quantity of biomass used for energy production comes from agriculture. The highest share, ca. 40 % belongs to by-products of plant origin, 30 % belongs to waste of animal origin and energy crops (Edenhofer, Madruga, Sokona, 2012).

Two most popular biofuels globally are bioethanol and biodiesel; other biofuels include butane, fischer-tropsch diesel, syngas, and biogas. Bioethanol is made from wheat, corn, sugarcane etc., and biodiesel is made from oil seeds such as soybeans, rape seed, and palm oil. The feedstock used in the production of biofuels is also used for human and animal consumption, affecting food crop prices. Biofuels production process has been accompanied by a threat of food price increase resulting from competitive application of agricultural raw materials used for foodstuff or biofuels production.

First generation biofuels are produced using vegetable oil, animal fat, and used cooking oil. The feedstock used in producing biofuels is also used as food, and the prices of these feedstocks are directly associated with the demand from biofuels creating conflict between the food and energy sectors. This continuous issue has led to the development of second and third generation biofuels to overcome the limitations of first generation fuels. Second generation fuels are produced using non-food crops like wood (saw

dust), organic waste (corn stover) and specific biomass plants such as jatropha, camelina, and switchgrass. The third and fourth generation fuel, also called advanced biofuel, is produced using specially engineered energy crops like algae as feedstock, which provides higher yield with lower resource inputs (techNavio, 2015). Fourth generation of feed stock for biofuels production is still in laboratory stage, so we don't know yet what kind of organisms will be developed with use of genetic engineering methods. In Table 1, classification of raw materials used for biofuels production has been presented.

Table 1

Generation of biofuels

1 st generation	2 nd generation	3 rd generation	4 th generation
Cereals Rape Palm oil Soybean oil Corn	Organic waste Non-food crops Cellulosic waste	Micro-algae Seaweed	Genetically modified feedstocks

Source: author's study

It is recommended to reduce production of the first generation biofuels, i.e. manufactured using the same raw materials as during food production, in connection with competitive effect that appears between biofuels production and food production (Nelson, 2010). Even so, the global production is still growing. Production of liquid biofuels reached the level of 133 billion litres in 2015 and it was 3 % higher than in 2014. More than 74 % of the global production of liquid biofuels is constituted by bioethanol, biodiesel 22 % and other advanced biofuels 4 %. The biggest global manufacturer is the USA where 46 % of the global biofuels production is manufactured, then Brazil constituting 24 % share and EU – 15 %. The USA share in the global bioethanol production is ca. 50 %, and 25 % ca. is Brazil share. The European Union (EU) takes the fourth place, following China that constitutes 6 %. As far as biodiesel production is concerned, the first place is taken by the EU with

42 % share and it is followed by the USA – 18 % and Brazil – 11 % (OECD/FAO, 2015; OECD/FAO, 2016). Biodiesel production in the EU has been developed due to support provided by the Common Agricultural Policy, but also in connection with the Directive on transportation. It is manufactured from rapeseed, so its production competes with foodstuff production. Biofuels production in the EU are not related to macro-economic indicators in the Member States. High consumption of renewable energy in the EU results from the conducted environmentally-friendly policy (European..., 2009; Rokicki, 2016).

Aim and methods

The goal of the article is to evaluate whether production of modern biofuels competes with food production. The goal has been achieved due to implementation of three scientific tasks: 1) determination of raw materials quantities of agricultural origin used for production of modern biofuels; 2) determination of the agricultural crops area where production is used to produce biofuels; 3) determination of the agricultural area share used to produce biofuels and determination of the share change ratio.

Central Statistical Office of Poland (CSO) and Agricultural Market Agency (AMA) data have been used in the analysis. Data coming from the CSO statistics referred to the agricultural areas in Poland, average yields and livestock. Data regarding quantity and energy production mix coming from renewable energy sources, including production of biodiesel, bioethanol and agricultural biogas, have also been collected. Data concerning quantity of raw materials used for production of the agricultural biogas have been accessed from AMA. Data for 2005-2015 have been collected. There is no comparable statistical data for the previous years. It has been assumed that from oilseed rape we obtain on average 40 % of oil and from 1 ton of cereal grains we obtain 340 l of ethyl alcohol. The subject of the study is the agricultural area utilized

directly for the production of raw materials for biofuel production and its share in the total agricultural area in Poland. The object of the study is therefore crop production in Poland.

Agricultural area used to produce raw materials necessary in biofuels production process has been determined considering main crops. Due to short series of data, the results have been presented in tables and in a descriptive form. There is no reason to apply statistical methods. Additionally, there is no price analysis because prices on Polish agricultural market strongly depend on situation on whole European market, so much wider analysis is necessary to explain influence of biofuels market size on food market prices.

Specific conditions for biofuel production development in case of biomass

There is a correlation between the economic growth, intensification of agricultural production and stronger impact on natural environment. Production of biofuels and bioenergy is one of public goods provided by agriculture in result of greenhouse gases reduction (GHG) and impact on natural environment (Danilowska, 2015). Many authors present mechanism of reducing the agriculture impact on natural environment in connection with biomass production development needed for energy generation. It mainly results from reduction of GHG general emission, carbon deposition from atmosphere but also from management of agriculture production waste and food production waste. It is one element of the sustainable intensification of agriculture (Dressler et. al., 2012; Golebiewska and Pajewski, 2016; Jarosz and Faber, 2016; Lenerts, 2015; Pajewski, 2016; Popluga et al., 2015; Popluga and Feldmane, 2016; Rokicki, 2016). Some authors state that production of first generation biofuels contributes to net reduction of GHG emission to a very limited extent, but it could generate negative impact resulting from introduction of agricultural monocultures

(Zoladkiewicz, 2016). As a result, more and more attention is paid and more support provided to use the second generation biofuels or other cheap energy sources, e.g. wind turbines, photovoltaic cells (Eriksson et al., 2016; Jefremov and Rubanovsakis, 2015; Popluga and Feldmane, 2016; Woon, Lo, Chiu, Yan, 2016). The agriculture biofuels production is still a kind of social innovation (Melece, 2015) because production of renewable energy from the traditional solid biomass (timber) is still better developed in many EU countries (Krievina and Melece, 2016).

Further development of the agricultural production of biofuels mostly results from the environmentally-friendly policy conducted by Member States (Jefremov and Rubanovsakis, 2015; Golebiewski, 2014; Pelse and Lescevic, 2016), including activities aimed at supporting energy micro-installations development (Chodkowska-Miszczyk, 2015) that will cause income diversification in agricultural holdings and economic risk reduction (Wicka and Wicki, 2016; Wicka et al., 2013).

The most important obstacles, as far as further development of the agricultural production of biofuels based on biomass is concerned, are the following: high cost of investment in production facilities (Golasa, 2016; Melece, 2015; Wielewska, 2016a; Wielewska, 2016b) and still high cost of energy from renewable sources (Rokicki 2016). The power production cost is lower when combined heat and power unit (CHP) is used (Dressler et al., 2012). The results confirm that renewable energy production is cost-effective when fossil fuels prices remain high (Jasiulewicz and Gostomczyk, 2016; Borawski et al., 2016).

Research results

In Poland, the agriculture bio-energy production includes three types of fuels: bioethanol, biodiesel and biogas. Biodiesel production increased in Poland in 2008 when subsidies were introduced. The agriculture biogas energy share

in total energy supply was included in statistics in 2011 for the first time and its share in total bioenergy supply is very small. The energy production is shown in Table 2.

Table 2

Production of modern bioenergy from agricultural feedstocks in Poland in years 2005-2015

Year	Production of energy from agricultural resources in TJ			
	biogas	biodiesel	bioethanol	total
2005	-	2 471	2404	4 875
2006	-	3 423	3542	6 965
2007	-	1 822	2792	4 614
2008	107	9 943	2 459	12 509
2009	188	14 010	3 838	18 036
2010	334	14 584	4 538	19 456
2011	634	13 974	4 057	18 665
2012	1 463	23 247	5 124	29 834
2013	2 084	24 217	5 098	31 399
2014	2 811	27 343	3 812	33 966
2015	3 413	34 479	4 696	42 588

Source: GUS 2009, GUS 2014, GUS 2016

Biodiesel prevails in the biofuels production mix. Since 2008, the biodiesel share in total production of energy generated from agricultural raw materials is ca. 80 %. During biogas production, the second generation raw materials can be used and its percentage in energy production increased from 1 % in 2008 to 8 % in 2015. Energy from renewable sources provides 12 % of total energy consumption in Poland and bioenergy from agricultural sources is only 1.5 % of energy consumption.

In 2011, in biogas production 0.5 mil tons of raw material was used and in 2015 eventually 2.5 mil tons of raw material was used. There is no data for the previous years. 70 % of raw material for biogas production was agricultural wastes and food industry wastes. Ca. 30 % of raw material were specific plants (mostly maize silage) (Table 3). High percentage of wastes in the mix of raw material used during biogas production means that it is very modern sector

where mostly the second generation raw materials are used. There are only 78 agricultural biogas plants in Poland, whereas in Germany there are more than 10 000 plants, in France more than 700 and 17 000 in the whole EU.

Table 3

Structure of feedstock used in agricultural biogas plant in Poland in 2011-2015

Year	Structure of feedstock used in agricultural biogas plant in per cent			
	agric. wastes	food-wastes	agric. crops	others*
2011	59	11	28	2
2012	41	28	31	0
2013	31	43	26	0
2014	29	40	31	0
2015	27	47	26	0

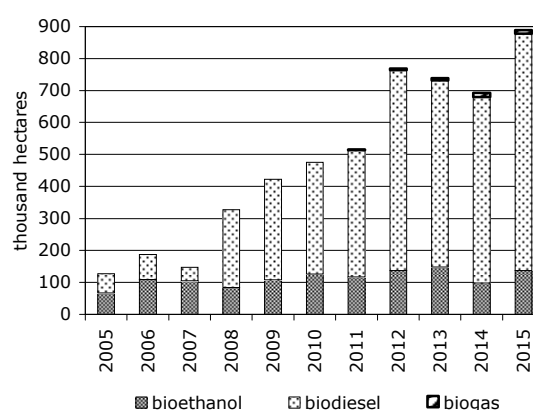
*in years 2012-2015 less than 0.5 per cent

Source: author's calculation based on data from AMA reports for years 2011-2015

Area of crops used as raw material in agricultural biogas plants is only 12 000 hectare (0.11 % of the arable land area). Use of slurry in agricultural biogas plants is equal to 0.5 % of the total production. The importance of the use of waste in agricultural biogas plants is therefore relatively low in the overall amount of waste. Similarly, biogas production does not compete with food production. Agricultural crops used for bioethanol and biodiesel production occupy much bigger area. In 2015, the total area was equal to ca. 880 000 hectares; while in 2005, the total area was equal to 130 000 hectares and 475 000 hectares in 2010 (Fig. 2). In the years 2010-2015, 50 to 70 % of rapeseed production in Poland was processed to biodiesel. In case of bioethanol production, only 2 % of production was used to bioethanol production.

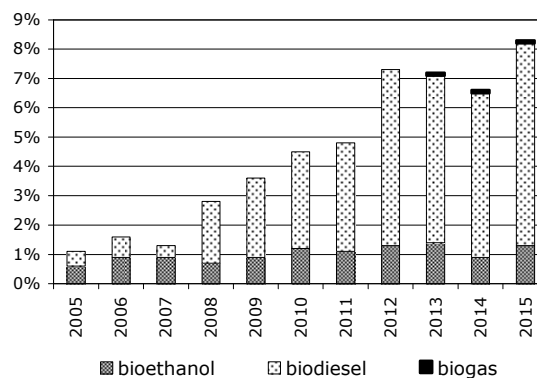
Production area of agricultural raw materials used for bioenergy production significantly increased since 2008 when subsidies for rapeseed production to be used to generate energy were introduced. Bioethanol production to be used as biofuel is not cost-effective without subsidies. Total arable land area used for production

of raw materials necessary during bioenergy production process has increased. In 2015, the area where agricultural energy raw materials were produced was equal to ca. 8 % of the total arable land area. The percentage of land used for energy crops was systematically increasing. In 2008, it was 2.8 %. The average yearly increase rate was 14.5 % in 2008-2015. Since 2012, the growth rate decrease can be also observed. This suggests that the reached level shall be maintained (Fig. 3).



Source: author's calculation

Figure 2. Area of crop for biofuels production in Poland in years 2005-2015



Source: author's calculation

Figure 3. Share of arable land allocated for energy crops in Poland in years 2005-2015

Observed high percentage of land used for production of energy crops means that bioenergy production competes with food production. In Poland, the quantity of the food produced exceeds domestic demand; nevertheless, permanently increasing area used for production of energy crops makes more difficult to increase

e.g. animal production or food export (Grontkowska and Wicki, 2015).

Conclusions

- 1) Renewable energy production grows all over the world. In the recent years, the fastest increase can be noticed in photovoltaic cells energy production. Importance of energy from bio mass is still high and equal to even 14 %.
- 2) Ca. 10 % of biomass used for energy production is delivered from agriculture, but as far as production of modern bioenergy is concerned, the agricultural raw materials constitute major part.
- 3) Production of energy from agricultural raw materials competes with food and feed production. It is then recommended to use the second generation raw materials, mostly by-products and wastes as source of biomass.
- 4) In Poland, the renewable energy constitutes ca. 12 % of energy consumption and agricultural bioenergy constitutes only 1.5 % of energy consumption.

- 5) More than 90 % of the agricultural bioenergy is produced from raw materials which can be also used for food production (cereals, rape seed). Up to 8 % (900 000 hectares) of the arable land area is used for production of energy raw materials, mostly rapeseed.
- 6) Bioenergy production in Poland competes with food production; yet, it does not limit food availability but reduces forage production capacity as well as food export capacity.
- 7) In Poland, it is recommended to support development of systems using the second generation energy raw materials and to reduce production of energy from agricultural raw materials which can be used for food production.

Bibliography

1. ARR (2012). Sprawozdanie z działalności Agencji Rynku Rolnego w 2011 roku (The Report on the Activity of Agricultural Market Agency in 2011). Warszawa: Agencja Rynku Rolnego, p. 231.
2. ARR (2013). Sprawozdanie z działalności Agencji Rynku Rolnego w 2012 roku (The Report on the Activity of Agricultural Market Agency in 2012). Warszawa : Agencja Rynku Rolnego, p. 223.
3. ARR (2014). Sprawozdanie z działalności Agencji Rynku Rolnego w 2013 roku (The Report on the Activity of Agricultural Market Agency in 2013). Warszawa: Agencja Rynku Rolnego, p. 217.
4. ARR (2015). Sprawozdanie z działalności Agencji Rynku Rolnego w 2014 roku (The Report on the Activity of Agricultural Market Agency in 2014). Warszawa: Agencja Rynku Rolnego, p. 231.
5. ARR (2016). Sprawozdanie z działalności Agencji Rynku Rolnego w 2015 roku (The Report on the Activity of Agricultural Market Agency in 2015). Warszawa: Agencja Rynku Rolnego, p. 269.
6. Borawski, P., Wyszomierski, R., Beldycka-Borawska, A., Jankowski, K. (2016). Ocena opłacalności wykorzystania biomasy na cele energetyczne ze szczególnym uwzględnieniem peletu (Evaluation of Profitability Use of Biomass for Energy Purposes With Particular Regard Paid to Pellet). Roczniki Naukowe SERiA, vol. XVIII, No 2, pp. 296-302.
7. Chodkowska-Miszczuk, J. (2015). Biogazownie rolnicze w rozwoju małoskalowych instalacji odnawialnych źródeł energii w Polsce (Agricultural Biogas Plants in the Development of Small-Scale Renewable Energy Installations in Poland). Roczniki Naukowe Ekonomii Rolnictwa i Rozwoju Obszarów Wiejskich, vol. 102, No 1, pp. 97-105.
8. Danilowska, A. (2015). Provision of Public Goods by Agriculture in Poland. Economic Science for Rural Development, No 37, pp.142-151.
9. Dressler, D., Loewen, A., Nelles, M. (2012). Life Cycle Assessment of the Supply and Use of Bioenergy: Impact of Regional Factors on Biogas Production. International Journal of Life Cycle Assess, No 17, pp. 1104-1115. DOI 10.1007/s11367-012-0424-9.
10. Eriksson, O., Bisailon, M., Haraldsson, M., Sundberg, J. (2016). Enhancement of Biogas Production From Food Waste and Sewage Sludge – Environmental and Economic Life Cycle Performance. Journal of Environmental Management, No 175, pp. 33-39. DOI 10.1016/j.jenvman.2016.03.022.
11. European Communities (2009). DIRECTIVE 2009/28/EC OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL of 23 April 2009 on the promotion of the use of energy from renewable sources and amending and subsequently repealing Directives 2001/77/EC and 2003/30/EC. ELI: <http://data.europa.eu/eli/dir/2009/28/oj>
12. Golasa, P. (2015). Agricultural Biogas Production and the Development of Prosumer Energy in Poland. Economic Science for Rural Development, No 37, pp. 134-141.

13. Golebiewska, B., Pajewski, T. (2016). Negatywne skutki produkcji rolniczej i mozliwosci ich ograniczania (The Negative Effects of Agricultural Production and The Possibility of Its Limitation). *Roczniki Naukowe SERiA*, vol. XVIII, No 3, pp.76-81.
14. Golebiewski, J. (2014). Biogospodarka jako inteligentna specjalizacja regionow w Polsce (Bioeconomy as a Smart Specialization of Regions in Poland). *Przedsiębiorczość i Zarządzanie (Entrepreneurship and Management)*, Vol. 15, z. 8, part 1, pp. 55-69. Retrieved: <http://piz.san.edu.pl/docs/e-XV-8-1.pdf>. Access: 22.12.2016.
15. Grontkowska, A., Wicki, L. (2015). Zmiany znaczenia agrobiznesu w gospodarce i w jego wewnętrznej strukturze (Changes in the Importance of Agribusiness in the Economy and Its Internal Structure). *Roczniki Naukowe Ekonomii Rolnictwa i Obszarow Wiejskich*, vol. 102, No 3, pp. 21-32.
16. GUS (2009). *Energia ze zrodel odnawialnych w 2008 roku (Energy from Renewable Sources in 2008)*. Warszawa: Główny Urząd Statystyczny (Central Statistical Office), p. 60.
17. GUS (2014). *Energia ze zrodel odnawialnych w 2013 roku (Energy from Renewable Sources in 2013)*. Warszawa: Główny Urząd Statystyczny (Central Statistical Office), p. 72.
18. GUS (2016). *Energia ze zrodel odnawialnych w 2015 roku (Energy from Renewable Sources in 2015)*. Warszawa: Główny Urząd Statystyczny (Central Statistical Office), p. 72.
19. Jarosz, Z., Faber, A. (2016). Mozliwosci i ograniczenia emisji rolniczych z uprawy kukurydzy przeznaczonej do produkcji bioetanolu (The Possibility of Agricultural Emission Limitations From Corn Cultivation on Bioethanol). *Roczniki Naukowe SERiA*, vol. XVIII, No 3, pp.120-126.
20. Jasiulewicz, M., Gostomczyk, W. (2016). Economic Efficiency of the Utilization of Local Biomass for Energy Purposes. *Roczniki Naukowe SERiA*, vol. XVIII, No 1, pp. 90-97.
21. Jefremov, V., Rubanovskis, A. (2015). Electric Power Sector Development Potential. *Economic Science for Rural Development*, No 39, pp. 253-263.
22. Krievina, A., Melece, L. (2016). Comparison of the Consumption of Wood Pellets Between Latvia and Other EU Countries. *Economic Science for Rural Development*, No 41, pp. 210-218.
23. Lenerts, A. (2015). Development of Sustainable Intensification Evaluation Methodology for Farmlands in Latvia. *Economic Science for Rural Development*, No 37, pp.160-170.
24. Madruga, R., Edenhofer, O., Sokona, Y. (eds.) (2012). *Renewable Energy Sources and Climate Change Mitigation. Special Report of the Intergovernmental Panel on Climate Change*. New York: Cambridge University Press, p. 1076.
25. Nelson, G. (2010). Are Biofuels the Best Use of Sunlight? In Khanna, M., Scheffran, J., Zilberman, D. (eds.) *Handbook of Bioenergy Economics and Policy*. New York:Springer. DOI 10.1007/978-1-4419-0369-3.
26. OECD/FAO (2016). *OECD-FAO Agricultural Outlook 2016-2025*. Paris: OECD Publishing. DOI 10.1787/agr_outlook-2016-en.
27. OECD/Food and Agriculture Organization of the United Nations (2015). *OECD-FAO Agricultural Outlook 2015*, OECD Publishing, Paris. DOI 10.1787/agr_outlook-2015-en.
28. Pajewski, T. (2016). Environmental Changes in the Polish Agriculture – Toward the Bio-Economy. *Economic Science for Rural Development*, No 41, pp.243-251.
29. Pelse, M., Lescevic, M. (2016). Smart Specialization Assessment in Latvia. *Economic Science for Rural Development*, No 42, pp. 126-131.
30. Popluga, D., Feldmane, L. (2016). Development of Sustainable Living Environment in the Cities Through the Bioeconomy. *Economic Science for Rural Development*, No 41, pp. 260-265.
31. Popluga, D., Naglis-Liepa, K, Lenerts, A. (2015). Latvia's Progress towards Agricultural GHG Mitigation. In *Proceedings of the 25th NJF Congress. Nordic View to Sustainable Rural Development*. Riga: NJF Latvia, pp. 265-269.
32. REN21. (2016). *Renewables 2016. Global Status Report*. Paris: REN21 Secretariat, p. 271.
33. Rokicki, T. (2016). Sustainable Development in Energy Sector in the European Union Countries. *Economic Science for Rural Development*, No 43, pp. 108-115.
34. TechNavio. (2015). *Global Biorefinery Market 2015-2019*. Infiniti Research Limited, p. 117.
35. Wicka, A., Golebiewska, B., Golebiewski, J., Jedrzejczyk, I., Kobus, P., Wicki, L., Wojciechowska-Lipka, E. (2013). Czynniki i mozliwosci ograniczania ryzyka w produkcji roslinnej poprzez ubezpieczenia (Factors and Possibilities of Reducing the Risk of Crop Production Using Insurance). Warszawa: Wydawnictwo SGGW, p. 271.
36. Wicki, L. Wicka, A. (2016). Bio-Economy Sector in Poland and Its Importance in the Economy. *Economic Science for Rural Development*, No 41, pp. 219-228.
37. Wielewska, I. (2016a). Przeznaczenie odnawialnych zrodel energii na obszarach wiejskich wojewodztwa pomorskiego (Intended Use of Renewable Energy Sources in Rural Areas of the Pomeranian Province). *Roczniki Naukowe SERiA*, vol. XVIII, No 5, pp. 274-280.
38. Wielewska, I. (2016b). Position of Energy Obtained from Agricultural Biogas in Sustainable Power Industry. *Economic Science for Rural Development*, No 42, pp. 179-185.
39. Won, K., Lo, I., Chiu, S., Yan, D. (2016). Environmental Assessment of Food Waste Valorization in Producing Biogas for Various Types of Energy Use Based on LCA Approach. *Waste Management*, No 50, pp. 290-299. DOI 10.1016/j.wasman.2016.02.022.
40. Zoladkiewicz, A. (2016). Ekonomiczno-ekologiczne aspekty produkcji biopaliw cieklych (Economic and Ecological Aspects of the Production of Liquid biofuels). *Roczniki Naukowe SERiA*, vol. XVIII, No 3, pp.427-431.

PRODUCTION AND CO-OPERATION IN AGRICULTURE

PROBLEMS AND SOLUTIONS FOR ABANDONMENT OF UTILISED AGRICULTURAL AREAS IN LATVIA

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Abstract. Utilised agricultural area is one of the most important natural resources in Latvia, which provides population with food and promotes the operation of agricultural companies. Unfortunately, appropriate land management is a problem for the majority of agricultural land owners, thereby adversely affecting the efficiency of resource use and increasing possibilities for the resource depletion. Constantly new solutions are searched for in Latvia to avert inefficient use of utilised agricultural areas and reduction of land as resource. Therefore, the research aim is to identify problems for agricultural land abandonment and describe adopted solutions for reduction of the abandoned land areas in Latvia. The authors have concluded that the utilised agricultural areas decrease with every year in Latvia; thus, constituting the decline of 2.78 % within six years. Land areas primarily decrease due to the abandonment and change of land use purpose. The share of unmanaged utilised agricultural areas in the total amount of agricultural land ranges from 12.97 % to 15.23 % between 2011 and 2016 reaching the peak in 2015. The major reasons for land abandonment include inefficient land management due to its low quality (soil fertility) as well as land owners lack the financial resources, time and willingness to manage the land. To avoid land degradation and decline of land resources, an additional immovable property tax rate in the amount of 1.5 % to agricultural land which is not being farmed is imposed from 2010 and from 2016 fines are applied to those landowners who leave land abandoned. The research is mainly based on the monographic descriptive method as well as the methods of data analysis and synthesis and a graphical method.

Key words: utilised agricultural area, land abandonment, soil fertility.

JEL code: Q15

Introduction

The European Commission identifies utilised agricultural area as the total area taken up by arable land, permanent pasture and meadow, land used for permanent crops and kitchen gardens (Commission Regulation, 1987). Generally, the utilised agricultural area (hereinafter UAA) is the land on which agriculture is the main economic activity and it includes arable land, meadows, pastures and orchards. Though, definitions for abandoned land and their interpretations differ, for example, W.L. Filho (Filho et al., 2016) and other authors define land abandonment as "a term commonly used to describe uncultivated land (land used for agricultural purposes until recent times but not currently cultivated, with a noticeable cover of shrubs), as abandoned land (land not subject to any cultivation practice (including conservation agriculture), nor intended for grazing), neglected land (when they pose a threat to neighbour owners)". C.Keenleyside and G.Tucker (Keenleyside, Tucker et al., 2010) have pointed that farmland abandonment can be a complex

and gradual process, starting with progressive marginalisation (i.e. withdrawal of management) that leads initially to a reduction in farming intensity (e.g. lower stocking rates or concentration of management in a reduced area of the farm or infrequent cultivations). In this point, the authors of the present research agree with the previous authors that "it can be difficult to define and recognise abandonment of various degrees, especially since it can also be temporary, transitional or permanent" (Keenleyside, Tucker et al., 2010). Therefore, the present research employs the term *abandoned land* as a synonym for unfarmed, uncultivated or unmanaged agricultural land.

The research authors similar to other researchers like I.Pilvere, A.Nipers, I.Upite (2014) consider that the UAA is a limited and key natural resource ensuring agricultural production. V.Sinkeviciute (2014) as well as I.Pilvere, A.Nipers, I.Upite (2014) in their studies on utilised agricultural areas point to the fact that appropriate use of agricultural land ensures a long-term provision of food to population. An

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efficient use of land and proper maintenance of its condition may ensure and develop agricultural production as well as enhance the economic growth in general. Several authors have concluded that the inappropriate use of land leads to its degradation consequently reducing the efficiency of this natural resource and reduced agricultural output. The shrinkage of production has been accompanied by both a trend towards less intensive farming systems and the removal of some land from production, either temporarily or permanently (Land Abandonment, 2004).

Many researchers (Mandel M., Maasikamäe S., 2015; Baumann M., Kuemmerle T. et al., 2011; Gellrich M., Zimmerman N., 2007; Keenleyside C., Tucker G.M., 2010; Mandel M., Maasikamäe S., 2013; Pilvere I., Nipers A., Zarins J., 2013; Platonova D., 2014; Atkocevicene V., Gudritiene D., Sudoniene V., 2011; Platonova D., Jankava A., 2011) have studied the use of land from different aspects like conversion of land, land abandonment problems, preconditions of land consolidation etc., as they have always been topical. These researchers have focused basically on the efficiency of agricultural land use and possibilities to increase land productivity. However, the present research is aimed at the analysis of reasons for the abandonment of agricultural land and study of the methods applied in Latvia for the reduction of the unmanaged agricultural land areas in order to avoid land degradation and decline of this natural resource. Therefore, the authors of the present research have advanced the research **hypothesis**: land abandonment arises from low soil fertility due to the terrain peculiarities, lack of financial resources, time or unwillingness to manage land. The research **aim** is: to identify problems for agricultural land abandonment and describe adopted solutions for reduction of the abandoned land areas in Latvia. The following **tasks** are set to successfully achieve the research aim: 1) to study changes in the utilised

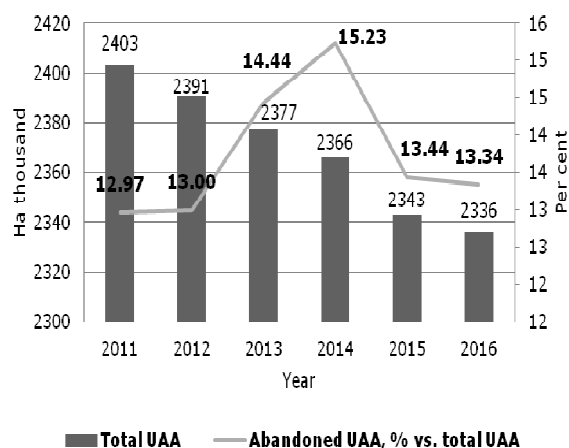
agricultural areas; 2) to analyse reasons for the abandonment of utilised agricultural areas; 3) to describe the presently adopted solutions for reduction of abandoned agricultural areas.

The research is mainly based on the monographic descriptive method as well as the methods of analysis and synthesis are used to study the problem elements and synthesise coherencies or formulate regularities; graphical and data analysis methods facilitate data reflection and interpretation. The authors have used legal and regulatory enactments, statistical data, and working papers and research done by local and foreign scientists for the needs of the present study.

Research results and discussion

In Latvia, the utilised agricultural area covered 36 % on average of the total land area from 2011 to 2016. Nevertheless, it has to be admitted that the agricultural land areas have decreased from 2 402 619 ha to 2 335 773 ha during the analysed period (Rural Support Service data, 2011-2016) or by 66 846 ha (2.78 %) within the period of six years. The most rapid decline was observed in 2015 when the utilised agricultural areas decreased by 23 505 ha compared with the previous year. Agricultural land areas are decreasing due to inappropriate land management; thus, resulting in a change of land use purpose, for example, following all the requirements prescribed by the Cabinet Regulation No 496 (20.06.2006) "Classification of Targets for the Use of Real Estate and Procedure for the Change of Targets for the Use of Real Estate" and the Cabinet Regulation No 240 (30.04.2013) "General Regulations for Territory Planning, Use and Building", a land owner may change the land use target to forest land or land for construction; hence, reducing utilised agricultural areas.

Though, the share of unmanaged UAA has rapidly grown till 2014 irrespective of the decline in the area of arable land plots (Figure 1).



Source: authors' construction based on the Rural Support Service data, 2011-2016

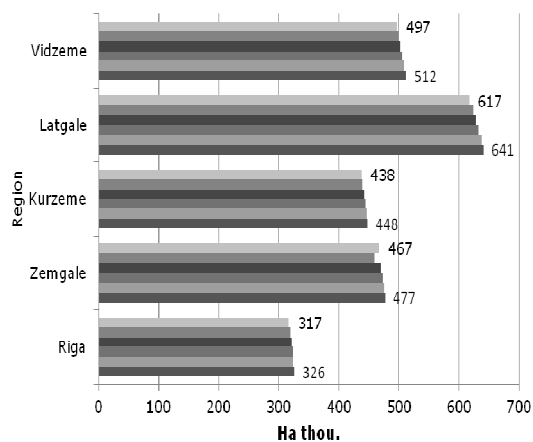
Fig. 1. The utilised agricultural areas and abandoned land plots in Latvia for the period 2011-2016

In Latvia, under the law unfarmed agricultural land is all the unfarmed agricultural land area of the land unit, if more than 30 % of the agricultural land area of the relevant land unit until 1 September of the current year are not being used for producing or growing agricultural products, including crop harvesting, grazing and keeping of animals for agricultural purposes, or the referred to land area is not being maintained in a good agricultural and environmental state (Par nekustama..., 1997). Initially, the UAA was considered unfarmed or unmanaged if more than 70 % of the land area of the unit were not maintained in proper condition; yet from 1 January 2013 the criteria was reduced to 30 %. These amendments to the law "On Immovable Property Tax" increased the share of abandoned utilised agricultural areas of total UAA by 1.44 percentage points. Already in 2010, the government tried to reduce degradation of UAA due to its abandonment introducing the amendments to Section 3 of the above mentioned law determining that "an additional immovable property tax in the amount of 1.5 % shall be applied to agricultural land which is not being farmed, except for land, the area of which does not exceed one hectare or for which restrictions on agricultural activities have been determined by laws and regulations" (Par nekustama..., 1997 with amendments). Hence,

the total immovable property tax rate for abandoned agricultural land is 3 %. Unfortunately, the introduced amendments did not essentially influence land management, since the share of unmanaged UAA continued to increase. Certainly, one may believe that the share of abandoned areas would grow faster without the introduction of these amendments. As the increased tax rate did not provide the desired results, the government of Latvia looked for other solutions to reduce the unmanaged areas. As a result, in 2015 the mass media often published reports on the government plans to introduce amendments to the "Latvian Administrative Violations Code" foreseeing fines for unmanaged UAA. According to the information disclosed in Figure 1, in 2015, the share of unmanaged UAA significantly decreased, i.e. by 1.79 percentage points compared with the previous year. The decline may be explained by the fact that land owners feared fines already in 2015, and thus, cultivated the land. The amendments to the "Latvian Administrative Violations Code" were passed only in 2016 and came into effect from 1 June, 2016. The Administrative Violations Code was supplemented with Section 54.4, which prescribes an administrative fine for the violation of land use conditions. The fine shall be up to EUR 700 for natural entities and up to EUR 5 000 for legal entities depending on the abandoned land areas. These amendments refer to those natural and legal entities that from 1 November 2014 possess more than 10 and 5 ha of agricultural land respectively (Latvijas Administratīvo pārkāpumu..., 1984). Thanks to the adopted amendments total unmanaged UAA in 2016 went down by 0.10 percentage points compared with the year before.

To identify reasons for land abandonment, the research authors analyse the breakdown of total UAA and unmanaged land areas by the regions of Latvia. Throughout the surveyed period, the largest utilised agricultural areas are observed in

Latgale region - about 26 % of the total UAA contrary to the UAA in Riga region which accounts for an average of 13 % of the total UAA. Total area and population density in the region are the basic factors impacting the amount of UAA in the regions of Latvia. The land will be more covered with buildings if the region has a high population density, so there are fewer areas of agricultural land. Respectively there are less UAA in Riga region, which total area covers 10 439 km² with the population density of 96 persons per km² and more UAA in Latgale region with the area of 14 550 km² and the population density of 19 people per km² on average (Platība, iedzīvotāju ..., 2016). A decrease in utilised agricultural areas in all regions of Latvia is observed throughout the surveyed period (2011-2016), excluding the year 2016 when the UAA territories in Zemgale region grew by 8 090 ha or 1.76 % (Figure 2).



Source: authors' construction based on the Rural Support Service data, 2011-2016

Fig. 2. The utilised agricultural areas in the regions of Latvia for the period 2011-2016, ha

Within six years, the largest decrease of UAA has occurred in Latgale and Vidzeme regions, where the areas declined by 23 343 ha and 14 968 ha respectively. In Vidzeme region, the decrease was observed in all districts; yet Aluksne, Gulbene and Madona districts were the dominating ones. In Latgale region, the most essential decreases were in Zilupe, Rezekne, Ludza and Dagda districts. The analysis of two

other regions shows that utilised agricultural areas in Kurzeme and Riga regions have declined by 10 416 ha and 8 610 ha respectively. In Zemgale region, total UAA has decreased by 9 509 ha in 2016 compared with 2011 irrespective of the UAA increase compared with 2015. The research authors believe that the terrain in Latgale and Vidzeme regions serves as the basic reason for the decline of utilised agricultural areas there (Figure 3).



Source: Latvia map, 2009

Fig. 3. The map of Latvia

Vidzeme and Latgale regions have the roughest relief in Latvia. As it is seen in the map of Latvia, the districts of Rezekne, Ludza, Zilupe, Dagda, Aluksne, Gulbene, Madona, Smiltene, Jaunpiebalga and Vecpiebalga have the highest and roughest relief. According to the research author's previous conclusion, exactly these territories have experienced the most significant decrease of UAA within the past six years. Agricultural production is economically unfavourable in these districts due to the rough relief, since soil fertility is low and without economic return. Therefore, land owners sell the UAA to forestry companies or change the land use purpose themselves and afforest arable land plots. Statistical data also evidence the increase of afforested areas in Latvia, which show that forest areas have grown by approximately 115 000 ha or 5 % for the period of six years (Latvijas meža ..., 2016).

As previously mentioned by the research authors, the amendments to the Administrative Violations Code on the application of fines for the

unfarmed UAA promoted the decrease of the share of unfarmed areas in total UAA by 0.1 percentage points. It was expected that abandoned unfarmed UAA would decline in Latvia in general; though, the decrease was observed only in Zemgale and Kurzeme (Table 1). This means that the relief and soil fertility significantly impact the amount of abandoned UAA, as land owners neither farm land nor engage in agricultural production in land plots that cannot ensure the desired efficiency. I.Pilvere, A.Nipers and I.Upite (2014) admit that "the main preconditions for the production of agricultural products are soil fertility, climate, and the location of land that, to a great extent, affect agricultural output and farm income". Similar ideas had been expressed in the seminar "Land abandonment, biodiversity and the CAP" stating that "abandonment has been propelled partly by the retirement of an older generation of more traditional farmers who accepted generally low living standards but formed part of a strong rural culture" (Land Abandonment ..., 2004). These are just some reasons for leaving agricultural production and looking for other occupations offering greater financial rewards and shorter working hours. D.Platonova (2014) expresses an opinion, which is also supported by the research authors that land owners are not willing to start or continue agricultural production if it requires excessive investments due to inefficient use of land. As shown in Table 1, the largest unfarmed territories of UAA are found in Latgale region, where the highest peak is reached in 2014 with 127 141 ha of abandoned UAA and figures for unmanaged UAA generally ranging between 112 756 ha and 127 141 ha for the period 2011-2016. Here, the share of abandoned UAA in total UAA is from 17.67 % to 20.23 %. The average soil fertility index in Latgale region is 32 points, which is the lowest index in Latvia; thus, it is more inefficient to farm land there and consequently there are many abandoned agricultural areas.

Ludza and Rezekne districts in Latgale region are territories with the majority of abandoned UAA. In 2016, the abandoned territories of UAA amounted to 13 146 ha and 25 052 ha in Ludza and Rezekne districts respectively. Zemgale region displays the smallest share of abandoned territories of UAA ranging between 8.78 % and 11.25 %. The average soil fertility index is 42 points in this region, which is the highest soil fertility index in Latvia (Nekustama ipasuma ..., 2014).

Table 1

**Abandoned utilised agricultural land areas
in the regions of Latvia
between 2011 and 2016**

	Riga region	Zemgale region	Kurzeme region	Latgale region	Vidzeme region
Abandoned UAA, ha					
2011	49129	42507	40401	118303	61221
2012	47603	41688	47168	112756	61633
2013	47342	51372	52632	125707	66235
2014	49592	53002	57121	127141	73571
2015	44290	44831	46055	119627	60007
2016	45270	42112	43005	120807	60507
Abandoned UAA, %					
2011	15.09	8.92	9.02	18.46	11.97
2012	14.69	8.78	10.58	17.67	12.13
2013	14.67	10.86	11.86	19.9	13.11
2014	15.44	11.25	12.92	20.23	14.62
2015	13.88	9.76	10.46	19.18	11.99
2016	14.28	9.01	9.83	19.57	12.18

Source: authors' construction based on the Rural Support Service data, 2011-2016

Therefore, the abandoned territories of UAA in Zemgale region are approximately 2-3 times less than in Latgale region. Soil fertility index in some districts of Zemgale region is smaller; hence, manufacturers of agricultural produce are not willing to engage in agricultural production, as it is not sufficiently efficient, and thus, land areas stay uncultivated. In Zemgale region, the most uncultivated land areas are found in Vecumnieki, Krustpils and Jaunjelgava districts. In 2016, uncultivated land areas amounted to 5 983 ha in

Vecumnieki district, 3 980 ha in Krustpils district and 3 482 ha in Jaunjelgava district. The research authors' conclusions on utilised agricultural areas broken down by regions coincide with the opinions expressed by I. Pilvere et al. (2013) and D. Platonova (2014) that agricultural production will not be performed in the territories with low soil fertility as it is more capital intensive. The fact that Latgale region evidences the lowest soil fertility index and the largest Figure of unfarmed agricultural areas prove the expressed conclusion.

Latgale region has the largest territories of UAA and simultaneously the largest territories of abandoned UAA, which can lead to a large-scale degradation of areas. This requires focusing on more efficient use of the UAA and reduction of the unmanaged areas. In Latgale region, the UAA consists of approximately 46 % of arable land and 52 % of meadows and pastures. Since Latgale region has the roughest relief and the lowest soil fertility, the best attributed agricultural activity there is livestock production. The authors' suggestion for reduction of unfarmed UAA in Latgale region may be considered as innovative - the conversion of uncultivated arable land plots into meadows and pasture could reduce the unmanaged areas in Latgale region; thus, the land would be used more efficiently facilitating to increase the number of herd, resulting from sufficient green forage and pasture. Consequently, more cattle-breeding companies could operate and develop in Latgale region, thus, reducing land abandonment and degradation.

Another problem is that the UAA is possessed not only by those engaged in agricultural production. Many land owners have inherited agricultural land but land is not used for agricultural purposes. This raises a variety of situations:

1) a land owner himself does not want or does not have enough financial resources to

manage the land, so s/he leases land to a manufacturer of agricultural produce;

2) a land owner himself does not want or does not have enough financial resources to manage the land and manufacturers of agricultural produce are not willing to lease land plots either due to low soil fertility or small land areas; hence the land stays uncultivated;

3) a land owner does not pay serious attention to the condition of its property, and has neither the time nor the desire to manage it but s/he has enough financial resources to pay an additional amount of tax and fines for unmanaged UAA.

The previous analysis has allowed concluding that the main reasons for land abandonment include low soil fertility due to the terrain peculiarities, lack of financial resources, time or willingness to manage land.

The government of Latvia should not only focus on the existing system of sanctions for unmanaged UAA, since land owners may sell their land to forestry holdings or change the land use purpose to avoid fines, thus, leading to a reduction of utilised agricultural areas. A significant decrease in utilised agricultural areas may result in the situation that is it impossible to ensure the population of Latvia with a sufficient amount of own-produced food and it has to be imported from other countries.

The government of Latvia could avoid decrease of utilised agricultural areas and increase of unmanaged land areas if land areas with lower soil fertility are directed to livestock production through the provision of financial aid for the conversion of land management purpose as well as it could support those landowners, who have insufficient financial resources for land management or who are unable to find agricultural producers to whom lease or sell the land. For example, the government could prescribe tax reliefs to those agricultural producers who have helped manage land of the

land owners having small income, having inherited the land or if the land is leased or purchased from such land owners.

Conclusions, proposals, recommendations

- 1) In Latvia, the utilised agricultural areas decreases with every year, thus, leading to a reduction of 66 846 ha within six years. Approximately 13-15 % of agricultural land is no longer cultivated, resulting in land degradation and land resource reduction.
- 2) Reasons for the abandonment of the UAA include low soil fertility due to the terrain peculiarities, lack of financial resources, time or willingness to cultivate the land.
- 3) The government of Latvia to reduce the uncultivated land areas has prescribed an additional immovable property tax in the amount of 1.5 % to agricultural land which is

not being farmed, and from 2016 fines are applied to those land owners who leave the land abandoned. Tax rate increase did not leave an essential impact on the reduction of abandoned land areas, since they continued to increase, while the application of fines facilitated the decrease of unmanaged agricultural land areas by 1.89 %.

- 4) Unfortunately, the introduced amendments to "Immovable Property Tax" did not essentially influence land management, since the share of unmanaged UAA continued to increase.
- 5) The utilised agricultural areas with low soil fertility could be directed for the development of livestock production. These land plots could be sold to cattle-breeding companies for a lower price or the state aid could be provided for the management of such land.

Bibliography

1. Atkocevičienė V., Gudritienė D., Sudonienė V. (2011). The Analysis on the Change of Farming Lands in the Territory of Middle Lithuania. *Baltic Surveying '11: Proceedings of the International Scientific Conference*, pp. 25-36.
2. Baumann M., Kuemmerle T., Elbakidze M., Ozdogan M., Radeloff V.C., Keuler N.S., Prishchepov A.V., Kruhlov I., Hostert P. (2011). Patterns and Drivers of Post-socialist Farmland Abandonment in Western Ukraine. *Land Use Policy* (28), pp. 552-562.
3. Commission Regulation (EEC) No 649/87 of 3 March 1987 laying down detailed rules for the establishment of a Community vineyard register. *Official Journal L 062*, 05/03/1987 P. 0010 – 0017. Retrieved: <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=CELEX:31987R0649:EN:HTML>. Access: 29.01.2017.
4. Filho W.L., Mandel M., Quasem Al-Amin A., Feher A., Jabbour C.J.C. (2016). An Assessment of the Causes and Consequences of Agricultural Land Abandonment in Europe. *International Journal of Sustainable Development & World Ecology*. Taylor & Francis. Retrieved: <http://www.tandfonline.com/loi/tsdw20>. Access: 04.03.2017.
5. Gellrich M., Zimmerman N. (2007). Investigating the Regional-scale Pattern of Agricultural Land Abandonment in the Swiss Mountain, a Spatial Statistical Modelling Approach. *Landscape and Urban Planning* (79), pp. 65-76.
6. Keenleyside C., Tucker G.M. (2010). Farmland Abandonment in the EU: an Assessment of Trends and Prospects. Report prepared for WWF. Institute for European Environmental Policy, London, p. 93.
7. Land Abandonment, Biodiversity and the CAP (2004). Land Abandonment and Biodiversity, in Relation to the 1st and 2nd Pillars of the EU's Common Agricultural Policy; Outcome of an International Seminar in Sigulda, Latvia, 7-8 October, 2004. Utrecht, 2005 DLG, Service for Land and Water Management. Retrieved: http://www.ieep.eu/assets/197/land_abandonment_Final_report.pdf. Access: 29.01.2017.
8. Latvia map (2009). Retrieved: <http://www.ezilon.com/maps/europe/latvia-physical-maps.html> Access: 29.01.2017.
9. Latvijas Administratīvo parkapumu kodekss (Latvian Administrative Violations Code) (1984). Retrieved: <http://likumi.lv/doc.php?id=89648>. Access: 19.01.2017.
10. Latvijas meža zeme (Forest Land in Latvia) (2016). Retrieved: http://data.csb.gov.lv/pxweb/lv/lauks/lauks__ikgad__mezsaimn/MS010.px/table/tableViewLayout2/?rxid=cdcb978c-22b0-416a-aacc-aa650d3e2ce0. Access: 19.01.2017.
11. Maasikamäe S., Mandel M. (2015). The Impact of Plot Spatial Properties on the Conversion of Arable Land into Brushwood. *Proceedings of the International Scientific Conference "Research for Rural Development"*. Retrieved: http://ilufb.llu.lv/conference/Research-for-Rural-Development/2015/LatviaResearchRuralDevel21st_volume2-119-125.pdf. Access: 29.01.2017.
12. Mandel M., Maasikamäe S. (2013). Correlation between Conversion of Arable Land into Brushwood and Distance of Plots from Roads. *The Sixth International Scientific Conference Rural Development 2013*; Aleksandras Stulginskis University, Akademija, 28-29 November, 2013. Kaunas, Lithuania, (3), pp. 343-348.
13. Nekustama ipasuma lietošanas merku klasifikacija un nekustama ipasuma lietošanas merku noteikšanas un mainas kartiba (2006). (Classification of Targets for the Use of Real Estate and Procedure for the Change of Targets for the Use of Real Estate). Ministru kabineta noteikumi Nr. 496. Retrieved: <https://likumi.lv/doc.php?id=139503#n4&pd=1>. Access: 29.01.2017.

14. Nekustama ipasuma tirgus parskats (Real Estate Market Overview) (2014). Retrieved: http://www.vzd.gov.lv/files/liz_parskats_18032014_kopa.pdf. Access: 29.01.2017.
15. Par nekustama ipasuma nodokli (On Immovable Property Tax) (1997). Retrieved: <http://likumi.lv/doc.php?id=43913>. Access: 19.01.2017.
16. Pilvere I., Nipers A., Upite I. (2014). Agricultural Land-use Potential and Investment Required in Latvia. Proceedings of the International Scientific Conference "Engineering for Rural Development". Retrieved: http://tf.llu.lv/conference/proceedings2014/Papers/79_Pilvere_I.pdf. Access: 29.01.2017.
17. Pilvere I., Nipers A., Zarins J. (2013). Use of Agricultural Land in the Parishes of Latvia. The 6th International Scientific Conference "Rural Development 2013: Innovations and Sustainability", Aleksandras Stulginskis University, Kaunas, Akademija, 28-29 November 2013, Volume 6, Book 1, pp. 591-598.
18. Platība, iedzīvotāju blīvums un pastāvīgo iedzīvotāju skaits reģionos (Area, Population Density and Number of Permanent Residents by Regions) (2016). Retrieved: http://data.csb.gov.lv/pxweb/lv/Sociala/Sociala__ikgad__iedz__iedzskaitis/IS0010.px/table/tableViewLayout2/?rxid=09cbdccf-2334-4466-bdf7-0051bad1dec1. Access: 20.01.2017.
19. Platonova D. (2014). Agricultural Holdings and Their Land Size Changes in Latvia. Journal of Baltic Surveying. Volume 1. Retrieved: http://llufb.llu.lv/Raksti/Journal_Baltic_Surveying/2014/Journal_Baltic_SurveyingVol1_2014-7-13.pdf. Access: 29.01.2017.
20. Platonova D., Jankava A. (2011). Research on the Preconditions of Land Consolidation in Rural Districts. Proceedings of the International Scientific Conference: Economic Science for Rural Development, pp. 174-181.
21. Rural Support Service (2011-2016). Retrieved: <http://www.lad.gov.lv/lv/atbalsta-veidi/noderigi/lauksaimnieciba-izmantojamas-zemes-apsekosana-1/>. Access: 18.01.2017.
22. Sinkeviciute V. (2014). Analysis of Farming Land Usage in Southern Lithuania. Journal of Baltic Surveying. Volume 1. Retrieved: http://llufb.llu.lv/Raksti/Journal_Baltic_Surveying/2014/Journal_Baltic_SurveyingVol1_2014-20-25.pdf. Access: 29.01.2017.
23. Vispārīgā teritorijas planošana, izmantošana un apbūves noteikumi (2013). (General Regulations for Territory Planning, Use and Building). Ministru kabineta noteikumi Nr. 240. Retrieved: <https://likumi.lv/doc.php?id=256866>. Access: 29.01.2017.

COOPERATION IN LATVIAN FISHERIES SECTOR

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Abstract. In the development of Latvia's economy, the fisheries have always played a significant role. In Latvia, the fisheries sector has not only a long-standing history and traditions, but also an internal potential of self-development and the ability to produce a competitive product in the world market. At the EU level, increasing attention is being paid to cooperation and its role in promotion of fisheries sector's growth potential. The aim of the article is to explore significance of cooperation in Latvian fisheries sector, determining further development opportunities. On the basis of the analysed scientific literature, the EU and Latvia legislation, different planning documents as well as the results of the interviews and questionnaires, the article reflects the study of significance of cooperation in the Latvian fisheries sector. The research results acquired by author may assist the institutions involved in the fisheries' policy formation to work more successfully and improve the common policy in the fisheries sector.

Key words: cooperation, social economy, producer organizations, fisheries, Latvia.

JEL code: K2

Introduction

In the development of Latvia's economy, the fisheries have always played a significant role - especially in the development of the Baltic Sea and Riga Gulf coastline areas. In Latvia, the fisheries sector has not only a long-standing history and traditions, but also an internal potential of self-development and the ability to produce a competitive product in the world market (Biuksane I., Judrupa I., 2016). Cooperation plays a significant role in promotion of sector's competitiveness and development and, at the EU level, continuously increasing attention is being paid to such cooperation. The European Commission believes that cooperation opportunities are still not used in full, and the role and position of cooperative societies should be enhanced both at the national and European level (Kaktins J., Ancans S., Pabērza K., 2005).

The scope of the Common Fisheries Policy (CFP) extends to measures related to the markets for fishery and aquaculture products in the Union, where the common organisation of the markets in fishery and aquaculture products (CMO) is an integral part of the CFP and should contribute to achieving its objectives. Fishery and aquaculture producer organisations (PO) are the key to achieving the objectives of the CFP and of the CMO (European Parliament and Council, 2013a; European Commission, 2013).

PO are formed in order to improve trade of products and economic profitability, stabilise the

market and reduce environmental impact of fishing (European Parliament and Council, 2013a; Saeima, 2004). PO are the main participants that may promote vitality of fishing and aquaculture (European Parliament and Council, 2014). Consequently, it is essential to strengthen the responsibility of PO and provide the necessary financial support in order they, in accordance with CFP, could undertake more significant tasks in daily management of fisheries (European Parliament and Council, 2013a; 2014).

The aim of the research - to explore the significance of cooperation in Latvian fisheries sector, determining further development opportunities. In order to achieve the aim, the following tasks were put forward: 1) to identify the essence of cooperation; 2) to explore the role of PO in the Latvian fisheries sector; 3) to draw conclusions and propose recommendations.

The novelty of the research - explored and gathered information on significance of cooperation and opportunities of its development promotion in the Latvian fisheries sector that may assist the institutions involved in the fisheries' policy formation to work more successfully and improve the common policy in the fisheries sector.

The author applied quantitative and qualitative methods in elaboration of the research. The method of sociological research was used for evaluation of scientific literature, the EU and Latvian legislation, as well as different

planning documents. In order to obtain the topical opinion on PO and their performance in Latvia, the author interviewed fishery PO and representatives of the institutions involved in the fisheries' policy formation and implementation. In addition, the questionnaire was prepared and sent to fisheries companies and state direct administration institution, which is responsible for authorization of PO, supervision and control of their performance.

The author used the monographic or descriptive, graphical and logically-constructive (induction and deduction) method for information processing and evaluation. To draw conclusions and elaborate suggestions, mainly the methods of analysis and synthesis were applied.

Research results and discussion

1. Essence of cooperation

Cooperation from the Latin word 'cooperatio' denotes a joint action or collaboration; its main aim is benefit obtained by every participant via joint action in cooperation, using the services provided by cooperation and opportunities obtained collectively (Kucinskis J., 2004). Economy based on cooperation is called cooperative or social economy (European Commission, 2016), and the most significant its participants are different types of co-operatives.

International Co-operative Alliance, founded in 1995, the aim of which is to promote the development of cooperation all over the world, defines co-operatives as „autonomous association of persons united voluntarily to meet their common economic, social, and cultural needs and aspirations through a jointly owned and democratically-controlled enterprise" (International Co-operative Alliance, 1995).

Co-operatives are based on the values of self-help, self-responsibility, democracy, equality, equity solidarity. In performance of co-operatives, several ethical values are respected: honesty, openness, social responsibility and caring for others (International Co-operative Alliance, 1995). Elitism, consumer society,

human exploitation, tyranny and slavery are not typical of cooperation (Kucinskis J., 2004).

Cooperation strives for improvement of social, economic and environmental conditions of the society (Rothschild J., 2009), frequently turning to those members of the society who are in disadvantaged position (Bird A., 2015; Baltaca B., 2003). Cooperation normally develops in conditions when many people suffer from poverty, misery and unfairness (Balodis Ed., 1927).

Cooperation reflects solidity of the sector and interest in promotion of sector's common development and growth. Performing in isolation, a company cannot achieve a high degree of competitiveness – cooperation with surrounding companies (Lacis V., 2006), state institutions and other organizations is necessary (Kassalis I., 2010).

Cooperation works as a stabilising, harmonising and humanising factor, integrator of fairness and rebuilder of balance (Kucinskis J., 2004). The French theorist Charles Gide has said: "Cooperation is a daughter of poverty and mother of prosperity" (Charles G., 1891). The principle of co-operatives' performance is: "One for all and all for one!" (Balodis E., 1927). As a result of cooperation, work productivity, quality and income increase, new jobs are created, time and energy is saved, education is promoted and community's spirit and inclination for common benefit is inculcated (Potter B., 1904; Balodis Ed., 1927).

Cooperation works as a tool of sustainable economic development, harmonising services with the needs, increasing the value of economic activity in the social aspect, promoting a fairer distribution of income and wealth, preventing discrepancies in labour market and extending and strengthening democracy of economy (CIRIEC, 2007). Cooperation facilitates human well-being and economic development; it promotes public participation and business development (Baltaca B., 2003).

2. Role of PO in Latvian fisheries sector

In Latvia, one can find different types of PO – fishery PO, aquaculture PO or inter-branch organisation, which combines the mentioned PO (MK, 2014).

In Latvia, 3 fishery PO have been founded. They include fisheries companies fishing in the Baltic Sea and Riga Gulf beyond the coastline area. In the period from 2005 to 2014, fishery PO embraced a comparatively small proportion (on average 15 %) of companies from total number of companies in Latvian fisheries sector (CSB, 2016; PO, 2016).

The aim of founding a fishery PO was to use marine resources rationally and sustainably, improve trade conditions and circumstances, plan and forecast production and economic processes and activities related to it as well as improve mutual collaboration between the members of PO and represent their common interests. The objectives defined by fishery PO are directed towards improvement of their performance (Table 1).

Table 1

Compliance of performance of Latvian fishery PO with EU CMO policy

EU CMO objectives	Fishery PO objectives
Contribute to the CFP achievement of the objectives, and in particular to the sustainable exploitation of living marine biological resources	<ul style="list-style-type: none"> - Rational use of marine resources - Development of fishing methods - Management and regulation of catch quotas - Control and protection of fishing activity - Elaboration of catch plans and programs - Improvement of fish trading conditions - Harmonisation of offer and demand, taking into account quality and quantity - Increase of offer and supply concentration - Regulation and stabilisation of the prices - Implementation of intervention measures in the market for fishery products - Common organization of the markets for fishery products - Planning and forecasting of production - Harmonisation and coordination of economic and political issues related to production of fishery products - Harmonisation, coordination of members' performance, promotion of mutual assistance and collaboration development, representation of interests - Eradication of discrimination - Assistance in equipment modernization and performance - Collection of statistical data on production and sale
Enable the fishery and aquaculture industry to apply the CFP at the appropriate level	
Strengthen the competitiveness of the Union fishery and aquaculture industry, in particular producers	
Improve the transparency and stability of the markets, in particular as regards economic knowledge and understanding of the Union markets for fishery and aquaculture products along the supply chain, ensure that the distribution of added value along the sector's supply chain is more balanced, improves consumer information and raises awareness, by means of notification and labelling that provides comprehensible information	
Contribute to ensuring a level-playing field for all products marketed in the Union by promoting sustainable exploitation of fisheries resources	
Contribute to ensuring that consumers have a diverse supply of fishery and aquaculture products	
Provide the consumer with verifiable and accurate information regarding the origin of the product and its mode of production, in particular through marking and labelling	

Source: author's calculations based on European Parliament and Council, 2013b; Lursoft, 2016

In order to achieve the objectives of EU CFP and ensure proper management of CMO, every year PO have to submit to the state direct administration institution, responsible for authorization of PO, a performance supervision and control, production and marketing plan, including: a production programme for caught or farmed species; a marketing strategy to match the quantity, quality and presentation of supply to market requirements; measures to be taken by the PO in order to contribute to the objectives

laid down in European Parliament and Council Regulation (EU) No. 1379/2013 Article 7; special anticipatory measures to adjust the supply of species which habitually present marketing difficulties during the year; penalties applicable to members who infringe decisions adopted to implement the plan concerned (European Parliament and Council, 2013a).

In order to promote achievement of PO objectives defined by the European Parliament and Council Regulation (EU) No. 1379/2013

Article 7, fishery PO in Latvia are required to implement at least 2 compulsory and at least 2 additional optional measures, and at least one or several measure activities (MK, 2014).

In the period from 2014 to 2016, fishery PO have chosen all compulsory and additional optional measures established by Latvian legislation, but not all possible measure activities (Table 2).

Table 2

Measures implemented by Latvian fishery PO and their implementation results for achievement of the objectives defined by the European Parliament and Council (EU) No. 1379/2013 Article 7 in the period from 2014 to 2016

Measures' type and name	Activity No.	Execution (%)			
		2005-2013	2014	2015	2016
Promoting sustainable fishing activities	3.1.1.1., 3.1.1.2., 3.1.1.3., 3.1.1.4., 3.1.1.5., 3.1.1.6.	-	-	-	-
	3.1.1.7.		100	100	✓
	3.1.1.8.		-	-	-
Avoiding and reducing unwanted catches	3.1.2.1.		100	91.67	✓
	3.1.2.2., 3.1.2.3.		-	-	-
Contributing to the traceability of fishery products and access to clear and comprehensive information for consumers	3.1.3.1.		30	35	✓
	3.1.3.3.		50	-	✓
	3.1.3.2., 3.1.3.4.		-	-	-
Contributing towards the elimination of IUU fishing practices	3.1.4.1.		75	87.5	✓
	3.1.4.2.		100	90	✓
Improving the conditions for the placing on the market of their members' fisheries products	3.1.5.1.		100	100	✓
	3.1.5.2.		100	100	✓
	3.1.5.3.		50	100	✓
	3.1.5.4., 3.1.5.5., 3.1.5.7.		-	-	-
	3.1.5.6.		-	-	✓
Improving economic returns	3.1.6.1.		-	-	-
	3.1.6.2.		66.67	58.33	✓
	3.1.6.3.		100	-	-
Stabilising the markets	3.1.7.1.		50	75	✓
	3.1.7.2.		100	100	-
	3.1.7.3.		100	100	✓
Contributing to food supply and promoting high food quality and safety standards, whilst contributing to employment in coastal and rural areas	3.1.8.1., 3.1.8.2., 3.1.8.4.		-	-	-
	3.1.8.3.		50	100	✓
	3.1.8.5.		100	82,50	✓
Reducing the environmental impact of fishing, including through measures to improve the selectivity of fishing gears	3.1.9.1., 3.1.9.2.		-	-	-
	3.1.9.3.		100	66.67	✓
Total execution:		x	85,12	83,64	x

Note: In the period from 2005 to 2013, fishery PO did not have to submit production and marketing plans.

Source: author's calculations based on European Commission, 2014; MK, 2014; Rural Support Service, 2016

Fishery PO chose measures that were directed towards promotion of sustainable fishing activities, reduction of environmental impact caused by fishing, preservation of fisheries resources, improvement of economic return, stabilisation of the market and improvement of conditions for placing fishery products on the market as well as precise compliance with food quality and safety standards etc.

Although the measures chosen by fishery PO are relatively homogeneous year after year, thus, reflecting constant needs and problems of PO, in general, the performance of fishery PO can be

considered as positive: in 2014, the production and marketing plans were implemented at the rate of 85.12 %, but in 2015 – at the rate of 83.64 %.

According to the responsible representatives of the state direct administration institution, the main reasons for non-fulfilment of the prescribed measures and activities may be different, and it is difficult to define them.

The responsible representatives explain that fishery PO have difficulties to plan their work in the long term, and one of the reasons is unstable situation in the market (Biuksane I.,

2016). Conversely, fishery PO explain that implementation of production and marketing plans in full (100 %) is hampered by different subjective and objective reasons, for instance, priority changes in season, complete or partial delay of the planned activities for (in)definite duration etc. Fishery PO acknowledge that the plans rarely can be implemented in full due to

current socio-economic and political situation (Biuksane I., 2016).

Although the measures implemented by fishery PO are directed towards improvement of their performance, they are not sufficient for promotion of competitiveness and development of the Latvian fisheries sector (Table 3).

Table 3

Measures to be implemented by PO for promotion of competitiveness and development of Latvian fisheries sector

Measures' name	Problem of fisheries sector to be solved	Measures to be implemented by PO					
		F PO		AQ PO		IBO	
		will now	in future	will now	in future	will now	in future
1.	2.	3.	4.	5.	6.	7.	8.
Promoting sustainable fishing/ aquaculture activities	Particularly sensitive environment of the Baltic Sea that is valuable resource of ecosystem. Considerable losses caused by wild animals.	CM	CM	CM	CM	-	-
Avoiding and reducing unwanted catches		CM	CM	-	-	-	-
Contributing towards the elimination of IUU fishing practices		CM	?	-	-	-	-
Reducing the environmental impact of fishing, including through measures to improve the selectivity of fishing gears		AOP	CM	-	-	-	-
Stabilising the markets	Low income, wage, productivity and gross added value in fishery. Fragmented, homogeneous production in aquaculture that is not based on export. Unsteady export markets in fish processing.	AOP	CM	AOP	CM	-	CM
Improving the conditions for the placing on the market of their members' fisheries/aquaculture products		AOP	CM	AOP	CM	-	-
Improving economic returns		AOP	CM	AOP	CM	-	CM
Contributing to the traceability of fishery products and access to clear and comprehensive information for consumers		CM	?	-	-	-	-
Endeavouring to ensure that aquaculture feed products of fishery origin come from fisheries that are sustainably managed	Low productivity in aquaculture and fish processing.	-	-	CM	?	-	-
Ascertaining that the activities of their members are consistent with the national strategic plans		-	-	CM	CM	-	-
Contributing to food supply and promoting high food quality and safety standards, whilst contributing to employment in coastal and rural areas	Decrease in population density can be observed in the territories significant for fishery.	AOP	?/CM	AOP	-	-	?/CM
.....	Low innovation level and poorly developed collaboration with science.	-	CM	-	CM	-	CM

Note: F PO - fishery producer organisations, AQ PO - aquaculture producer organisations, IBO - Inter-branch organisations, CM - compulsory measures, AOP - addition optional measures, ? - difference between implementation of these measures in PO and performance and functions of the respective responsible state institutions must be evaluated and realized, *.....* - in accordance with European Parliament and Council (EU) No. 1379/2013, PO may achieve also other objectives that are not currently prescribed by MK Regulations No. 753.

Source: author's calculations based on European Commission, 2014; Ministry of Agriculture, 2014; MK, 2014

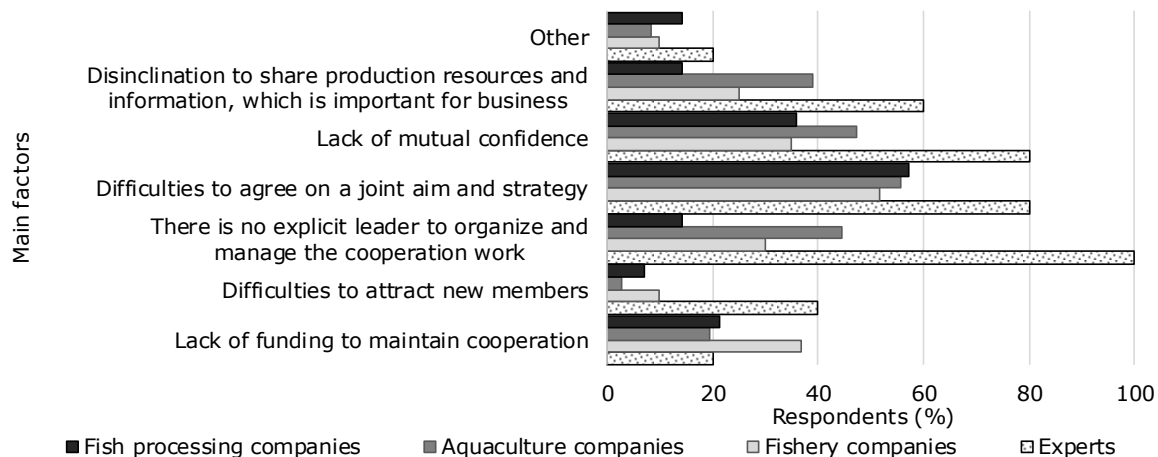
In accordance with the abstract of the Regulations of the Cabinet of Ministers No. 753, the elaborated regulations prescribe increase of administrative burden for existing PO and those companies that will wish to form producer or inter-branch organisations – the regulations are not expected to have a direct impact on development of economy (MK, 2014).

In order to enable promotion of not only performance improvement of PO, but also competitiveness and development of Latvian fisheries sector through the Regulations of the Cabinet No. 753, the author believes that the mentioned regulations need to be improved. They should be elaborated guiding not only by the legislative aspect regulating the EU CFP and

CMO, but also by the promotion aspect of competitiveness and development of the Latvian fisheries sector.

Currently, there is neither PO founded in inshore fishing, inland waters and aquaculture nor inter-branch organisation, although it would be highly significant and desirable for Latvian fisheries sector from the viewpoint of development and competitiveness promotion.

The major part (93 % of the respondents) of fisheries companies and experts believe that there are factors hampering the formation of strong cooperation in the Latvian fisheries sector (Biuksane I., 2016). In companies' opinion, the main reason for it is the fact that there are difficulties to agree on common objective and strategy, conversely, in experts' opinion – it is the lack of explicit leader (especially in inshore fishing and aquaculture) (Figure 1).



Note: Experts – the interviewed representatives of institutions involved in the fisheries' policy formation and implementation.
Source: author's calculations based on Biuksane I., 2016

Fig. 1. Main factors hampering formation of strong cooperation in Latvian fisheries sector (%)

Responsible representatives of the state direct administration institution explain that PO authorization criteria prescribed by the Regulations of the Cabinet No. 753 also may be an obstacle why different types of PO are not founded in Latvia (Biuksane I., 2016). Fishery PO agree with this opinion; they hold a view that it is impossible to found a new fishery PO in accordance with the prescribed authorization criteria and due to the current situation in the Latvian fisheries sector. Separate fishery PO declare that implementation of the prescribed authorization criteria is not difficult and believe that the prescribed authorization criteria should be stricter (Biuksane I., 2016).

In order to promote formation of new PO and improvement of their performance, the representatives of institutions involved in Latvian fisheries' policy formation and implementation are advised to promote common understanding of the sector in relation to significance and

usefulness of PO as well as the prescribed PO authorization criteria should be revised. Foundation of a strong and powerful PO can promote competitiveness and development of the fisheries sector.

Conclusions, proposals, recommendations

1) Cooperation is collaboration of entrepreneurs; its main goal is benefit that could be obtained by every participant via joint action in cooperation, using the services provided by cooperation and collectively obtained opportunities. Cooperation is based on democratic values, and it facilitates human well-being and economic development, promotes public participation and business development.

2) In Latvia, there are 3 fishery PO; they perform in accordance with the EU CMO policy, although do not cover its objectives in full. The measures implemented by the PO are directed towards improvement of their

performance; however, the measures are not sufficient for promotion of competitiveness and development of the Latvian fisheries sector.

3) PO are the main participants responsible for achievement of the EU CFP objectives and ensuring proper management of CMO. In order to promote formation of new PO and improvement of their performance as well as facilitate competitiveness and development of Latvian fisheries sector, the representatives of

institutions involved in the fisheries' policy formation and implementation are advised to promote single understanding in the sector in relation to the significance and usefulness of PO, revise PO authorization criteria and improve the Regulations of the Cabinet of Ministers No. 753. The mentioned proposals could promote formation of a more favourable environment and conditions for PO development.

Bibliography

1. Balodis, E. (1927). *Kooperacija (Cooperation)*. Riga: Latvijas Kooperativu Savienības Izdevniecības apgādība, p. 128.
2. Baltaca, B. (2003). *Finansu kooperativu pievienota vertība (Financial Co-operative Value-Added)*. *Latvijas Universitātes raksti 'Socialas zinātnes'*. No. 665., pp. 19-26.
3. Bird, A. (2015). *Some Thoughts on a Co-op Development Strategy*. Paper. p. 28.
4. Biuksane, I. (2016). The Results of the Interviews and the Questionnaire (restricted access data).
5. Biuksane, I., Judrupa, I. (2016). Evaluation of Competitiveness of the Fisheries Sector Cluster. *International Scientific Conference 'Research for Rural Development 2016' Proceedings*. Vol. 2, pp. 238.-245.
6. Charles, G. (1891). *Principles of Political Economy*. USA, Boston: D.C. Heath & Company. p. 581.
7. CIRIEC (2007). *Sociālā ekonomika Eiropas Savienībā (The social economy in the European Union)*. *Zinājums*. No. EESK-C-2007-11-LV, p. 48.
8. CSB (2016). Statistical Data about the Fisheries Sector of Latvia (restricted access data).
9. European Commission (2013). Commission Implementing Regulation (EU) No. 1418/2013 Concerning Production and Marketing Plans Pursuant to Regulation (EU) No 1379/2013 of the European Parliament and of the Council on the Common Organisation of the Markets in Fishery and Aquaculture Products. *Official Journal of the EU*. 28.12.2013., L 353, pp. 40-42.
10. European Commission (2014). Commission Recommendation (2014/117/EU) on the Establishment and Implementation of the Production and Marketing Plans Pursuant to Regulation (EU) No 1379/2013 of the European Parliament and of the Council on the Common Organisation of the Markets in Fishery and Aquaculture Products. *Official Journal of the EU*. 05.03.2014., L 65, pp. 31. - 38.
11. European Commission (2016). *Social Economy in the EU*. Retrieved: https://ec.europa.eu/growth/sectors/social-economy_lv. Access: 20.12.2016.
12. European Parliament and Council (2013a). European Parliament and Council Regulation (EU) No. 1379/2013 on the Common Organisation of the Markets in Fishery and Aquaculture Products, amending Council Regulations (EC) No 1184/2006 and (EC) No 1224/2009 and repealing Council Regulation (EC) No 104/2000. *Official Journal of the EU*. 28.12.2013., L 354, pp. 1-21.
13. European Parliament and Council (2013b). European Parliament and Council Regulation (EU) No. 1380/2013 on the Common Fisheries Policy, amending Council Regulations (EC) No 1954/2003 and (EC) No 1224/2009 and repealing Council Regulations (EC) No 2371/2002 and (EC) No 639/2004 and Council Decision 2004/585/EC. *Official Journal of the EU*. 28.12.2013., L 354, pp. 22-61.
14. European Parliament and Council (2014). European Parliament and Council Regulation (EU) No. 508/2014 on the European Maritime and Fisheries Fund and repealing Council Regulations (EC) No 2328/2003, (EC) No 861/2006, (EC) No 1198/2006 and (EC) No 791/2007 and Regulation (EU) No 1255/2011 of the European Parliament and of the Council. *Official Journal of the EU*. 20.05.2014., L 149, pp. 1-66.
15. International Co-operative Alliance (1995). *Co-operative Enterprises Build a Better Life*. Retrieved: <http://ica.coop/>. Access: 18.12.2016.
16. Kaktins, J., Ancans, S., Paberza, K. (2005). Lauksaimniecības kooperācija Eiropas Savienības valstīs (Agricultural Cooperation in the European Union Countries). *Proceedings of the International Scientific Conference 'Economic Science for Rural Development'*. No. 15, pp. 28-35.
17. Kassalis, I. (2010). Uzņēmumu konkurētspējas paaugstināšanas iespējas Latvijas tautsaimniecībā (The Potential of Increasing the Competitiveness of Companies in the Economy of Latvia). *Ekonomika un vadības zinātne*. No. 754., pp. 9.-22.
18. Kucinskis, J. (2004). *Kooperācijas attīstība Latvijā un pasaulē (Cooperation development in Latvia and the World)*. Riga: Latvijas Hipotēku un zemes banka, Lauku avīze, p. 335.
19. Lacis, V. (2006). *Zvejnieka dēls (Fisherman's son)*. Rīga: Zvaigzne ABC, p. 356.
20. Lursoft (2016). *Database of All Companies Registered in Latvia*. Retrieved: <https://www.lursoft.lv/lv/uznemumu-datu-bazes>. Access: 24.11.2016.

21. Ministry of Agriculture (2014). *Ricibas programma zivsaimniecības attīstībai 2014. – 2020. gadam (Operational Programme for Development of Fisheries 2014-2020)*. Retrieved: https://www.zm.gov.lv/public/files/CMS_Static_Page_Doc/00/00/00/49/90/ZRP_2014_2020_1.versijaarLVtekstuvicsaurRP.pdf. Access: 24.11.2016.
22. MK (2014). MK noteikumi Nr. 753 'Zvejas un akvakultūras produktu razotāju grupu atzīšanas kritēriji, kā arī razotāju grupu darbības nosacījumi un tas kontroles kārtība' (Fishing and aquaculture product producer group recognition criteria, as well as producer groups operating conditions and control arrangements). *Latvijas Vēstnesis*. 30.12.2014., No. 257 (5317), OP: 2014/257.26.
23. PO (2016). Producer Organizations' Data (restricted access data).
24. Potter, B. (1904). *The Co-operative Movement in Great Britain*. London: Swan Sonnenschein & CO., LIM. p. 290.
25. Rothschild, J. (2009). Workers' Cooperatives and Social Enterprise: A Forgotten Route to Social Equity and Democracy. *American Behavioral Scientist*. Vol. 52, No. 7, pp. 1023-1041. Doi: 10.1177/0002764208327673.
26. Rural Support Service (2016). Production and Marketing Plans of the Producer Organizations (restricted access data).
27. Saeima (2004). Lauksaimniecības un lauku attīstības likums (Agriculture and Rural Development Act). *Latvijas Vēstnesis*. 23.04.2004., No. 64 (3012).

MULTIDIMENSIONAL COMPARATIVE ANALYSIS OF THE POLISH AGRI-FOOD SECTOR IN REGARD TO OTHER EU COUNTRIES IN THE YEARS 2004 – 2014

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Abstract. Poland due to the EU accession introduced common agricultural, trade and industrial policy instruments. This situation has brought a new economic and social quality to the agri-food and rural sectors. The previously applied agriculture support instruments in Poland have been adjusted to the principles governing the EU single market and to the rules concerning state aid. Agriculture constitutes one of the core sectors of the national economy. This can be observed while analysing the land use and employment structures. Agriculture is of special importance to the social development and economic growth of the rural areas. The main subject of this research is the analysis of the position of Poland in regard to other EU countries taking into consideration its eleven-year-old membership in the EU. Eurostat database data was employed in analyses, basing on plant and livestock products information in particular. Presented research confirms, that Poland is one of important manufacturers more focusing on plant and livestock products. The analysis of the selected EU countries proved that in terms of agriculture France and Germany appear to be powerful leaders. At the end of the ranking list the countries characterised by the smallest area are placed (Estonia, Cyprus, Luxemburg, Slovenia)

Key words: agri-food sector, Taxonomic Measure of Development, zero unitarization method.

JEL code: Q17, C38

Introduction

Globalisation processes and the development of so-called knowledge-based economy resulted in reducing the participation of agriculture in the economic structure (Borec A., 2009). However, agriculture, one of the three pillars of economy, still determines its development. Unlike services and industry, agriculture is strongly influenced by environmental conditions. The proper use of environmental conditions depends on the level of society development. It may be noticed, year by year, that basic indexes indicating the significance of agriculture for the world economy have been decreasing. It should be emphasized, however, that it is caused by technological advancement and research development in the area of agricultural production and consequently by increasing agricultural productivity.

European agriculture basis on mix of universal and highly specific features. Thorough history Europe has taken care of its agricultural system. As a result agrarian policies was designed, adapted and re-adapted on local (regional) and national and European level (Van der Ploeg J. et al., 1999).

In 2016 the share of EU-27 agriculture in the GDP structure was 1.6 %. Decreasing share of agriculture in the GDP may be explained by the

fact that along with growing investments in agriculture, its productivity rises. Mechanisation and lower human commitment to agricultural work results from increasingly higher level of socio-economic development. A decreasing employment rate in agriculture sector is generated by this trend (Drejska N., 2015). According to the European Commission, in EU the employment rate was 5.1 % in the structure of working population in 2011. At the same time it was 1.6 % in the USA and 3.7 % in Japan.

For decades agriculture had been association of food. It plays a crucial role in the life of economy. It means that agriculture is the core element of the EU economics (Kusis J., Miltovica B., 2016). In consequences the current situation and multidimensional aspects of agriculture create new questions. One of them is question about food production and its role in economy.

The main purpose of the article is to discuss the importance and share of Poland in agricultural production in 2004 and in 2014 in relation to other European Union countries. The following tasks were implemented in scope of the research study: the selection of variables, synthetic measures construction, ranking construction and the assessment of Polish

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agriculture sector in relation to other EU countries.

The figures used for analysis are based on Eurostat. The following variables were included in the research:

X(1) - grains (including seeds), production value (mil Euro)

X(4) - Wheat and spelt, production value (mil Euro)

X(6) - rye and meslin, production value in regular price (mil Euro)

X(8) - dry grain legumes and protein crops for grain (including seeds and mixture of cereal grains and legumes, crops in thousand tonnes

X(9) - sugar beet, crops in thousand tonnes

X(10) - rape, turnip rape, sunflower seeds and soya, in thousand tonnes

X(11) - fodder plants harvested green in arable land, in thousand tonnes

X(12) - poultry in thousand pieces

X(13) - beef meat, slaughter (in thousand tonnes)

X(14) - pigs, domestic species, December, (in thousand pieces)

X(15) - pglets, under 20 kg, December, (in thousand pieces)

X(16) - General workforce per household (1,000 annual labour units).

All the selected variables are stimulants.

Due to the multidimensional character of the research, the analyses involved statistical methods which allowed to examine a phenomenon with reference to several pieces of information.

The research methods involved linear measurements e.g. Taxonomic Measure of Development and synthetic measurement proposed by K. Kukula. In the first stage of the research a ranking was constructed based on TMR and synthetic measure by K. Kukula then, the results of both methods were compared. In the final part of the research, the conclusions were drawn based on the analysis.

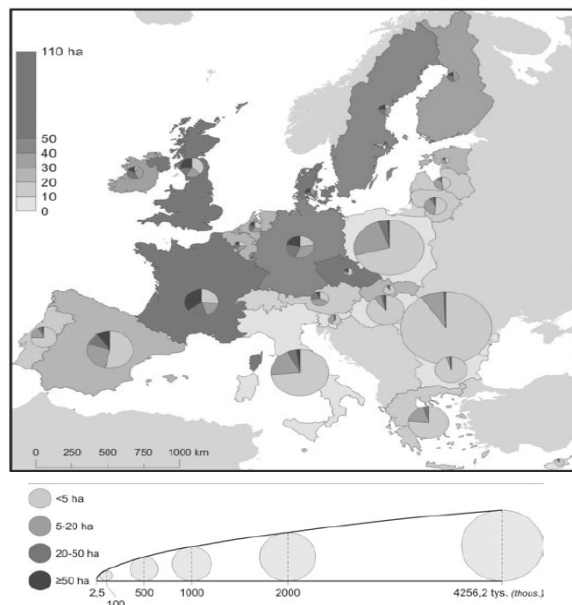
Polish agriculture in the EU

Accession of Poland to the European Union increased chances for Polish farmers to solve numerous problems of agriculture in Poland. Agriculture is an important sector of the Polish economy (Mrowczyńska-Kamińska A., 2008). This is proved by the land use and employment structure (Mickiewicz A., Mickiewicz B., 2010). This sector of the economy is particularly important for social and economical development of rural areas. Agriculture is an important sector for employment of rural population. Approximately 17 % of working population is employed in the agricultural sector. Along with farmers, there are representatives of various agricultural services, trade, local and governmental authorities and education employed in this sector, as well (Statistical Yearbook of Agriculture, 2014).

Polish agriculture is characterised by the large area of farmlands and workforce resources. Therefore, it takes an important place in food economy of the European Union. As far as the general area of farmlands is concerned, Poland follows next after Great Britain and larger countries such as France, Spain and Germany. In terms of arable land, whereas, Poland follows after France and Spain. In Poland arable farming is the most common in the land use, which is reflected by large plant production and the possibility of growing different plant species in clean environment (Statistical Yearbook of Agriculture, 2014).

Land fragmentation is one of essential problems in the Polish agriculture. Poland's situation is unfavourable compared to other EU countries in terms of land fragmentation (Fig 1). The average acreage of a Polish farm is twice as small as the average acreage of a similar farm in "old" EU countries (approximately 19 ha) (Bozek, J., 2010). As far as the acreage of an average farm is concerned, new EU member countries such as Bulgaria, Romania, Hungary and the countries in the south part of Europe: Greece,

Portugal and Italy appear to be the most similar to Poland.



Source: The role of agriculture in Polish economy p.6.

Fig. 1. Numbers, acreage structures and average acreages of farms in the countries of the European Union, 2005

The level of land fragmentation is determined not only by the agricultural areas, but also by the population structure including workforce in agriculture. In Poland over 2.8 mil people are employed in agriculture, the biggest number as compared to other EU countries. However, the employment in agriculture is constantly decreasing, which results from technological advancement in farm households and at the same time lower demand on human workforce. Polish agriculture in relation to both "old" and „new" members of the European Union has a lot to catch up with (Statistical Yearbook of Agriculture, 2014).

Agricultural production in Poland is extensive and limited. A large part of the Polish agriculture, with extensive plant production, has traditional character. Low quality seeds, low usage of fertilizers and plant protection products result in dissatisfying level of crops. Although crops are generally lower than in EU-15, there is an increased demand for Polish agricultural products due to the limited use of chemicals in farming.

Poland, which is one of the biggest grain producers in the EU, produced almost 9 % of the whole EU grain production in 2008 and only Germany and France produced more grain. What is more, Poland is among the top producers of sugar beet (after France and Germany) and holds the third position in producing rapeseed (11 % of EU production). Poland produces over 20.8 % of apples, over 15 % of carrot and almost 11 % of onion in the EU (Table 1).

Table 1

Share of Poland in EU agricultural production in 2014

Specification	European Union	
	Share of Poland [%]	Place of Poland
Wheat	6.3	4
Rye	32.8	2
Barley	7.6	5
Sugar beets	10.7	3
Rape and turnip rape	9.7	4
Apples	26.2	1
Meat	6.4	5
Cow milk	6.4	4
Pigs livestock	7.8	6
Cattle livestock	6.5	7

Source: *Statistical Yearbook of Agriculture, 2014*

The share of Poland in EU livestock production is slightly smaller. In 2012 Polish share in pig livestock amounted to 7.8 % of EU production , the sixth position among the EU countries. In terms of cattle livestock Poland was the seventh country (Table 1).

Research methods

Multidimensional Comparative Analysis (MCA) comprises a group of statistical methods used to study objects (phenomena) described by many features. Using MCA we can examine complex phenomena, i.e. phenomena which are described by two or more variables. The economic research such as MCA is understood as a collection of various methods designed to detect statistical patterns in collectivities.

Using *multidimensional comparative analysis*, we can solve two categories of problems:

- study the similarities of objects in terms of complex phenomena using the methods of classification
- rank objects in terms of a complex phenomenon with the use of linear ordering methods (Stanimir A., 2006).

Linear ordering is one of involves ranking objects according to one feature. In other words, the method allows to number objects from 1 to n. The objects are ranked according to a certain criterion – usually from „the best (1) to the worst (n)“.

Taxonomic measures of development are applied in benchmarking and linear ordering of socio-economic objects. The research of taxonomic methods in Poland was initiated by Z. Hellwig, who in 1968 used the taxonomic measure for benchmarking the development of selected countries. The construction of Taxonomic Measure of Development (TMD) is general, so there are no contraindications against using it in comparative analysis and linear ordering of various social (or socio-economic) phenomena. The basis of this method is to build a theoretical model of development.

The TMD algorithm is as follows:

- standardizing the character of variables by transforming all of them into stimulants (Stimulants (S) : an increase in their value causes an increase in the level of the phenomenon; destimulants (D): an increase in their value causes a decrease in the level of the phenomenon; nominants: a specific value (N) indicates the highest level of the phenomenon (Dudek H. et al., 2011)).
- normalization of diagnostic variables using formula (4)

$$z_{ij} = \frac{x_{ij} - \bar{x}_j}{s_j} \quad (1)$$

where:

\bar{x}_j the arithmetic mean of variable X_j ,

s_j the standard deviation of variable X_j

- Pattern construction – an object that has the best (highest) values of diagnostic variables

$$z_{0j} = \max_i \{z_{ij}\} \quad (2)$$

where:

z_{ij} –normalized values observed in the whole set of data;

- determining the distance (d_i) of each object from the pattern.

$$d_i = \sqrt{\frac{1}{m} \sum_{j=1}^m (z_{ij} - z_{0j})^2} \quad (3)$$

- normalization of the measure is carried out using the following formula:

$$TMD_i = 1 - \frac{d_i}{d_0} \quad (4)$$

where

$$d_0 = \bar{d} + s_d$$

Higher TMD indicates a higher level of the phenomenon studied. In order to take into account different levels of impact of individual diagnostic variables on the studied phenomenon - weight is introduced in the process of constructing the synthetic measure of development.

Synthetic Measure based on zero unitarization method is also linear ordering method. In the first stage of the procedure each of k variables is normalised by zero unitarization method proposed by Kukula (Kukula K., 2014; Kukula K., Bogocz D., 2014). Depending on the variable: stimulant (S) or destimulant (D) normalised formula in described by the following formulae (5) and (6):

$$z_{ij} = \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \quad X_j \in S \quad (5)$$

$$z_{ij} = \frac{\max_i x_{ij} - x_{ij}}{\max_i x_{ij} - \min_i x_{ij}}, \quad X_j \in D \quad (6)$$

Normalised formula changes the value of variable X_j into $[0,1]$. Therefore, based on the set of variables normalised with this method it is possible to construct synthetic measure whose values are included in $[0,1]$. It is described by the following formula (7):

$$Q_i = \frac{1}{k} \sum_{j=1}^k z_{ij} \quad (7)$$

Research results and discussion

The ranking based on the taxonomic measures of development by Hellwig is presented in Table 2. The highest measure was reported for Germany and France. The top position of these countries is proved by data analysis. Germany

and France are the countries with the highest values for most of the information items regarding agricultural production. They are leaders in growing plants and animal breeding. Poland holds the third position and has the largest rye and root crops. Cyprus and Luxembourg are found at the end of the list. The lowest values of all the information items were reported for these two countries. It should be emphasised that the ranking is very stable and only few countries change their positions in the list. Lithuania moved up from 16 position in 2004 to 12 position in 2014. It was possible due to increased cereal production (including wheat and spelt), rape and root crops.

Table 2

TMD ranking for selected European countries

Country	Position in ranking		Country	Position in ranking	
	2004	2014		2004	2014
Austria	13	14	Italy	6	6
Belgium	12	13	Latvia	20	20
Cyprus	23	23	Lithuania	16	12
Czech Republic	9	10	Luxemburg	24	24
Dania	8	8	Holand	7	7
Estonia	21	21	Poland	3	3
Finland	17	17	Portugal	18	18
France	2	2	Slovakia	19	19
Germany	1	1	Slovenia	22	22
Greece	14	15	Spain	4	4
Hungary	10	9	Sweden	11	11
Ireland	15	16	Great Britain	5	5

Source: author's calculation based on EUROSTAT data

In the next stage of the research a ranking was constructed based on the zero unitarization method. The results of the analysis are presented in Table 3. There is a strong convergence of both rankings. The leaders and the followers remain at the same positions, but in the second ranking Germany and France exchange their places. Poland and Spain take 3 and 4 position respectively, whereas Cyprus and Luxembourg are placed at the end of the list. This stable arrangement of the countries indicates a large gap between these countries and the other countries in the ranking.

Changes in ranking are visible only in the middle positions. Belgium which in the first ranking took 12 and 13 positions, in the second ranking moved up from 13 to 11 position. Austria which was at first classified 13 and 14, moved in the second ranking to 14 and 16 position. In the first ranking Sweden took stable 11 position and in the second ranking this country was placed from 12 to 16 position. All the above-mentioned changes indicate large homogeneity (unity) of the middle group. In this case each change in the algorithm of synthetic measure construction alters the order of the objects. Results presented

in the paper confirms research others authors

(Bogdan W. et al., 2015).

Table 3

Synthetic methods ranking for selected EU countries

Country	Position in ranking		Country	Position in ranking	
	2004	2014		2004	2014
Austria	14	16	Italy	5	5
Belgium	13	11	Latvia	20	20
Cyprus	23	23	Lithuania	17	12
Czech Republic	10	10	Luxemburg	24	24
Dania	9	9	Holand	7	7
Estonia	21	21	Poland	3	3
Finland	18	18	Portugal	16	17
France	1	1	Slovakia	19	19
Germany	2	2	Slovenia	22	22
Greece	11	13	Spain	4	4
Hungary	8	8	Sweden	12	14
Ireland	15	15	Great Britain	6	6

Source: author's calculation based on EUROSTAT data

The analysis of the selected EU countries proved that in terms of agriculture France and Germany appear to be powerful leaders. These two countries with the largest land area have the best conditions to run modern agriculture: large acreage of farms, specialised farms and technologically advanced infrastructure. This is proved by the research of other Authors (Kolasa-Wiecek, A., Tukiendorf, M. 2012).

Conclusions

At the end of the ranking list the countries characterised by the smallest area are placed. Their livestock and crop production in relation to other countries is considerably smaller. In addition, it should be emphasised that the range of variables selected for the research reflected the items produced in a particular climate zone that Poland belongs to. Countries placed in the

other part of the list often have different conditions and types of crop production than the ones assumed by the research.

As a result of political transformation and the accession of Poland to the EU, Poland implemented important changes. Agriculture however, remains not only one of the most important sectors in the Polish economy, but it also takes an important position in the EU agriculture.

The research proved the need to implement multidimensional comparative analysis. It should be remembered, however, that (similarly to the research conducted), a change in the linear allocation method may result in different order of the examined items in the ranking. Therefore, in this kind of analysis the results should be compared to actual data based on which the research was conducted.

Bibliography

1. Bogdan, W., Boniecki, D., Labaye, E., Marciniak, T., Nowacki, M. (2015). Poland 2025: Europe's New Growth Engine, *McKinsey & Company*.
2. Borec, A. (2009). Sustainable Rural Development. EU Agricultural Perspective, *Jouranl of Geography* 4-1, pp 37-55.
3. Bozek, J. (2010). Typology of European Union Counitres with Respect to Similarity od Agrarian Structure, *Acta Oeconomia*, 9 (3) , pp. 17-23.
4. Drejerska, N. (2015). Spatial Patterns on the Labour Market on Rural Areas in Poland. *Proceedings of the International Scientific Conference: Rural Development 2015*, s. 1-5.
5. Dudek, H., Krawiec, M., Landmesser, J. (2011). Fundamentals of Statistical Analysis in Market Research, *SGGW Press, Warszawa*.

6. Hellwig, Z. (1968). The Use of Taxonomic Measures for Typological Distribution of Countries in Terms of Their Level of Development, Resources and the Structure of Qualified Staff, *Statistical Review*, 15 (4)
7. Kolasa-Wiecek, A., Tukiendorf, M. (2012). Application of Agglomerative Method of Clustering in Segmentation of European Union Countries. *Journal of Research and Applications in Agricultural Engineering*, Vol. 57, nr 1, p. 80-82
8. Kukula, K. (2014). Budowa rankingu wojewodztw ze względu na wyposażenie techniczne rolnictwa w Polsce. (Ranking construction of the Polish Voivodships due to the technical equipment of agriculture), *Wiadomości Statystyczne (Statistical News)*, nr 7 p. 62-76.
9. Kukula, K., Bogocz, D. (2014). Zero Unitarization Method and Its Application in Ranking Research. *Agriculture*, Tom 7, No 3 pp. 5-13
10. Kusiś, J., Miltovica, B. (2016). Latvian, Lithuanian and Polish urban youth perceptions of occupational prestige of farmer, *Proceedings of the 152016 International Conference: Economic Science for Rural Development No 43* pp.66-73.
11. Mickiewicz, A., Mickiewicz, B. (2010). Polish Food Sector in the European Union, *Economic Science for Rural Development* Nr. 21 pp. 46-51.
12. Mrowczyńska-Kamińska, A. (2008). The Importance of Agriculture in the Polish National Economy: Macroeconomic and Regional Analysis), *Scientific Journal Warsaw University of Life Sciences – SGGW Problems of World Agriculture* N20 pp. 96-108
13. Pluta, W. (1977). Multidimensional comparative analysis of economic research), *PWE*, Warsaw.
14. Stanimir, A. (2006). Analiza danych marketingowych: problemy, metody, przykłady. (Analysis of Marketing Data: Problems, Methods, Examples), *Wydawnictwo Akademii Ekonomicznej im. Oskara Langego we Wrocławiu*, Wrocław.
15. Statistical Yearbook of Agriculture, 2014.
16. Van der Ploeg, J., Werry, F., Blom, J., Silvis, H. (1999). The European Agricultural Model: perspectives, prospects and research needs, *Position Paper*, Wageningen University.
17. Znaczenie rolnictwa w gospodarce Polski (The Role of Agriculture in Polish Economy).
[https://www.igipz.pan.pl/tl_files/igipz/ZGWiRL/ARP/01.Znaczenie %20rolnictwa %20w %20gospodarce %20Polski.pdf](https://www.igipz.pan.pl/tl_files/igipz/ZGWiRL/ARP/01.Znaczenie%20rolnictwa%20w%20gospodarce%20Polski.pdf)

AGRICULTURAL SOCIAL INSURANCE FUND BUDGET FINANCING IN POLAND IN 1996-2016

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Abstract. The aim of the article is to assess the Polish agricultural budgets in terms of size and structure of the funds allocated to the social policy benefiting farmers in Poland, in the form of expenses on Agricultural Social Insurance Fund (ASIF). The article also features a comparison of social security systems for farmers in selected EU countries. The study is a synthesis of many years of work of the authors related to ASIF in the agricultural budgets.

Key words: ASIF, budgetary expenses, the EU.

JEL code: H55, H29, H60

Introduction

The Act of 20 December 1990, which established the Agricultural Social Insurance Fund (ASIF), allowed to take over the distributed earlier duties relating to farmer social insurance and to undertake new tasks, hitherto unrealized by any insurance institution in Poland. From that point on, the agricultural insurance system became significantly more similar to the employee insurance system. Thus, the gap has been filled with regard to the category of benefits and the rules for their granting to individual farmers. At the same time, it created a significant commitment to the agricultural and food sector, which had to carry the state budget load. It is also worth mentioning that in the transition period after 1989, agriculture and the Agricultural Social Insurance Fund took over a large part of the cost of social and economic changes. From the non-agricultural sectors, during processes of employment restructuring, peasant-workers were fired in the first place. Then, they were acquired by the sector of agriculture and rural areas. These people, going back to their own, even small farms did not procure the status of the unemployed in line with the applicable laws, and thus did not receive appropriate benefits. ASIF took over the burden of insurance and security for such people. It is also worth noting that during the transformation of the Polish economy particularly benefits paid in the initial period by the Agricultural Social Insurance Fund were in a provision of basic social support for the existence in rural areas, not only for agricultural pensioners, but also for peasant families.

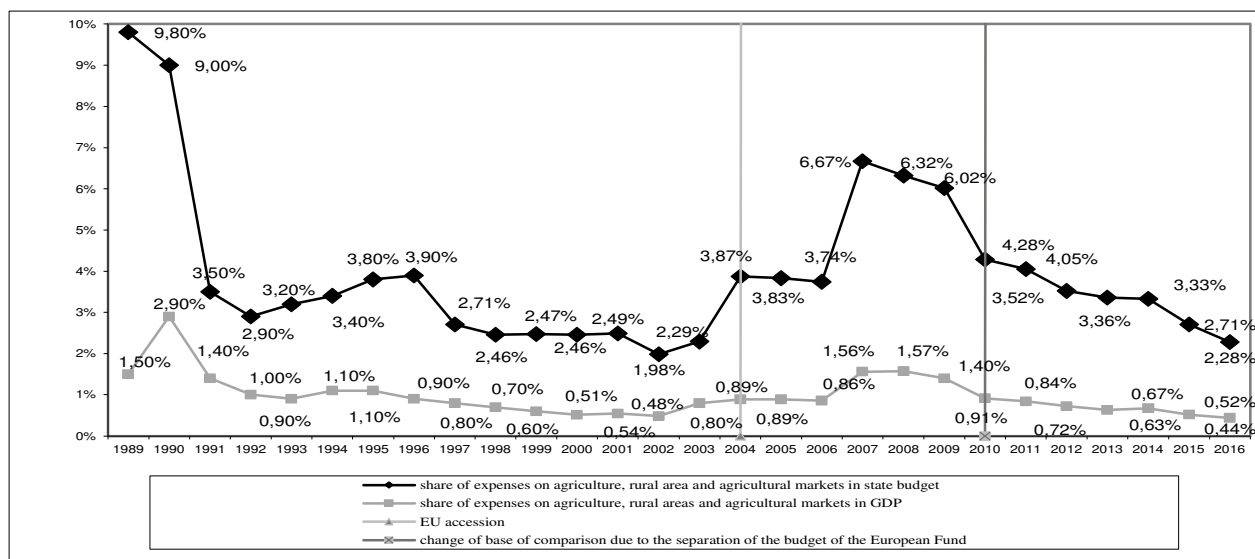
The aim of the article is to assess the Polish agricultural budgets in terms of the size and structure of the funds allocated to the social policy for farmers in Poland, in the form of expenses on ASIF in 1996-2016. The authors recognise a clear dilemma of the budgetary and economic policies in this scope, namely the competitiveness of social expenses (ASIF) to support structural changes in agriculture and rural areas. The second part of the article features a comparison of the systems of social security for farmers in selected EU countries. Source materials coming from the budget laws and methods of analysis of the structure and dynamics as well as regression were used.

Agricultural Social Insurance Fund in the period before Poland's accession to the EU

An analysis of the share of expenditure on the agricultural sector in the state budgetary expenses in the researched period indicates that EU integration was crucial to changing trends in the perception of decision-makers in terms of its financing. By 2003, opinions on Budget Acts gave rise to pessimism. There were reasons to believe that the irrational deterioration of the economic situation since 1997 has placed agriculture in the face of an increasing crisis. In fact, since the beginning of the economic transformation in Poland, it was difficult to recognize that agriculture was a priority in the policy of the government (Czyzewski, Matuszczak, 2014). As indicated in Figure 1, the share of expenditure on the agricultural sector in budgetary expenses exhibited a stagnation with dangerous falls, similarly to 2002 to below 2 % (Fig. 1). It can be

considered that the average share of expenses on the agricultural sector in the researched period at the level of 2.36 % illustrated the approach to agricultural policy at that time. After a relatively good situation for agriculture in 1991-1997, there was a clear breakdown in funding purposes of the agricultural budget. Additionally,

there were times when budgetary funds were not isolated or used for the implementation of many previously adopted purposes. Omissions, which were made over the years, evidenced progressive marginalization of development issues of agriculture, rural areas and agricultural markets in future state budgets.



*Comparisons to the previous years relate to the provisions in the Budget Acts.

**Expenditure on the agricultural sector covers the period from 1989 to 2000 including expenditure for: the Ministry of Agriculture and Food Economy, Agricultural Market Agency, Agency for Restructuring and Modernisation of Agriculture, the budgets of provincial governors in the scope of agriculture and specific provisions. After 2000, the expenditure was allocated for Agriculture, rural development and agricultural markets along with the budgets of provincial governors and specific provisions excluding funds for co-financing and pre-financing of goals and programmes of the EU and ASIF.

*** In 1989, the GDP amounted to PLN 118.318.7 billion, while the budget expenses total was PLN 18.204.1 billion and the expenses for the agricultural sector were PLN 1.782.5 billion, hence the high share of sectoral spending in the state budget expenses. These values were similar in 1990.

Source: authors' compilation based on the Enforcement of Budgetary Acts for 1996 (pp. 2/8), 1997 (pp. 2/8), 1998 (pp.2/9), 1999 (pp.2/8), 2000 (pp.2/14), 2001, 2002, 2003, 2004, and A.Czyzewski, *Opinia o budżecie na lata 2002-2016, Dział Analiz i Opracowań Tematycznych Kancelarii Senatu RP*.

Fig. 1. The share of expenditure on agriculture, rural development and agricultural markets in the budgets of the state and GDP in 1989 and 2016 (in %)

By 2003, the economic situation of farms with regard to the non-agricultural environment didn't improve, on the contrary, a civilization gap for most of them grew and degradation deepened.

The projected expenditures in the budget acts were not able to alleviate the fundamental problems of agriculture and rural areas in Poland, such as even the disparity of income, education or the state of social infrastructure. However, the biggest problem was the lack of systemic solutions to support structural changes in the analysed sector, which indirectly could create an opportunity of increasing the income of agricultural producers.¹

The investment processes weren't supported enough, which weakened the processes of reproduction in agriculture by means a low rate of assets. There was no chance for the implementation of a rule, which worked out in highly-developed countries: through income growth and investment in agriculture and rural areas the pace of structural changes would speed up. Therefore, it was difficult to talk about adapting agricultural structures to the requirements of a modern market economy.

farmers' ability to compete on the domestic and foreign markets depended on the above situation. As a result, farmers, through the mechanism of the market, executed (in the form of primary income) approximately 75 % -77 % of generated gross added value. Taxes and applicable benefits corrected the value to 2/3. This means that about 33 % of added value was taken over by the non-agricultural part of the economy. (Czyzewski, 2001).

¹ Economic instability influenced the development process of the sector, which was reflected also in the income situation of farmers. The

A special position in the structure of expenditure in state agricultural budgets is taken by the Agricultural Social Insurance Fund (ASIF) – firstly, those are nominally the biggest expenses, secondly, they are subject to significant changes (Fig. 2).

Before the Polish accession to the EU, the share of expenditure on agriculture and food economy, together with the Agricultural Social Insurance Fund, in total, amounted to 3.8 % in 1991 and as much as 9.5 % in 1992 – especially without changing their level in subsequent years.

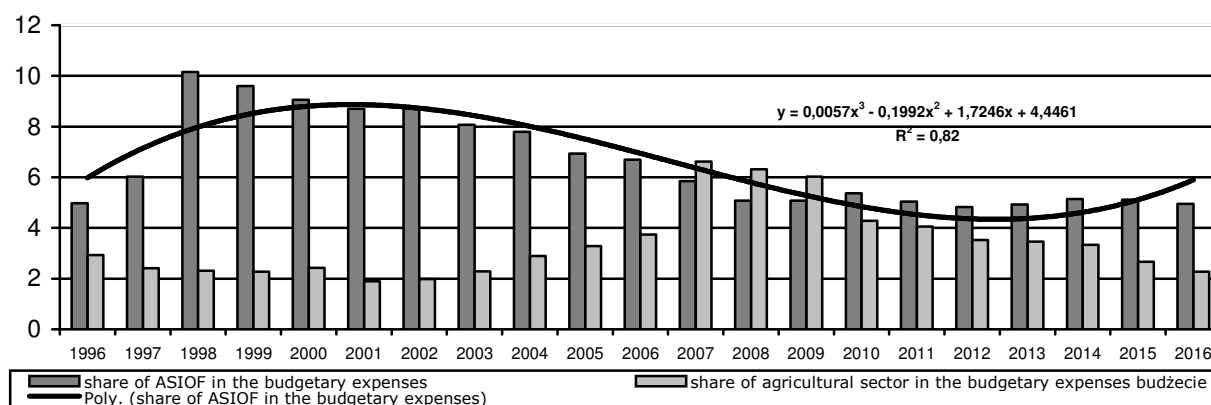
Also, the proportion of expenses on agriculture and food economy and the Agricultural Social Insurance Fund in 1990-2002 significantly increased in favour of social expenses. Already in 1992, this share was 2.3 times greater than expenses on agriculture and food economy, to grow in the next few years at a similar level. Since 1997, there has been a growth observed to 2.5 fold; in 1998, to 3.2 fold; in 1999, to 4.1 fold; and in 2002, up to 4.4 fold (Czyzewski 1997-2014) (Fig. 3). This is a meaningful evidence of a high and sustained socialization of budgetary expenses on agricultural population and postponing the problem of restructuring Polish agriculture in the pre-accession period. The issue of pension insurance of farmers moved forward before the budget expenses. More and more often it happened at the expense of structural transformation of agriculture and food economy.

Unfortunately, this was not an alternative. Consideration of a dilemma whether to socialize the agriculture budget or support structural changes in the sector, was a mistake.

For a long time, both phenomena should be supported by doing it consistently, yet reasonably, and not by substituting expenses on structural transformation of agriculture and rural areas with social expenses. Unfortunately, the growing of provisions for the Agricultural Social Insurance Fund in absolute values, has become necessary because they resulted from many years of inaction and negligence, and were the price of structural transformations' postponing in Polish agriculture and rural areas. At the same time, the social costs of the lack of restructuring of the agricultural and food sector grew due to the long-term insufficiency of farms.

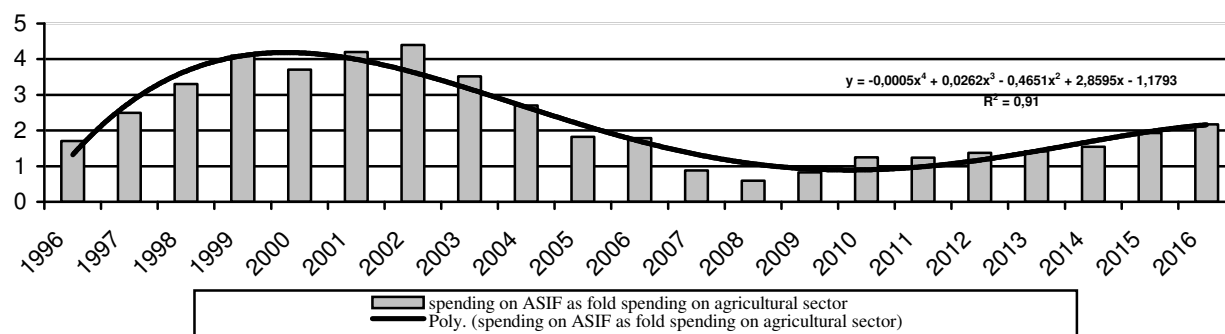
ASIF after Poland's accession to the EU

Immediately before Poland's accession to the EU, it was said that the Polish agriculture and rural areas have already passed the period of the so-called "constructive destruction". Since 2003, there has been a clear "bounce back" in the form of a permanent, real growth in budgetary expenses on the agricultural sector, which changed the previous trend (Fig. 1). For the first time, there was a chance to directly improve the income situation of domestic agricultural producers and reproduction processes in their farms.



Source: authors' compilation based on the Enforcement of Budgetary Acts (see Fig. 1)

Fig. 2. Expenditure on agriculture and food economy and the Agricultural Social Insurance Fund in 1996-2016, in million PLN as a share of budget expenses in total (in %)



Source: authors' compilation based on the Enforcement of Budgetary Acts (see Fig. 1)

Fig. 3. Expenditure on ASIF as a multiplicity of the limit of expenses on agriculture, rural development and agricultural markets in 1996-2016

As it has been mentioned above, even in 2002 the share of expenditure on agriculture, rural development and agricultural markets in budgetary expenses amounted to 1.98 %, so it can be assumed that in the period prior to Poland's accession to the EU, this share has reached an average level of nearly 5 %. This considerable increase was due to the need for increasing domestic financing (in the scope of cooperation and pre-financing), to make it possible to obtain EU funds. A higher growth rate of expenditure on the agricultural sector is also noticeable as compared to the national budget (although the latter also "accelerated", which was related to the fact of initiation of an upward phase of the business cycle). The clear decrease of expenses on the agricultural sector since 2010 is largely apparent due to the previously mentioned fact that expenses on agriculture, rural development and agricultural markets that year included the amount associated with the loan for CAP pre-financing. Since 2010, the separation of that amount as part of BGK results in the inability of direct comparisons of expenses for different purposes before 2010. However, it should be clearly emphasized that since accession to the EU, there has been a clear sustainable and real growth in budgetary expenditure on the agricultural sector, which reverses the current trends, as it was mentioned above. Naturally, it is also an undisputed determinant to improve the income situation of farms and support their reproductive capabilities.

Also for ASIF, 2003 was a turning point because of the noticeable change in the proportion of the share of expenditure on agriculture, rural development and agricultural markets, as mentioned above. We note a decrease in the share of expenditure of a social nature. While in 2001-2002, as mentioned above, it was more than 4.4 times higher than expenses on the development of the agricultural sector and rural areas, this ratio decreased to 3.5 times in 2003, and since 2007, for the first time in the researched period, this Figure was below one, i.e. in 2008, it was 0.59, while in 2009 – 0.83. Hence, it may be said that 2003 brought an inhibition, or it even started to reverse the trend of socialization of budget expenses in favour of the increase in expenses on structural transformation of agriculture and rural areas. We can also observe a significant change in 2010, which results mainly from accounting issues (i.e. the creation of the European Budget Funds), but the subsequent years have shown a relative stabilization of expenses on Agricultural Social Insurance Fund as to their level. The proportion of expenses on Agricultural Social Insurance Fund and the other on agriculture, rural development and agricultural markets after 2010 again slightly reopened up to expenses on ASIF. It should be noted, however, that in the period immediately pre-accession, i.e. in 2001-2002, expenses on ASIF were over four times higher than on agriculture, rural development and agricultural markets (Fig. 3). In 2009-2016, this share

amounted to an average of ca. 145 % in relation to expenses for agricultural purposes. This also shows that the role of expenses on ASIF in Polish agricultural budget in the long term, relatively decreased. Over the past 18 years, the share has declined by nearly one half, while after 2008 it was at an average of 5.11 % of expenses on agriculture, rural development and agricultural markets. We should also add that in the pre-accession period, i.e. in 1998-2004, this share fell by 1.46 %, while over the next 12 years after Poland's accession to the EU (2004-2016) by further 2.62 %. Hence, one may claim that stimulation of economic functions of the Polish agricultural budget has continued for several years. However, recent years (2011-2016) brought a relative increase in the volume of expenses on ASIF, which on the one hand, suggests that this level approached the critical threshold of socially determined expenses and on the other hand, that this kind of socialization of expenses from the national agricultural budget does not limit its function of pro-development due to an active role in this respect when it comes to the European Funds Budget and growth of GDP.

Comparison of social insurance for farmers in selected EU countries

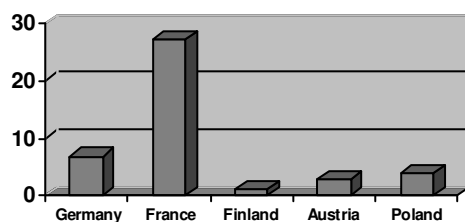
The separate system of farmer social security existing in Poland is not a European exception. In at least seven EU countries, there are similar social insurance schemes for farmers. Apart from Poland, these countries include Germany, Austria, France, Finland, Greece and Luxembourg. As you may see, at least three of these countries can be included amongst the leading EU producers of agricultural raw materials due to the volume of production, as well as the potential of their generation resources (Musiał 2014).

We should also point to the absolute annual number of budget support for social insurance systems for farmers. The Polish contribution from the budget is one of the lowest and it has amounted to an average of PLN 16.6 billion in the last 10 years. It's nearly the same amount as in Austria and seems somewhat less than the amount in Germany (Fig. 4) (Piatkowski 2000). Nevertheless, it should be noted that in the relative dimension, the share of funding social insurance schemes for farmers in the analysed countries is quite different. The largest relative share of funding social insurance premiums is in Poland and France (95 % and 82 %), the lowest – in Germany (65 %) (Fig. 5).

Comparison of social insurance schemes for farmers in selected EU countries

	France	Germany	Austria	Finland	Poland
Personal scope	Farmers and relatives working on the farm, workers employed in the agricultural sector of their family.	Farmers and their families, foresters and their families.	Farmers and their families, foresters and their families	Farmers, foresters, fishermen, reindeer owners and their families, artists and scientists who have received a grant or a scholarship.	Farmers and relatives working on the farm.
Method of determining premiums	On the basis of the income of the last 3 years, income calculated based on flat rates for individual crops and livestock, flat-rate wages for managers and employees.	On the basis of total income, which is the basis for taxation with income tax.	On the basis of the so-called unit value of the farm and the insurance rate. The revenue office calculates the unit value taking into account the size of the farm, soil quality, location. Actual income.	On the basis of crop area and forest areas.	On the basis of the base pension (10 % of the pension) plus additional % for farms above 50 ha.
Retirement age	60 years for women and men. From 2018 - 62 years and a full premium period or 67 years.	65 for men and women, the target is 67.	60 for women, 65 for men, eventually equalizing the age to 67 years	65 years for women and men, there is a proposal to raise to 68 years	60 for women, 65 for men, with the possibility of extending the working time
Minimum contribution period	38 years for those born before 1945 and later period increases up to 41 years for those born in 1952, and later	15 years old and transferring the farm onto a new user and completed 65 years	45 years	40 years	25 years and the retirement age or 30 years for people five years younger than retirement age who stopped farming

Source: authors' compilation based on (ENASP 2015) and (Pawlowska-Tyszk, Soliwoda)

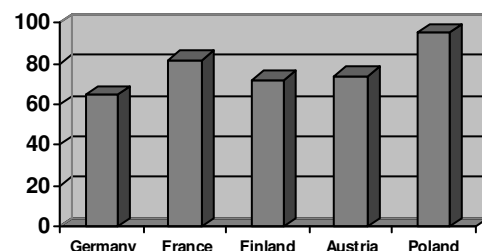


Source: authors' compilation based on data from (ENASP 2010)

Fig. 4. The amount of funding of social insurance systems for farmers in countries belonging to the European Network of Agricultural Social Protection Systems in 2009 (in billion EUR)

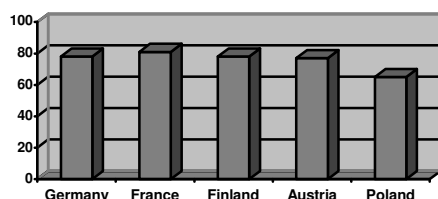
It should also be added that in the analysed countries, a significant share of state subsidy is allocated for funding pension benefits. However, the Polish social security system for farmers compared to other countries forming the European Network of Agricultural Social Protection Systems (ENASP) benefits from state

subsidies to farmers' pensions in the smallest extent. The largest share of subsidies to pension occurs, among others, in France (Fig. 6) (Pawlowska-Tyszk 2011).



Source: as in Fig. 5.

Fig. 5. The share of funding of social insurance systems for farmers in countries belonging to the European Network of Agricultural Social Protection Systems in 2009 (in %)



Source: authors' compilation based on data from national statistics systems of social security and data from (ENASP 2010)

Fig. 6. Share of funding pension benefits from the social insurance of farmers 2009 [%]

Systems of social security of farmers in the EU countries vary in terms of organization, but their shape invariably affects the processes of demographic change among the rural population. At the same time, the most important issue related to the reform of the current system, should be the problem of linking the size of paid insurance premium for pension with the level of income on the farm. The key aspects to efficient functioning of the system also include active life expectancy and the length of the contribution period enabling to obtain a pension in full. Both aspects of the system, that are important from the point of view of the agrarian and social policy, are facing each other in opposition: the acceleration of change in population in agriculture through the use of a system to promote the transition to early retirement means for the beneficiary that there is a shorter premium payment period, which raises the need to reduce the amount of paid benefits, or a need of involving state budget funds in the form of a supplement to the expected amount of pension entitlement. In view of the projected decline in the working population in all EU countries, and growth in the working age population above 65 years, we are currently moving away from systems that support the acceleration of generations among farms to systems that promote flexible level of retirement age.

Final conclusions

1) The farmer social security played a key role in the analysed period as part of a social policy towards rural areas and agriculture. **It served**

Jelgava, LLU ESAF, 27-28 April 2017, pp. 330-337 a positive role in supporting farm incomes in difficult conditions associated with side effects of economic transformations. Farms took over the burden of maintaining the family members **with the risk of the** worsening phenomenon of unemployment in rural areas.

- 2) The flow of transfers due to **ASIF** is a specific channel for the flow of budgetary funds in the Polish conditions, which is more than a social development. One should be aware that these measures did not allow for extended reproduction, and only held back the existing structures. Benefits of **ASIF**, however, had a significant impact on agricultural income, and thus enabled many farming families to acquire a permanent source of income in the form of pension benefits.
- 3) The financial situation of the agricultural and food sector changed shortly before accession to the EU (2003-2004), and this status is currently continued, which created prerequisites for a breakthrough in agricultural policy in Poland in connection to Poland's membership in the EU. The share of expenses on agriculture, rural development and agricultural markets **increased** in the total **budget expenditures**. At the same time, there has been a tendency to limit socialization expenses for their growth on the structural changes in rural areas.
- 4) After Poland's accession to the EU, there has been a gradually progressing rationalization of the national agricultural budget that consists of reducing its social functions to stimulate the economy. After 2010, this process has reached a relative stabilization in connection to reaching the critical threshold of ASIF socially determined expenses. The increase in economic benefits from the cost savings of **ASIF** is becoming increasingly doubtful.
- 5) Considering the dilemma whether to support structural changes in agriculture and rural areas at the expense of reductions in expenses on **ASIF** is a wrong approach.

Nowadays, similar proportions should be retained as to doing both, consistently, though reasonably and not to substitute expenses on structural transformation of agriculture and rural areas with social expenses.

A separate social insurance system for farmers in Poland is not **unique** in the EU. Effective, efficient and independent functioning of the general system of separate **social insurance systems** for farmers was noted in such countries as Germany, France, Austria, Finland, Greece and Luxembourg. Their different scope, method of determining premiums, type of guaranteed benefits, the expected retirement age of the beneficiaries, the minimum contribution period were shown. All of these **systems have been functioning** for years, have an established

position and there are no talks about their liquidation, as they effectively fulfil the aims of the society. In Poland, there can be no liquidation of the ASIF system, as there are no premises or no economic and social conditions for any alternatives. However, there is a need for gradual changes in relative levels of premiums and benefits, in order to make them similar to the relation occurring in highly developed countries of the EU.

Acknowledgements

The study contains fragments of text under the title: KRUS a Państwo w budżetach rolnych Polski w długim okresie, submitted for publication in the journal „Ubezpieczenia w rolnictwie”, KRUS, Warszawa, 2016.

Bibliography

Journal paper with author(s)

1. Czyżewski, A. (2001). Rola polityki makroekonomicznej w kształtowaniu warunków zrównoważonego rozwoju rolnictwa, w: Współczesne problemy agrobiznesu w Polsce, ed. A. Czyżewski, Zeszyty Naukowe AE No. 13, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań, p. 11.
2. Czyżewski, A. (1997-2016). Opinie o projektach ustaw budżetowych na lata 1997–2016 w części dotyczącej rolnictwa, rozwoju wsi i rynków rolnych, Dział 0.10, część 32, 33, 35 oraz pozostałe części dotyczące rolnictwa, sporządzone na zamówienie Kancelarii Senatu (Biuro Informacji i Dokumentacji, Dział Informacji i Ekspertyz)
3. Musiał D. (2014). Zrównicowanie ubezpieczeń społecznych rolników w wybranych krajach Europy, „Roczniki Ekonomiczne KPSW w Bydgoszczy”, Bydgoszcz
4. Piątkowski, K. 2000, SVB- Zakład Ubezpieczenia społecznego rolników austriackich, Ubezpieczenia w rolnictwie. Materiały i Studia, nr 7, KRUS, Warszawa.

Books

5. Czyżewski, A., Matuszczak, A. (2014). *Budżet rolny Polski przed wstąpieniem do UE i po akcesji. Poziom, dynamika, tendencje*, [w] red. I. Nurzyńska. W. Poczta, *Polska wieś 2014: raport o stanie wsi*, Warsaw, Scholar Scientific Publisher in Warsaw, pp. 225-255
6. Pawłowska-Tyszkowski, J. (ed.) (2011). *Zmiany systemu ubezpieczeń społecznych rolników a finanse państwa*, Program Wieloletni 2011-2014, IERiGZ, No 2, Warsaw.
7. Pawłowska-Tyszkowski, J., Soliwoda, M., *Ubezpieczenia społeczne w rolnictwie w wybranych krajach UE – analiza porównawcza*, IERiGZ-PIB, Warszawa, https://www.ierigz.waw.pl/.../11137-Ubezpieczenia_spoeczne_w_wybra...https://www.google.pl/?gws_rd=sslhttp://webcache.googleusercontent.com/search?q=cache:T4VK-BD9-K8J:https://www.ierigz.waw.pl/download/11137-Ubezpieczenia_spoeczne_w_wybranych_krajach_UE.pdf+&cd=2&hl=pl&ct=clnk&gl=pl

Internet sources

8. ENASP 2010, "Agricultural Social Insurance in the European Union",
9. http://www.enasp.eu/files/enasp/enasp_1293802765477_ENASP_BOOKLET_INSIDE_2010.pdf and statistics of national social security systems
10. ENASP 2015, http://www.enasp.eu/wp-content/uploads/2015/11/ENASP_Booklet_2015_EN2.pdf
11. http://www.enasp.eu/files/enasp/enasp_1293802765477_ENASP_BOOKLET_INSIDE_2010.pdf and statistics of national social security systems.

Acts

12. Budgetary Acts for 1996 (pp. 2/8), 1997 (pp. 2/8), 1998 (pp.2/9), 1999 (pp.2/8), 2000 (pp.2/14), 2001, 2002, 2003, 2004, Warsaw.

FARMERS' ASSESSMENT OF TRAINING SERVICES AND THE IMPACT OF AGRICULTURAL ADVISORY ON SELECTED DEVELOPMENTAL FACTORS AFFECTING FARMING

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Abstract. The research aim of the paper is to provide assessment of the influence of actions of advisors employed in the District Advisory Team (DAT) in Kłodzko on selected developmental factors affecting farms located in the Kłodzki District. Moreover, the farmers were surveyed for their satisfaction with advisory services they were provided with. A diagnostic poll method was used for the survey. The results have revealed that the surveyed farmers were mostly interested in services in the field of new European Union regulations and entrepreneurship development, as well as assistance in completion of applications for direct payments and support within the RDP (Rural Development Programme). The respondents' satisfaction with services provided by the analysed advisory centre was most often found to be at satisfactory level.

Key words: agricultural advising, training courses, developmental factors.

JEL code: Q10, Q16

Introduction

The system of agricultural advisory in Poland has been evolving over time following the constantly changing structure and needs of agriculture (Dorofiejczuk-Paradny J., Zawisza S., 2011; Kania J., et al., 2014; Mickiewicz A., et al., 1998; Wawrzyniak B.M., 2003; Zawisza S., 2012). It needs to meet the demands connected with technological and technical progress. Integration of Poland with the European Union confronted agricultural advisors with new challenges (Dutka B., Mickiewicz B., 2015), which today are significant part of their work. Functioning of agricultural advisory centres is now focused on the advisor-producer relations and aims at meeting the needs of consumers and farmers through improving the quality of products to be supplied to the market and improving the economic situation of farmers. In order to achieve these goals the agricultural advisory system needs to be efficient and effective. Therefore, it is important to choose appropriate communication forms and suitable methods and the content of advising must be adjusted to the needs of customers. Integration of Poland with the EU had a positive impact on the income of farmers (Roman M., 2014). Financial support from the EU budget has considerably contributed to the present situation of the Polish agriculture. According to Poczta,

Czubak and Pawlak (2009), in the post-accession period (years 2004-2008), as compared to pre-accession (years 2000-2003), the average annual level of financial support for the agricultural sector has increased by 11 times. It is estimated by the authors that an average annual growth of income from the Polish agriculture in the post-accession period was in 70 % due to the increase in financial support, whereas the share of other factors (the production volume growth, technological progress – advances in production technologies) accounted for the remaining 30 %. Due to constant support from the EU, the Polish agriculture has gone through complex processes of technological, structural and logistic modernization (Satola L., et al., 2014) thanks to which it has become more competitive in relation to other countries. Factors which affect competitiveness also include growth in productivity, referred to as an increase in effects for given outlays, creation of development tendencies and efficient development of a product market through extension of a relation network, close collaboration with customers and reliability in cooperation with foreign partners (Dzieza G., et al., 2015). Agricultural Advising Centres are units which play an important role in the support system provided by the European Union. They provide assistance in the field of farming technologies, technical, economic and

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structural solutions, (Prus P., 2007) and information how to implement innovations that lead to additional sources of income. Currently, the national agricultural advisory is focused on activities outlined by the European Commission as part of the Rural Development Programme (Kania J., Bogusz M., 2010), which over the years has also evolved from a strategy of intensive production volume increase (mainly through direct land payments) into sustainable development and ecological production. This is supposed to provide the environment with protection and change of the production model from quantitative into qualitative one, which is reflected in the newest Rural Development Programme for 2014-2020, as well as in current reports from the debate of the European Commission for Agriculture and Rural Development, and results, among others, from changing demands of consumers in the EU (Koreleska E., 2016). According to Kielbasa and Krysztoforski (2009), since 2004 farmers have shown a special interest in these issues and it has not decreased so far. Farmers usually search for such services that are related to new requirements of the Common Agricultural Policy and an opportunity to increase the production quality and obtainment of financial support to increase production quality and competitiveness.

After the integration of Poland with the European Union, functioning of the agricultural sector including the system of agricultural advisory services have undergone substantial transformation, the latter one having to adapt its services to the introduced reforms so as to satisfy the needs of farmers shaped by the Common Agricultural Policy. Under the Act of 22 October 2004 on Agricultural Advisory Units (Journal of Laws 2004, no. 251, item 2507), as many as 16 provincial agricultural advisory centres were founded including district agricultural advisory teams. The goal of this study is to analyse the impact of services provided by advisors employed in the District

Advisory Team (DAT) in Klodzko functioning within the structure of the Lower Silesian Agricultural Advisory Centre in Wroclaw, on selected factors affecting development of farms which come under this centre, as well as assessment of the satisfaction levels of farmers with the advisory services.

Material and the research method

In order to collect empirical data, a method of diagnostic poll involving a survey was used. The survey was carried out on owners of farms situated on the territory of the Klodzko County who used services of the District Advisory Team in Klodzko. Klodzko County is, after Wroclaw County, the largest county of Lower Silesian Voivodship, where there are 6419 individual farms. The survey did not include owners of farms with area smaller than 5 hectares, as these are subsistence farms run only to satisfy the needs of their administrators. The analysis included a population of 2449 farms, which identified a sample group of the size calculated by means of the below given formula (1):

$$N_b = \frac{N}{1 + \frac{4d^2(N-1)}{Z_\alpha^2}}$$

N_b – sample size
 N – population size
 d – permissible estimation error (5 %)
 Z_α – 1.64 for $\alpha=0.1$

(1)

Hence, the size of the surveyed sample group with permissible estimation error 5 % was 242. The survey was carried out with participation of employees of the District Advisory Team in Klodzko, who were given 250 questionnaires. However, only 185 of them were sent back to be analysed, so the estimation error increased by 6 %.

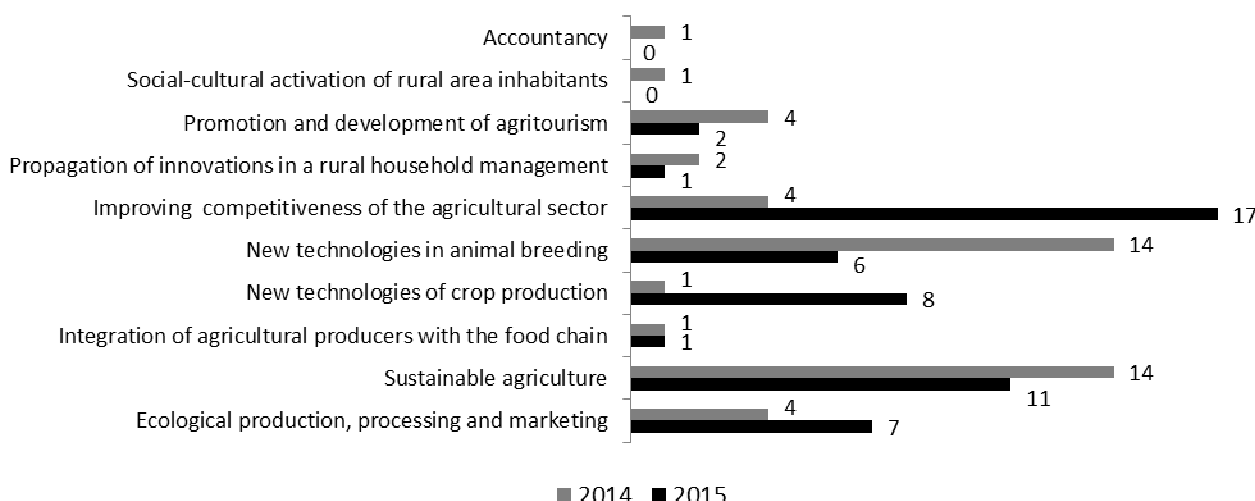
The questionnaires were completed during training courses in the period from June 2015 to November 2015. The respondents were asked to indicate areas of agricultural advisory services they most frequently took advantage of. They were also supposed to provide the number of training courses in particular areas. Respondents were also requested to provide assessment of the level of satisfaction with the training courses,

consistence of the subject matter with the profile of their farms, clarity of the provided information, quality of rooms where the courses were held and general evaluation of advising capacity of the District Advisory Team in Klodzko to adjust their operation to the needs and expectations of farmers. The farmers were also supposed to define the influence of the received services on selected factors affecting development of farms.

Research results and discussion

The processes of restructuring and modernization of the Polish agriculture have been carried out for many years with a big support of funds coming from the EU budget. The funds that are available to farmers as part of direct support systems aim mainly at stabilization of farmers' families incomes and maintenance of production processes, whereas the means dedicated to Rural Development Programme 2007-2013 and Rural Development Programme 2014-2020 are meant to improve the structure of the Polish agriculture (Wojewodzic T., 2016). In order to make it happen, farmers need to learn how to successfully apply for financial support offered by the EU, which is hardly possible without the help of agricultural advisors. Therefore, farmers who

want to develop their farms engage into cooperation with agricultural advisory centres where they are provided with individual services or can hire a consultant to perform a specific task (Kania J., 2008). They can also take part in training courses and shows. According to literature, being able to take advantage of professional support largely contributes to achieving success in farming (Sroka W., Dacko M., 2010). The subject matter of the training courses offered by particular centres is highly diversified and depends both on the demands of farmers and the range of training programmes launched at the national level. The District Advisory Team in Klodzko offered a diversified training programme (Figure 1). The most popular subject in 2014 included new technologies to be used in farms specializing in animal production, and farming consistent with the rules of sustainable development (protection, conservation and improvement of the natural environment). In 2015, most of the training courses were devoted to improving competitiveness of the agricultural sector through increasing productivity of farms by introduction of innovation and restructuring.



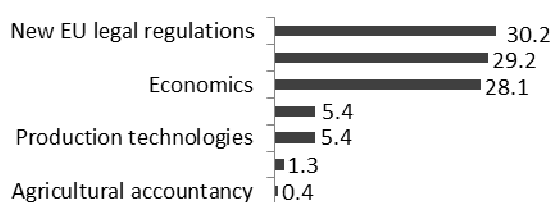
Source: authors' construction based on materials provided by the District Advisory Team in Klodzko

Fig. 1. Subjects and number of training courses provided by the District Advisory Team in Klodzko (2014 and 2015)

According to the survey results, the respondents most often took advantage of professional support offered by consultants

employed in the District Advisory Team in Klodzko in the areas of new EU regulations set out in the Common Agricultural Policy including:

plant cultivation, cross-compliance and integrated protection of plants, agricultural and non-agricultural entrepreneurship, assistance in completion of applications for subsidies and other services of the Lower Silesian Agricultural Advising Centre. Training courses covering the subjects connected with agricultural production technology and mechanization of agriculture, or finally on the subject of farm management and accountancy (Figure 2).

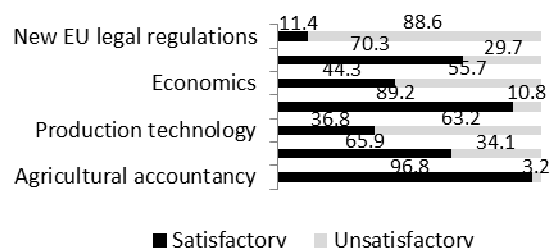


Source: author's calculations based on research

Fig. 2. Areas of agricultural advisory that enjoy the most popularity among the surveyed farmers (in %)

According to the respondents, there were not enough courses offered by the DAT in Klodzko that would cover all areas of their interest. Only slightly over one third of the respondents were of the view that the number of courses on the subject of agricultural production technologies was sufficient. As far as agriculture mechanization is concerned, a great majority of respondents were satisfied. More than half of the respondents thought that the advisors should provide many more meetings on the subject of completion of applications for financial support available within the Rural Development Programme. Only few farmers were not satisfied with the amount of time devoted to agricultural accountancy. Nearly two thirds of the respondents thought that the number of courses concerning organization of production and farm management was sufficient. It should be mentioned here that the ability to successfully manage an agricultural farm through utilization of the available resources and production means is gaining more and more significance (Prus P., 2010) especially in light of economic recession that is slowly taking over Poland (Plonka A.,

Paluch L., 2015). Therefore, it is crucial to develop entrepreneurship skills among farm owners (Mickiewicz B., 2015), which will allow them to find alternative, including non-agricultural sources of income. It is optimistic though that more than two thirds of respondents were satisfied with the number of training courses on the subject of agricultural and non-agricultural entrepreneurship. Unfortunately, a great majority of farmers indicated existence of a significant "information gap", regarding training courses on the subject of the EU legal regulations within the Common Agricultural Policy (Figure 3). An increasing interest of farmers in the new requirements connected with the Common Agricultural Policy has already been mentioned along with the results of Kielbasa and Kryzstoforski (2009) research results.



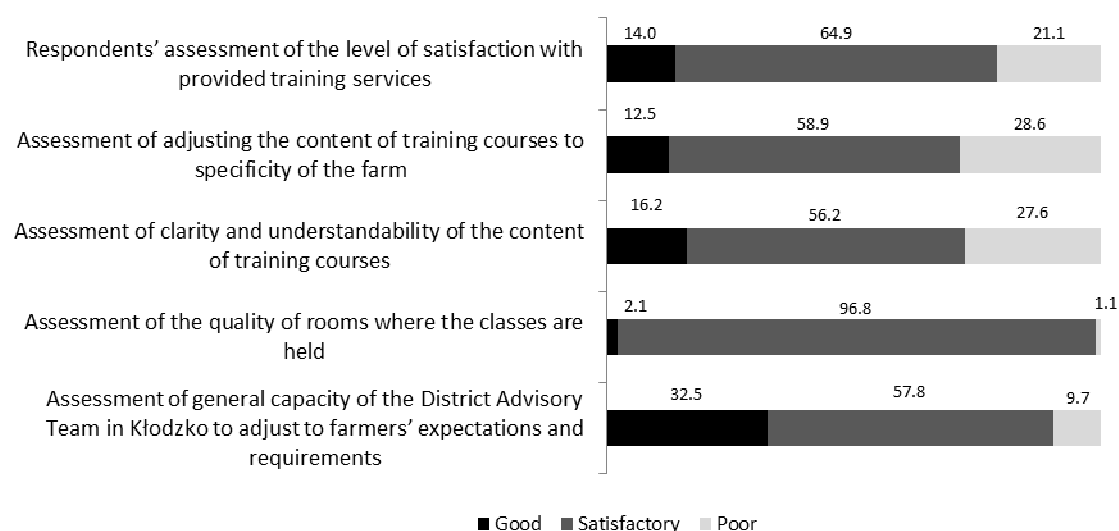
Source: author's calculations based on research

Fig. 3. Respondents' opinion on the number of training courses organized by the District Advisory Team in Klodzko (in %)

Nearly two thirds of the respondents found their satisfaction with services provided by the District Advisory Team in Klodzko to be at a satisfactory level, whereas every fifth farmer found them to be poor. As many as 14.0 % were very satisfied with the services. Adjustment of the subject matter of provided training services to the farm specificity was found to be satisfactory by most of the respondents. Unfortunately, a sizable group of farmers considered it to be poor, whereas only every tenth respondent thought it was good. A good advisor has to be able to choose the content of training courses but they also need to make sure that their lectures are clear and understandable. The choice of subjects chosen for the courses

were considered by slightly more than a half of farmers as satisfactory, however more than one fourth of respondents found it to be poor. This can be due to failure to adjust the communication form to the needs of farmers as it should not be too colloquial but should not contain too sophisticated or difficult phrases, either. It should not be too abstract because too high level of abstractness can lead to misunderstandings (Zawisza S., 2003). If advisors want to successfully introduce new and complicated ideas, they must know how to communicate with

their customers (Van den Ban. A.W., Hawkins H.S., 1997). A great majority of respondents were of the opinion that the rooms where training courses were held were satisfactory. More than a half of respondents found the general capacity of the District Advisory Team in Kłodzko to adjust to expectations and needs of agricultural producers to be satisfactory whereas nearly one third thought it was high. On the other hand, nearly every tenth respondent indicated poor capability of the DAT in Kłodzko to adjust to producers' expectation and demands (Figure 4).



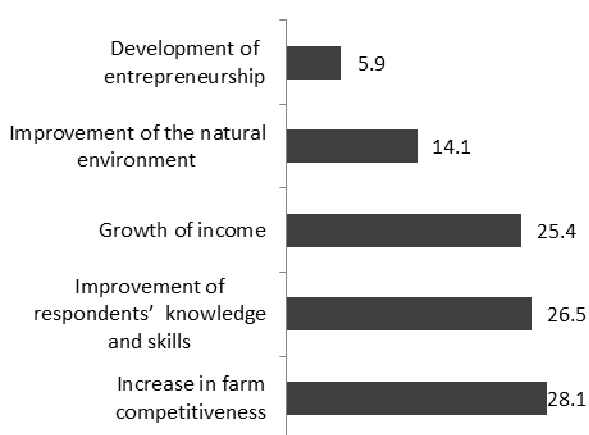
Source: author's calculations based on research

Fig. 4. Respondents' assessment of the level of satisfaction with provided training services, subject matter of training courses, clarity of teaching, quality of rooms and capacity of the District Advisory Team in Kłodzko to adjust to farmers' expectations and requirements (in %)

More than one fourth of the surveyed farmers thought the advisors had contributed to their farms competitiveness. A similar number of respondents declared that the effects of the advisors' actions from Kłodzko found reflection in an increase in farmers' skills and knowledge. Similarly, one fourth of respondents were of the opinion that the services offered by the District Advisory Team in Kłodzko contributed to their farms' income increase. The influence of agricultural advisors on the natural environment and development of agricultural or non-agricultural entrepreneurship was found to be positive by fewer respondents (Figure 5). The answer to the question about the importance of actions aiming at improving one's own

competitiveness seems to be obvious. However, there appears another issue concerning the consequences of poor participation in market activities and resignation from qualification improvement. Kalinowski (2013) focuses attention on the fact that there is not enough awareness among some households and their family members that raising competences brings both measurable and immeasurable benefits including the capital to be invested in the market as well as the prospect of personal development not related to economic factors. He also notices some dysfunction of the surveyed groups (including inhabitants of rural areas), who lack the ability to explore the market of training services and find ones that will meet future

challenges of the market. Demanding attitude of the surveyed farmers who blame the advisers for not enough information on the possibilities of qualification improvement is also an issue. Thus, it is necessary to boost inspiration as knowledge and competences are commonly desired benefits. It means that raising skills and qualifications will positively shape the social structure to become the basic economic resource providing new social, political and economic forces.



Source: author's calculations based on research

Fig. 5. The impact of the District Advisory Team in Klodzko activities on the above listed factors affecting farm development in the opinion of the respondents (in %)

Conclusions

The results of the discussed survey show that the respondents were mainly interested in courses on the subject of new EU legal regulations connected with the Common Agricultural Policy (including plant cultivation, cross-compliance and integrated plant protection), development of entrepreneurship

(agricultural and non-agricultural), as well as assistance in completion of application forms for direct payments and in other activities within the Rural Development Programme. The District Advisory Team in Klodzko did provide services in these areas; however, the respondents signalled there were not enough courses of this type. They indicated that there was a significant "information gap" as regards the above mentioned EU legal regulations, therefore, great majority of respondents were not satisfied with the number of courses. The satisfaction level of the surveyed farmers with the offered training courses in terms of the subject adjustment, clarity of communication, and the quality of lecture rooms was most often assessed as satisfactory. According to almost every third farmer, the capacity of the District Advisory Team in Klodzko to customize their services to meet requirements and expectations of farmers, was good. Flexibility and capability to adjust their offer to customer demands is connected with efficiency of the advisers' work. Fast pace of changes occurring in every sphere of life (legal, economic etc.) imposes on farmers the necessity of quick response. An efficient system of agricultural advisory centres is necessary to provide agriculture and rural areas with professional support. Therefore, it is essential to constantly monitor farmers' expectations from the system of agricultural advisory centres and provide quick response to new requirements and demands.

Bibliography

1. Dorofiejczuk-Paradny, J., Zawisza, S., (2011). Ewolucja systemow wsparcia doradczego na swiecie - od doradztwa panstwowego do prywatnych uslug doradczych (Evolution of the world agricultural extension systems – from public to private extension services). *Zagadnienia Doradztwa Rolniczego*, 1(63), pp. 23-28.
2. Dutka, B., Mickiewicz, B., (2015). Farm Advisory Service in Poland in Light of Legal Regulations. Proceedings of the 25th NJF Congress, "Nordic View to Sustainable Rural Development", Riga, Latvia, 16-18 June 2015, pp. 504-507.
3. Dzieza, G., Sikora, M., Murawski, A. (2015). Rozwiazania logistyczne jako czynnik przewagi konkurencyjnej przedsiebiorstw (Logistics Solutions as a Factor of Competitive Advantage of Companies). *Studies & Proceedings of Polish Association for Knowledge Management*, Bydgoszcz, No. 75, pp. 50-58.
4. Kalinowski, S. (2013). Wybrane elementy aktywnosci zawodowej ludnosci wiejskiej o niepewnych dochodach (Selected Factors of Economic Activity among Rural Populations with Uncertain Incomes), *Optimum. Studia ekonomiczne*, No. 6(66), pp. 159-172.
5. Kania, J., (2008). Wybrane efekty doradztwa rolniczego we wdrazaniu instrumentow Wspolnej Polityki Rolnej (Chosen Effects of Agricultural Extension Service in Implementation of CAP Instruments). *Roczniki Naukowe SERIA*, 10(1), pp. 133-138.

6. Kania, J., Bogusz, M. (2010). Efekty pracy doradczej we wdrażaniu instrumentów wspólnej polityki rolnej na przykładzie województwa małopolskiego (Effects of Agricultural Extension Service Engagement in Implementation of CAP Instruments in Malopolska Province). *Roczniki Naukowe SERiA*, 12(5), pp. 73-77.
7. Kania, J., Vinohradnik, K., Tworzyk A., (2014): *AKIS and Advisory Services in Poland. Report for the AKIS inventory (WP3) of the PRO AKIS project*. Retrieved: [http://www.proakis.eu/sites/www.proakis.eu/files/Country %20Report %20Poland %2017 %2007 %2014.pdf](http://www.proakis.eu/sites/www.proakis.eu/files/Country%20Report%20Poland%2017%2007%2014.pdf) Access: 12.01.2017
8. Kielbasa, B., Krysztoforowski, M. (2009). Potrzeby doradcze rolników w opinii pracowników wojewódzkich ośrodków doradztwa rolniczego (The farmers advisory needs in opinion of workers of Voivodship Agricultural Advisory Centers), *Zagadnienia Doradztwa Rolniczego*, 2(57), pp. 43-53.
9. Koreleska, E., (2016). Zachowania niemieckich konsumentów na rynku ekologicznych produktów żywnościowych (Behaviour of German Consumers in the Market for Organic Food Products). *Konsumpcja i rozwój*, No. 3, pp. 45-57.
10. Mickiewicz, A., Mickiewicz, B., Skotarczak, T., (1998). Rola doradztwa w procesie restrukturyzacji i modernizacji gospodarstw rodzinnych Pomorza Zachodniego (Role of advisory in restructuring and modernization process of family farms in Western Pomerania). *Zeszyty Problemowe Postępów Nauk Rolniczych*, Vol. 457, pp. 257-272.
11. Mickiewicz, B., (2015). Wybrane aspekty rozwoju przedsiębiorczości na obszarach wiejskich województwa zachodniopomorskiego – wyniki badań własnych (Chosen Aspects of Development of Entrepreneurship in Rural Areas of the Zachodniopomorskie Province - Own Research Results). *Zeszyty Naukowe WSES w Ostrołęce*, 1(16), pp. 35-46.
12. Plonka, A., Paluch, L., (2015). Główne symptomy recesji w gospodarstwach rolnych w świetle załamania koniunktury gospodarczej w latach 2008-2010 (The main symptoms of recession in farms in the light of economic decline in the years 2008-2010). *Roczniki Naukowe SERiA*, 17(6), pp. 217-222.
13. Poczta, W., Czubak, W., Pawlak, K. (2009). Zmiany w wolumenie produkcji i dochodach rolniczych w warunkach akcesji Polski do UE (Changes in the volume of production and agricultural income in the conditions of Poland's accession to the EU), *Zagadnienia Ekonomiki Rolnej*, No. 4(321), pp. 40-52.
14. Prus, P., (2007): Źródła informacji jako narzędzia podejmowania decyzji przez rolników (Sources of information as a tool for decision taking by farmers). *Zagadnienia Doradztwa Rolniczego*, 3(51), pp. 18-28.
15. Prus, P., (2010). *Funkcjonowanie indywidualnych gospodarstw rolniczych według zasad zrównowzonego rozwoju (Individual farms functioning according to sustainable development principles)*. Wydawnictwa Uczelniane UTP w Bydgoszczy, Bydgoszcz, p. 90.
16. Roman, M., (2014). *Ekonomiczno-społeczne uwarunkowania rozwoju agroturystyki w gminach wiejskich województwa podlaskiego (Economic and social conditions of the development of agritourism in rural communes of Podlaskie voivodship)*. Wydawnictwo ZSCKR w Gołdówce, Gołdówko, pp. 87-88.
17. Satola, L., Wojewodzik T., Dacko, M. (2014). Do Divestments and Investments Determine Farm Development? *Bulgarian Journal of Agricultural Science*, Volume 20, Issue 6, pp. 1281-1288.
18. Ustawa z dnia 22 października 2004 r. o jednostkach doradztwa rolniczego. (Dz.U. 2004 nr 251 poz. 2507.) The Act of 22 October 2004 on Agricultural Advisory Units. (Journal of Laws 2004, no. 251, item 2507)
19. Sroka, W., Dacko, M., (2010). Ocena czynników rozwoju przodujących gospodarstw rolniczych z wykorzystaniem metody drzew regresyjnych typu C and RT (Evaluation of development factors in the leading agricultural holdings using the method of regression trees (C&RT)). *Zagadnienia Ekonomiki Rolnej*, 2(323), pp. 100-112.
20. Van den Ban, A.W., Hawkins, H.S., (1997). *Doradztwo rolnicze (Agricultural Extension)*. Małopolskie Stowarzyszenie Doradztwa Rolniczego, Kraków, p. 74.
21. Wawrzyniak, B.M., (2003). *Doradztwo i postęp w rolnictwie polskim (Counseling and progress in Polish agriculture)*. Włocławskie Towarzystwo Naukowe, Włocławek, pp. 179-188.
22. Wojewodzik, T., (2016). Czynniki różnicujące absorpcje wybranych działań PROW 2007-2013 w makroregionie Małopolska i Pogórze (Absorption differentiation factors of selected PROW 2007-2013 measures the Małopolska and Pogórze Macroregion). *Roczniki Naukowe SERiA*, 18(2), pp. 290-295.
23. Zawisza, S., (2003). *Procesy komunikowania w doradztwie. Teoria i badania empiryczne (Processes of communication in counseling. Theory and empirical research)*. Wydawnictwa Uczelniane UTP w Bydgoszczy, Bydgoszcz, pp. 57-58.
24. Zawisza, S., (2012). Przemiany systemu doradztwa rolniczego w Polsce w świetle potrzeb doradczych mieszkańców wsi (Transformations of agricultural counseling in Poland in view of counseling needs of rural areas inhabitants). *Zagadnienia Doradztwa Rolniczego*, 3(69), pp. 20-34.

ACCESSIBILITY OF RURAL DEVELOPMENT PROGRAMME SUPPORT FOR SMALL RURAL FARMS IN LATVIA AND LITHUANIA

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Abstract. The small rural farms are an important part of the social and economic situation of Latvia and Lithuania; however, they have not been sufficiently evaluated so far. The aim of the research is to study the availability of public funding for the development of rural farms of Latvia and to compare the situation with the one in Lithuania. The paper analyses the RDP project measures that are targeted at the development of rural farms, and the author uses the available statistical data. The research indicates that the small farms in Latvia are supported disproportionately little, and as a result, they do not utilize their development potential. There are few support measures suitable for the small farms. In addition, the public funding in them is very limited. In Lithuania the funding for different groups of farms is spread more proportionally, which is reflected in the contribution of these farms to the country's economy. This allows conclude that a large part of Latvian farms is economically small just because their potential (land, labour, a.o.) is not utilized sufficiently, but the current areas would provide the opportunity to manage more efficiently, as a result these farms would contribute significantly more to the economy.

Key words: agriculture, support, small farms.

JEL code: O13, Q18

Introduction

The paper studies the opportunities of the availability of public funding for the development of small rural farms in Latvia, as well as compares the situation with the one in Lithuania. The significance of the problem is highlighted by the large number of the small farms and their share in the structure of rural farms. This means that they have a critical role in maintaining the density of rural population. However, there is a question, if the current state policy in agricultural and rural development is aimed to maintaining and economic strengthening of these farms. The research hypothesis is that the current opportunities of rural farms to receive developmental support are insufficient.

The aim of the research is to study the availability of public funding for the development of rural farms of Latvia and to compare the situation with the one in Lithuania. To attain the research aim, the following tasks have been set:

- to show the significance of small farms in the total structural of rural farms;
- to study the available types of public funding;
- to compare the funding intensity for small farms with the other groups of farms and to evaluate its impact on the development of these farms.

The paper applies both quantitative and qualitative research methods. The main applied ones are analysis and synthesis as well as the monographic method. The paper analyses the research on small rural farms and their development opportunities conducted in Latvia up to now. There are used official statistics (Central Statistical Bureau data (CSB)), data of paying agencies, Farm accountancy Data Network (FADN) data and also information published in the website of the Ministry of Agriculture of the Republic of Latvia.

The novelty of the research is the study of the funding opportunities for small farms and comparison of the funding intensity with the other groups of farms, conducting also an international comparison. Lithuania was selected as a country for comparison considering that its structure of farms and its historical situation are similar to the ones in Latvia.

Although in the recent years several studies on the importance, opportunities and problems of small farms have been conducted in Latvia (Pilvere I., 2013; Tisenkopfs T., ..., 2015; Leimane I. ..., 2014 etc.), their number and the covered issues are still is not sufficient. Therefore, research in this field should be extended. Due to the scope limitations, the present research

focuses on the funding of the Rural Development Programme, which should be considered the main source of public funding for investment in rural farms since 2007.

Research results and discussion

1. Characteristics and significance of small farms in the rural areas of Latvia

To evaluate the significance of small farms in Latvia, a clear understanding of what they are is necessary. Taking into consideration the industry specifics, a particular classification of farms is used in agriculture. This classification differs from the definition of a small enterprise in other industries. There does not exist an official classification in either Latvian or European level that would allow for an unequivocal definition of 'small' farms as compared to others; however, the existing classifications allow for an approximate separation of this group so that when applying various criteria, different results can be obtained.

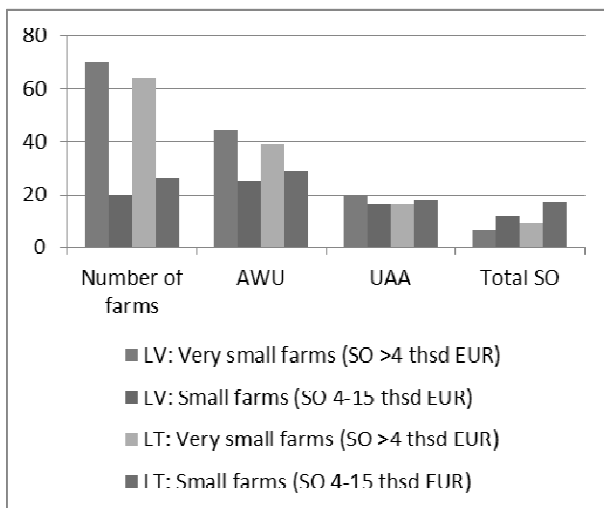
The most popular and the most precise criterion by which to evaluate the size of rural farms is the economic size. Since 2010, it is measured by standard output (SO). At the European level, it is recommended to consider farms with SO below EUR 8 thou as very small, but farms with SO from EUR 8-25 thou as small. According to this threshold, about 90 % of rural farms in Latvia should be considered small and very small, but 77 % - very small (CSB). There also exists the so-called *semi-subsistence farm* definition. Farms that sell not more than 50 % of their production belong to them (European Parliament, 2013). 75 % of all farms in Latvia are in this group. In addition, almost two thirds of them do not produce anything for selling.

The other sometimes applied criteria are such as utilized agriculture area (UAA) or the number of employees, which should be considered insufficient because they have very little relation to the economic potential of farms. For example, a 4-ha large intensive vegetable farm yields a much higher revenue than a 10-ha extensive cattle breeding farm. The number of employees

and its changes do not bring a sufficiently proper idea of the size of the farm either, taking into account the fact that under the impact of technological modernization the need for employees has significantly reduced. For example, in 2001 there were 67 % of farms with the number of employees less than 5 in Latvia, but in 2013 there were more than 98 % of such farms (CSB). That is explained by the fact that the average number of employees has significantly reduced in farms, but the other economic criteria (production volume, revenue, UAA) approve that the average size of the farm has significantly increased. A common trend is that the number of small farms and their proportion in the total structure of farms is gradually decreasing, but it is still very high. In addition, at the European level, the proportion of small farms is big. According to the SO criterion, 70 % of EU-27 farms can be considered very small (with SO up to EUR 8 thou), but this proportion differs significantly among both the old and the new Member States and regionally – between the north and the south. EU-15 states have the lowest proportion of small farms, except for Greece, Italy, Spain and Portugal (24 %), but it is the largest in the new Member States that accessed the EU in 2004 and 2007 (EU-12) – 86 %. Among all EU-27 in Latvia the proportion of such farms is the 5th largest (77 %) after Rumania (94 %), Bulgaria (92 %), Hungary (86 %) and Lithuania (85 %) (European Parliament, 2013). This means that Latvia belongs to countries that need a special policy for funding small farms, considering their large socially economic significance.

The share of small farms in the total structure of Latvian and Lithuanian agriculture is depicted in Figure 1. According to the statistical published division, small farms are divided in two groups: with SO up to EUR 4 thou (in both countries, these farms are considered very small or self-consumption farms; they are below the FADN

threshold), as well as with SO from EUR 4 to 15 thou.



Source: author's calculations based on Farm Structural survey's data

Fig. 1. Share of small and very small farms in Latvian (LV) and Lithuanian (LT) agriculture (% , 2013)

It can be observed that very small farms form 70 % of the total number of farms in Latvia and 64 % in Lithuania. The extremely high share they make up in employment as well as about 40 % of the number of employees in full-time units (AWU) in both countries. The proportion of the UAA and standard output of these farms is significantly lower. The contribution of the next group (with SO of EUR 4-15 thou) is already more even: 20 %-28 % regarding both the number of farms and AWU, while 12 % of the standard output in Latvia and 17 % in Lithuania. In total, the largest importance of both these groups is exactly in employment: they form almost 70 % of the total number of agricultural employment (AWU) in both countries. This means that these farms are of very large significance in developing the density of rural population because it can be considered that they together with families comprise at least half of the total number of rural inhabitants (in Latvia 629 thou people, CSB 2016). In addition, researchers (Tisenkopfs T. ..., 2015) who have studied the viability of small farms of Latvia, first of all see the contribution of small farms to society in maintaining the density of rural population

(including the borderland and less beneficial territories) and rural viability, local culture and social life. A significant aspect is also the fact that these farms serve as a social security network providing people with work, income, self-expression and food in the circumstances when the opportunities for alternative employment in agriculture are limited. In addition, it is less apprehended, but a significant contribution of these farms is providing of local food if contrasted to the dependence on global import, market speculations, as well as potentially rather easily hurt food supply via concentrated supermarket chains.

2. Funding opportunities

According to the Common Agricultural Policy (CAP), agriculture funding is divided into two pillars. The first pillar is the so-called guarantee payments that are directly related to agricultural production with the aim to ensure revenue support and facilitate manufacturing of market-oriented production. In recent years, in order to prevent overproduction and to facilitate environmental conservation, these payments are mostly separated from direct production and are related to the historical production volume, UUA etc. (Cantore N..., 2011). In Latvia, the most widespread payment of this type is single area payment. This payment is proportional to the area of UAA and the money is paid if particular requirements are met. The funding of the first pillar more has a maintenance role not that of a development facilitating. It is understandable that small farms (in area and volumes) do not receive so large maintenance funding to develop the farm significantly and to increase revenues.

The second pillar is the rural development policy. It is exactly this direction from which to expect that taking into consideration the large significance of small farms in the density of rural population, funding for small farms to increase their competitiveness and diversifying of economy would be one of its priorities.

However, in both the previous (2007-2013) and this (2014-2020) programming period, the opportunity for small farms to use the measures of the Rural Development Programme (RDP) is limited. There are few measures that would correspond to the opportunities of these farms.

The measures include the compensatory area payments, but their character corresponds more to the 1st Pillar payments; therefore; the analysis in this paper is focused on the project measures which are aimed at increasing competitiveness and at development.

Only less than 20 % of the supported rural farms in Latvia are very small farms (SO up to EUR 4thou) in the RDP 2007-2013. Among them, a significant number of farms participated in only one measure. In addition, this measure (Measure 122 – "Improving the Economic Value of Forests") is not related to agriculture and the average support funding was less than EUR 3 thou. Only a small number of these farms (181) have been supported by Measure 141 "Supporting Semi-subsistence Farms Undergoing Restructuring", which should be considered the main measure in fostering structural changes. In the given measure, the determined amount of support was EUR 7500 over five years, and every farm could participate in the measure only once. In addition, the support for afforestation of unutilized agriculture area (Measure 223) has been received, but afforestation, of course, does not create remaining workplaces and income to be yielded in a near future. Not more than several tens of very small farms have participated in other measures, which is an insignificant number if compared to the total number of these farms - 57 thou (Table 1).

The farms of Group 1 (SO EUR 4-15 thou) also constitute approximately 20 % of the total number of supported farms. Considering that the proportion of these farms in the total structure of farms in the country is also quite similar to this, it can be observed that these farms have been

supported comparatively more actively than Group 0 farms.

Table 1

Number of small farms that participated in Latvian RDP 2007-2013 measures (during the whole period)

Measures		Size of farms	
Nr.	Description	<4 thou EUR	4-15 thou EUR
122	Improving value of forests	1024	564
223	The first afforestation	212	126
141	Semi-subsistent farms	188	429
121	Modernization	50	410
312&313	Diversification & tourism	40	45
226	Restoring forestry potential	67	40
411	Leader	19	72
112	Young farmers	3	50
x	Others	59	53
x	Total (unique)	1638	1743

Source: author's calculations based on data of paying agency

However, it is important to note that the farms of all the other (bigger) groups have been supported more intensively.

In addition, initially, in 2007-2013 it was planned to allocate a significantly larger funding for restructuring semi-subsistence farms, but with the amendments to the RDP, the funding was reduced more than 5 times – from EUR 51 mill. to under EUR 10 million. This way, in total, only 1462 farms received support for restructuring, which constitutes only 2 % of the small farms (Group 0 and Group 1). According to the requirements of the Measure, only farms with the annual turnover of at least EUR 3000 could participate in this measure. This requirement did not provide the possibility for approximately 90 % of the small farms, including almost all the very small farms (Group 0), to participate. This means that the measures of 2007-2013 programme involved only about one fifth of Group 1 farms, but, in reality, they were not oriented to the group that contained the largest number of farms, Group 0 or the very small

farms. Already some years ago there were studies what indicated that such a policy does not quite correspond to the respective goal of rural development – "A prosperous man in sustainably inhabited rural areas" (Veveris A., 2014 etc.), which means orientation to the support of not only the richest rural enterprises, but also those small enterprises (including rural farms) that perform the social function – develop the density of rural population and the social environment. Since the end of 2014, the new rural development programme for 2014-2020 has been opened, but it does not contain any principal changes regarding the support for small rural farms. In the sub-measure "start-up aid for the development of small farms", one round with the funding of approximately EUR 20 million has been announced up to now. This is single sub-measure provided for the development of small rural farms. In this period, the requirements have changed: instead of net turnover a standard output of at least EUR 2000 in the year before the project is required (Cabinet of Ministers, 2015). Such a requirement should be evaluated more positively than the turnover requirement because it allows such farms to participate that have been producing for their own consumption so far. This means that 47 % of the total farms (those with SO below EUR 2 thou) stay outside the range of the support candidates, but 43 % of the total number of Latvian farms can apply, the ones whose SO is from EUR 2 thou to 15 thou. However, in reality, the opportunity to apply is limited by the public funding allocated for the sub-measure, which in the edition of the RDP 2014-2020 that is currently in force is planned to be EUR 34.7 mill. EUR (Ministry of Agriculture, 2016). That is 3 times more than in the RDP 2007-2013, but it still significantly falls behind

the initially planned amount in the previous period. The fact that already in the first round more than half of the total funding planned in this period was made available and that many applications did not receive support due to the lack of funding shows that the allocated total amount is not sufficient.

3. Previous results

The available FADN information about the utilization of funding in various groups of rural farms of Latvia, classified by their size, is summarized in Table 2. According to the FADN threshold, these data are available about farms, starting with Group 1; thus, data about the farms whose SO is below EUR 4 thou (very small farms) are not available. However, Groups 1 to 6 that are included in FADN demonstrate a very sharp difference regarding the received funding: if the average amount of funding received by Group 1 farms is only 4 % of the total average of FADN farms, then for Group 6 it is 10 times bigger than the average funding. Also, calculating per one UAA hectare, the amount of the received funding increases with every next group and in the larger farms it is five times bigger than in the small ones. This difference should be considered large, and, in fact, it distorts competition, relatively worsening the situation of small and also medium farms.

Division by the measures reveals that there is an explicitly sharp difference based on the size of the farm in Measure 121, while in the other Measures (112 and 141) the differences are not that well expressed, and in Measure 141, which is targeted exactly at small farms, the situation is the opposite, but the financial importance of these measures has been insignificant if compared to Measure 121.

Table 2

**Public financing per farm in RDP measures in FADN farms by size groups in Latvia
(average per year 2007-2014)**

Econ.size (SO), thou EUR	Average UAA (ha)	Measure 121	Measure 141	Measure 112	Total in agricultural measures	Total % of average support
4-<15	30	186	220	0	406	4
15-<25	50	729	198	41	968	9
25-<50	79	2 005	151	34	2 190	21
50-<100	157	5 642	39	34	5 715	55
100-<500	404	19 514	10	62	19 586	190
>=500	1424	95 754	0	0	95 754	929
Average	238	10 164	112	35	10 311	100

Source: author's calculations based on FADN data

Whereas, according to the available data, the situation is essentially different in Lithuania. As Table 3 presents, the distribution of public funding among the groups of rural farms is significantly more balanced. In the group of small farms (Group 1), the received funding has been 18 times bigger than in Latvia. According to the available data, in the other groups there is also

more funding received (it could be attributed to the different reporting period), but in the groups of larger farms this difference reduces to 1.5 times. In addition, across the measures, the difference between the groups in Measure 121 is not that marked as in Latvia, whereas Measures 112 and 141 have been more important than in Latvia.

Table 3

Public financing per farm in RDP measures in FADN farms by size groups in Lithuania (2015)

Econ.size (SO), thou EUR	Average UAA (ha)	Measure 121	Measure 141	Measure 112	Total in agricultural measures	Total % of average support
4-<15	19	4 786	503	2 026	7 315	21
15-<25	39	7 891	28	1 601	9 520	27
25-<50	64	11 948	16	760	12 724	36
50-<100	114	22 086	0	253	22 339	63
100-<250	227	54 532	0	88	54 620	155
>=250	591	147 937	0	0	147 937	419
Average	147	34 293	126	868	35 287	100

Source: author's calculations based on FADN data

Thus, the small farms are much more supported in Lithuania than in Latvia, and this is also reflected in the production indicators – the small farms (SO 4-15 thou EUR) contribute more significantly to the economy of Lithuania – they account for 17 % of the total SO against 12 % in Latvia. However, the contribution of the largest farms (SO above EUR 500 thou) to the total output in Lithuania is 23 % against 28 % in Latvia (CSB, 2013c).

The data show that in Lithuania the economic indicators of farms are significantly more even and they suit better the distribution of the number of farms. This means more investment in ensuring the density of rural population. In addition, the social equity should be taken into account what is characteristic to European economic system in controversy to some other systems existing in the world. These other systems, which are often called as "fighting

capitalism" are not producing high standards of living for most of people (Prokurat S., 2010).

Although the opinion that small farms are not profitable and thus are not perspective is widespread, usually the growth potential of these farms is not evaluated. Recent research on the results of the funding utilization indicates that the small farms can use the support funding effectively, increasing the production volumes and the value added. For example, from 2007 till 2013 the annual gross value added in the farms that have received funding for restructuring of semi-subsistence farms (Measure 141) has increased due to the impact of the funding by EUR 5748 on average per farm (Benga E., 2016). Considering that the maximum total amount of funding was EUR 7500, this can be considered a very good achievement.

In addition, in Latvia in contrast to many other countries, the physical size of these farms is rather significant very frequently, and the low production volume is often determined by other factors, including the lack of financial resources. That allows the author to evaluate that a large part of Latvian farms is economically small just because their potential (land, labour, a.o.) is not utilized sufficiently, but if it were, the current areas would provide the opportunity to manage more efficiently, as a result of which these farms would contribute significantly more to the economy of Latvia.

Conducting a full value cross-country comparison is limited by the availability of data because in Lithuania only FADN information about the year 2015 regarding the paid-out RDP funding is available. However, in the authors' opinion, even the data sources used in this research reveal the importance of the problem sufficiently well and provide an insight into the significant differences between both countries.

Conclusions, proposals, recommendations

- 1) Latvia and Lithuania are countries with a very high proportion of small farms within the structure of rural farms. Although the investment of these farms in production volumes is comparatively small, they are of big socially economic importance in maintaining the rural space, the fact which has not been completely appreciated yet.
- 2) Only a small part of the measures of the Latvian Rural Development Programme are appropriate for the development of small farms. The farms frequently either do not qualify for the set requirements or are not capable of attracting private co-financing due to their specifics. Because of these reasons, in 2007-2013 period only a very small part of the small farms has received development funding. It was also caused by the distribution of funding across the measures, because in the measures suitable for the small farms it was smaller than in the measures that the large farms have mainly used.
- 3) In Lithuania, the situation is significantly different because the distribution of RDP funding between farms of different size is much more even. That facilitates a more balanced rural development.
- 4) Those small farms that have participated in the support measures demonstrate good results in total; whereas, the sector of small farms as such possesses unutilized potential (land, labour a.o.). This means that research on the prospects of small farms and on the development of an appropriate support policy at the national level should be considered priority objectives of rural policy in the nearest future.

Bibliography

1. Benga, E. (2016). Economic Impacts of Semi-Subsistence Farm Support Measure of Latvian Rural Development Programme 2007-2013. *Research for Rural Development, Jelgava, Vol.2*, pp. 196-202.
2. Cabinet of Ministers, Republic of Latvia (2015). Ministru Kabineta Noteikumi Nr.292 "Valsts un Eiropas Savienības atbalsta pieskirsanas kartiba pasakuma "Lauku saimniecibu un uznamejdarbibas attistiba" apakspasakuma "atbalsts uznamejdarbibas uzsaksanai, attistot mazas lauku saimniecibas" (Order of allocation of State and European support in measure "Farm and Business Development", submeasure "Start-up aid for the development of small farms"), Riga, 9 June 2015.
3. Cantore, N., Kennan, J., Page, S. (2011). *CAP Reform and development*. Overseas Development Institute, London, p.52.
4. Central Statistical Bureau of the Republic of Latvia (2013c). Economic Size and Specialization of Rural Farms. Retrieved:http://data.csb.gov.lv/pxweb/lv/lauks/lauks__ikgad__laukstrukt_13__1.visp/LSS13_I07.px/?rxid=cdbc978c-22b0-416a-aacc-aa650d3e2ce0. Access: 12.01.2017.
5. European Parliament Committee on Agriculture and Rural Development (2013). *On the Future of Small Agricultural Holdings*. Draft Report (2013/2096(INI)), 14.10.2013 (IIN), p.13.
6. Leimane, I., Krievina, A., Miglavs, A. (2014). Improving of Small Farm market Capability in Latvia. *Procedia – Social and Behavioral Sciences*, Volume 110, pp. 182-189.
7. Ministry of Agriculture (2016). *Latvia – Rural Development Programme (National)*, Vers. 3.3. p. 589. Retrieved: https://www.zm.gov.lv/public/files/CMS_Static_Page_Doc/00/00/00/88/06/Programme_2014LV06RDNP001_3_3_lv.pdf. Access: 12.01.2017.
8. Pilvere, I. (2013). Problems of Small Farms in Latvia. *Economics and Rural Development*, Volume 9, No.2, pp. 44-50.
9. Prokurat, S. (2010). European Social Model and east Asian economic Model – Different Approach to Productivity and Competition in Economy. *Asia – Europe. Partnership or Rivalry?* Wroclaw, pp.35-47.
10. Tisenkopfs, T., Sumane, S., Kunde, I. a.o. (2015). *Latvijas mazo saimniecibu dzivotspeja (Vitality of Latvian Small Farms)*. Baltijas Studiju Centrs un Latvijas Lauksaimniecibas Universitate, Jelgava, p.96.
11. Veveris, A. (2014). Investment Support and its Impact on the Economic Results of Rural Farms of Different Groups. *Economic Science for Rural Development, Jelgava, No. 34*, pp. 154-162.1