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Faculty of Economic Sciences

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No 1 2018

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Agricultural and food policy

Innovations for agribusiness

Rural and agricultural finances

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Time schedule of the conference

Preparation of the proceedings and organisation: December 2017 – June 2018
Conference: 7–8 June 2018
Researchers from the following higher education institutions, research institutions, and professional organisations presented their scientific papers at the conference:

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Agricultural University of Tirana	**Albania**
Ahi Evran University	**Turkey**
Aleksandras Stulginskis University	**Lithuania**
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Czech University of Life Sciences Prague	**Czech Republic**
Eurasia International University	**Armenia**
European Parliament	**Poland**
FAPA Foundation Polish Chamber of Cooperative Banking	**Poland**
Federation of Scientific and Technical Associations NOT. Council of the West Pomeranian Region in Szczecin	**Poland**
General Tadeusz Kościuszko Military University of Land Forces	**Poland**
Institute of Agricultural and Food Economics National Research Institute	**Poland**
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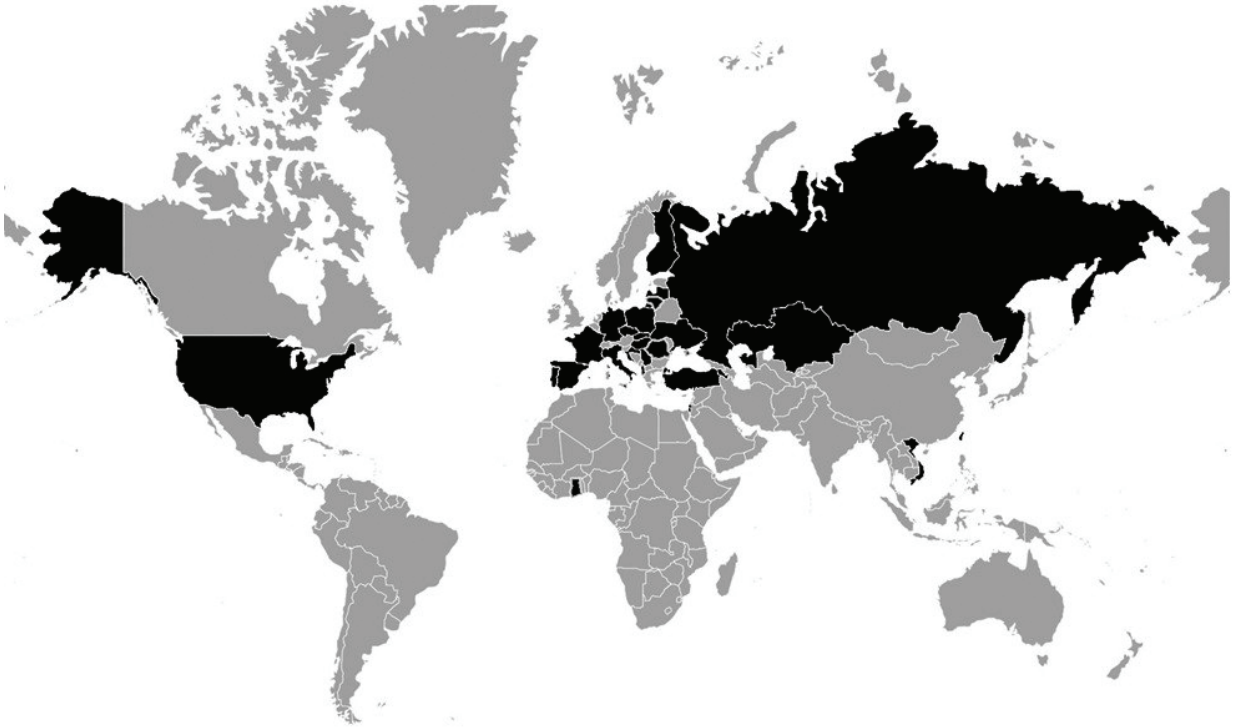

Countries from which we hosted Conference Participants 2018
(Patrycja Feryńska elaboration)

Publication of Ethics and Malpractice Statement for the International Scientific Conference 'Economic Sciences for Agribusiness and Rural Economy'

While upholding the highest form of ethical correctness, the Editorial Board ensured that the authors included in the publication of the papers, adhered to the ethical standards established by the Programme Committee. Each author was obliged to sign and present an editorial statement on the originality of the paper, and not publish any part or the whole paper before. The statement prepared for the authors required indicating all authors of the submitted paper and confirming their contribution to the study submitted to the editorial staff. In addition, while ensuring the correct use of sources during the preparation of the paper, the authors confirmed the demonstration of all citations used in the paper. The entire publication was planned and prepared in accordance with the highest standards of: the European Charter for Researchers, ensuring compliance with ethical standards over national standards, Polish legislation, ensuring ethical standards for publishing at the national level of the editorial office and the publisher, as well as maintaining the highest ethical standards of the institution represented by the editors of the publication – the Faculty of Economic Sciences of the Warsaw University of Life Sciences – SGGW. Under the leadership of the Editor-in-Chief, the entire editorial team, the scientific and organisational committee, as well as reviewers and authors applied the best practices in terms of their duties and ethics. All editorial staff members were introduced to the Code of Conduct and Best Practice Guidelines for Journal Editors of the Committee on Publication Ethics (COPE). In accordance with the COPE Code of Conduct and the Strategic Plan of 2016–2018 promoting integrity in research and its publication, a list of responsibilities and responsibilities were drawn up, necessary to meet the highest standards of ethical behaviour for all parties involved in the act of publication. The Scientific Council and the Editors were responsible for the high level of substantive content, a high rate of internationalisation of publications, implementation of good and better practices in the editorial process and maintaining the highest possible publishing standards.

DUTIES OF EDITORS

Publications decisions

The editorial responsibilities under the direction of the Editor-in-Chief varied depending on the stage of publication. The editors were responsible for maintaining high standards from the point of receiving the articles all the way through to the publication of the study. In mid-2017, the Editor-in-Chief, guided by the '*summum bonum*' of the planned publication, appointed experts with vast scientific and professional experience, as well as achievements in the international field. Thus, the appointed Scientific Council of the publication, consisted of the highest ranking experts for the planned thematic sections of the conference and publication at the same time. The Editors and the Organising Committee were appointed based on the experience of their members, knowledge and acquired skills. A diversity of views was ensured by the appointment of the Editorial Board, consisting of renowned experts from abroad, representing highly-rated scientific institutions. In the decision-making field, it was crucial to appoint reviewers to direct the papers submitted by the authors to the relevant substantive and recognised reviewers. The professionalism of scientists and their unblemished reputation were used as a guideline during the selection process. After obtaining two independent reviews at the discretion of the Editor-in-Chief, the decision on accepting or rejecting the submitted paper remained, however the scale of responsibility for this decision varied depending on the opinions issued by the reviewers. In special cases, the decision of the Editor-in-Chief was addressed to a third, independent review. The editors were responsible for deciding about the need for the author to introduce corrections. The decisions made were comprehensive, considering the fact that 131 papers were sent to the Editorial Office. Since the beginning of work on the publication, editors have been guided by the principles of ethics and responsibilities resulting from current legal requirements regarding such aspects as defamation, copyright infringement and plagiarism.

Fair play

The Editor-in-Chief asked for an assessment of papers based on their substantive content regardless of the origin of the author, the institution represented by them, race, sex, sexual orientation, religious beliefs, ethnicity, citizenship or political philosophy. Total impartiality also concerned the selection of reviewers as well as members of the Scientific Council, the Organising Committee and the Editorial Board. The development of the Fair Play principle can be found below in the Confidentiality section.

Confidentiality

The Editor-in-Chief and every member of the editorial office could not disclose any information about the submitted report to third parties. In order to maintain the highest standard of the Editor's decision, the submitted articles were sent directly to one

person from the Editorial Office, which then removed the personal data of the authors before referral for review and further proceedings. Thus, only the Editor-in-Chief and a designated representative for personal data had knowledge of the personal data of the authors. The given report, with the personal data removed, was then submitted to the reviewers appointed by the Council, who possessed no knowledge about the authors of the paper and about each other. The results of the blind, double review were directed to the authors without the disclosure of the personal data of the reviewers.

Disclosure and conflicts of interest

The submitted papers are the intellectual property of the authors and co-authors before, during and after the publication. The members of the Editorial Staff and all persons related to publishing the publications have no right to use them under their own name. In the event of a possible conflict of interest, the Editor-in-chief issued preventive orders to protect and place the good of the author of the paper above others.

DUTIES OF REVIEWERS

After the deletion of personal data of authors and co-authors, each submitted report was referred for a double, blank review. In situations of contradictory reviews, by decision of the editor-in-chief, the paper was sent for a 'super' third review. The editors' policy was to refer the paper to the reviewer from another institution and, if possible, from another city. Referral of the submitted paper to reviewers working in the same unit as the author was forbidden. It was seen as good practice to provide one reviewer for each paper, from a country other than that of the author's. In situations of the third 'super' review, it was the decision of the Editor-in-Chief that the final choice be made by outright experts in a given field, often awarded with an honorary doctorate.

Contribution to editorial decisions

The Editor-in-Chief made decisions about the acceptance or rejection of a paper on the basis of two professional, blind reviews. In some cases the authors also recommended that the paper should be corrected, with the aim of protecting the best interests of the authors of individual papers as well as the good of the entire publication.

Promptness

A professional computer system, the 'Online Journal System' was set up by the Editor-in-Chief prior to the planned work on the publication. This enabled each reviewer selected by the Editor to be granted a request for a review and receive information about the date of acceptance or rejection of the review, as well as a date for its completion. If it was impossible to complete the review within the time frame of the deadline set by the Editorial Board, the request was rejected and the decision required justification. The designated reviewer had 5 days to agree to the review and then 14 days for its implementation. In the case of a reviewer's request for an extension to the deadline, the Editor-in-Chief, taking into consideration the good of the author, decided to extend the deadline for the review to up to 21 days.

Confidentiality

The reviewers were informed of the necessity to maintain confidentiality in the reviewing process and all dissemination of information about the report was forbidden. The reviewer could not show or consult the paper with anyone other than the Editor-in-Chief or the person indicated by him.

Standards of objectivity

Each paper was subject to an unbiased and objective review. No personal criticism of the reviewer was allowed. Every opinion, either positive or negative, had to be supported by arguments concerning the content of the paper. In the case of an unsatisfactory justification, the reviewer was requested to elaborate upon his comments so as to prevent any reservations of the Editor with regard the content and opinion of the review.

Acknowledgement of sources

In the interests of the highest good of science and its creators, reviewers were required to identify situations in which parts of the paper were taken from other sources without this being mentioned by the authors. Any use of the work of other authors should be accompanied by appropriate quotations, which the authors were informed about when completing the statement

prepared by the Editorial Board. The reviewer was obliged to draw the Editor's attention to significant similarity between the discussed paper and any other document or publication. It was seen as good practice to use the 'random' function in the database to draw a paper in a unbiased way, that would then be checked by the anti-plagiarism system.

Disclosure and conflict of interest

Each reviewer was obliged to immediately report any cases where the review could be related to the work of the reviewer, or give competitive advantage in any way associated with the reviewer or their work.

DUTIES OF AUTHORS

Reporting standards

All authors and co-authors were required to present original contents, not previously published in fragments or in their entirety. In the case of work based on own research, they were required to present in their research in detail, its time and place, justification for its implementation, and any successes and failures. In the case of a paper based on secondary research, all authors and co-authors were required to provide as detailed information as possible about the origin of the data, their availability and use. All work was required to be presented in detail, in a way that would allow other scientists to use it for the purposes of their future research. All dishonest practices were forbidden and it was part of the Editors' and reviewers' responsibility to identify and remove them with the consequences. In projects whose author was a participant and the paper was completed due to the researcher's participation in it, they were obliged to present information about the project in the section of the paper dedicated for such a purpose.

Data access and retention

All authors who based their papers on their own research are required to store a database of such data for a period of at least 5 years from the date of publication of the paper. It is a good practice for the authors to make the database available for research and educational purposes at the request of governmental and non-governmental institutions.

Originality and plagiarism

The authors and co-authors attested the originality of their works in consideration of the protection of intellectual property, good name of science and editorial policy. The statement of originality of the paper, the quotation and presentation of any sources used in the creation of the work were provided in the bibliography together with the content of the paper and sent to the Editor. In addition, papers were selected in a random manner using the 'random' function and checked by a special anti-plagiarism program. Every effort was made to verify the presence of sources for citations and their correctness.

Multiple, redundant or concurrent publication

By submitting a paper to the Editorial Board of the conference 'Economic Sciences for Agribusiness and Rural Economy', the author and co-authors have stated that they have not published, and are not in the process of intending to send the same paper or any part of it to any other editorial office. Publication of a paper based on the same data is considered unethical by the editorial office and is unacceptable.

Acknowledgement of sources

The authors, by drawing on other publications and sources in their papers, were obliged to display their utmost diligence in ensuring the correct quotation of the works that they used to create their own papers. The use of various sources to create own work is the basis for the development of the world of science, which is why the entire editorial team has made every effort to prevent unethical behavior. A specially prepared review sheet was used containing detailed questions about the correctness of citations and bibliography. Thus, all reviewers were obliged to do their utmost to verify all sources on this basis.

Authorship of the paper

The author who sent the paper was obliged to present all the people who contributed to the creation of the work and list them as co-authors. All co-authors had to sign a statement attached to the paper. The statement contained information about the requirement to list all those who significantly contributed to the creation of the paper and agreed to send it to our editorial staff. It was perceived as good editorial practice to send the collected reviews to both the authors and co-authors.

Hazards and human or animal subjects

In cases when research involved the use of chemical compounds, behaviors or equipment associated with a possible threat to the health or life of animals or people, the author was obliged to clearly identify this threat in the paper.

Disclosure and conflicts of interest

Financial support for creating a paper resulting from cooperation with or membership of a project group should be demonstrated in a specially prepared section of the paper. Regardless of any conflict of interest, the authors preparing the papers were obliged to present the full truth to prevent the spread of unethical behaviour in the world of science.

Fundamental errors in published works

In the case of finding any error, every author and co-author of the submitted and published paper is obliged to immediately contact the Editor-in-Chief in order to withdraw the publication and correct it. Editors also give third parties the right to report errors or any ambiguities in the published publication. Any information about a possible error has always been, is and will be considered with respect to the good of science.

Editor-in-Chief *Jarosław Gołębiewski*

Foreword

On 7–8 June 2018, at the Faculty of Economic Sciences of the Warsaw University of LifeSciences, an International Scientific Conference was held under the title 'Economic Sciences for Agribusiness and Rural Economy'. The conference was attended by 410 people from 27 countries, from 4 continents, including 88 different scientific institutions. 118 presentations were given in thematic sessions and 12 speeches in plenary sessions. In addition, a special panel for young scientists was organised 'Challenges of Contemporary Economy in the Perspective of Research of Young Scientists', organised for the fourth time by the Faculty of Economic Sciences. To include students in the organisation of this great event, the organisers added to the conference an overview of Scientific Circles organised for students working inscience clubs at universities.The scientific articles presented as part of the conference were published in accordance with the scientific issues discussed during the conference session, in two volumes:

No 1

- Adaptation processes of enterprises for implementing the principles of sustainable development
- Policy towards agriculture and rural areas
- Innovation of the national economy, with particular emphasis on agribusiness
- Impact of the financial sector on agriculture, the food industry and rural areas

No 2

- Transformations in agriculture and food economy in European countries
- Agricultural markets in the era of integration and globalisation
- Importance of social capital in local and regional development
- Logistics as a factor in economic development

In total, 105 scientific articles were published in conference proceedings, which positively went through a double, blind review made by 210 reviewers from around the world. 18% of scientific articles sent to the conferences failed to be reviewed successfully. In 12% of cases the Editor-in-Chief asked for a third, conclusive review. The Editorial Board gathered 16 top experts in the field of economics from 9 countries: Latvia, Italy, Poland, Germany, the USA, Ukraine, the Czech Republic, Hungary and Finland. In connection with the significance of the event, six sponsors agreed to financially support this exceptional event for the development of science. In addition, the Association of Agricultural and Agribusiness Economists – SASEA (Polish Association of Agricultural and Agribusiness Economists) was the patron of the conference proceedings. This large-scale association operating for 25 years has been gathering economists in agriculture and agribusiness interested in current economic problems in the world. In light of the scale of the event in Warsaw, the association chose to become its patron.

The conference proceedings contained scientific articles of the highest quality, which gave an accurate description of economic reality. A number of theories were presented, a whole range of methods was applied and the most professional language was used to describe the variety of problems that the economy is facing today. The scientific knowledge presented brought to the event new ideas that are worth disseminating. The effects of the verification of results in science observed so far were also discussed. Due to the specificity of economics as a science which is inseparable with other fields, elements of other subjects such as sociology, politics, mathematics or natural sciences, were presented in the Conference Proceedings, which further confirm the Warsaw event as a solid foundation for the development of modern science. This year the topic of the conference included the most important contemporary issues, starting with the changes that are already occurring or will have to occur in enterprises with the current promotion of sustainable development. Issues related to food economy were also discussed, which since the beginning of humanity has invariably been the most important aspect for the functioning of the economy. In addition, sessions on integration and globalisation were presented, in light of the speed of these phenomena in the world. Observations regarding policy in many countries of the world, especially concerning agriculture and rural areas, were exchanged. By organising a session about the importance of social capital in local and regional development, the essence of human development was emphasised, and in consideration of the need for development, a session on innovations was formed, which, in the organisers' opinion, constitutes an inseparable element of improving the world's economies. A session on financial issues in agribusiness and logistics was also prepared, considering their immense significance for today's everyday economic life in Europe.

The presentations were attended by scholars from many countries. It is worth emphasising, however, that the Faculty of Economic Sciences hosted many scientists from all over Eastern Europe, namely, Latvia, Ukraine, Russia, the Czech Republic, Slovakia, Lithuania and Hungary. This gathering of scientists from the same part of Europe made it possible to share and gather knowledge from research conducted in countries that have much in common. In fact, the countries of Eastern Europe are influenced by a similar history and now have the same problems and advantages associated with their economy and political aspirations. The two-day Warsaw Conference was therefore an ideal moment to meet and discuss current problems, create new ideas aimed at the development of neighbouring countries, and share insights regarding economic everyday life of this region of Europe. Bearing in mind the high rate of internationalisation of conferences and at the same time scientific articles submitted, the Editorial Board used the services of an English translator to provide hosts with the most commonly used language of publications. The Conference Committee and the Editorial Board are open to any comments and recommendations regarding the preparation of future conferences and the release of subsequent volumes of Conference Proceedings.

Acknowledgements

The Editorial Board would like to thank all participants of the conference 'Economic Sciences for Agribusiness and Rural Economy' for delivering papers, the sent scientific articles and attendance in lectures on 7–8 June 2018 at the Faculty of Economic Sciences of the Warsaw University of Life Sciences – SGGW. In addition, we would like to thank the entire Scientific Committee and the Organising Committee for preparing this great event, as well as the reviewers for the performance of the task entrusted by the Editorial Board.

On behalf of the conference organisers
Jarosław Gołębiewski
Associate Professor of Faculty of Economics Sciences
Warsaw University of Life Sciences – SGGW

CONTENTS

PART 1

ADAPTATION PROCESSES OF ENTERPRISES FOR IMPLEMENTING THE PRINCIPLES OF SUSTAINABLE DEVELOPMENT

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HORIZONTAL INTEGRATION PROCESSES IN THE LIGHT OF THE PARADIGM OF INDUSTRIAL AND SUSTAINABLE DEVELOPMENT OF AGRICULTURE – CASE STUDY OF FRUIT AND VEGETABLE PRODUCERS

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ABSTRACT

The aim of this article was to initiate a discussion on the possibility of implementing the paradigm of sustainable agriculture by integrated fruit and vegetable producers. On the basis of the literature review the concept of industrial and sustainable agriculture and the dual model combining the advantages of both ideas were presented. Research has shown that institutional solutions have inspired horticulturists to join producer groups/ /organisations, resulting in an increase in the number of products offered on the domestic and international market. The strength of the correlation analysed between the number of producer groups/organisations and the selected characteristics of the fruit and vegetable market showed that integrated producers have a greater impact on the vegetable market than fruit. This impact had the properties of industrial agriculture. The structure of Polish groups/organisations in terms of their number allows us to suppose that, as small, often family businesses, they have premises to implement the paradigm of sustainable agriculture using the dual model. However, such an idea requires further long-term institutional support.

Keywords: industrial agriculture, sustainable agriculture, fruit and vegetable producer groups and organisations
JEL codes: Q01, Q13, F36

INTRODUCTION

Agriculture in Poland is at the stage of industrialisation, while the concept of sustainable development is of particular importance for the development of rural areas. However, the possibility of its implementation depends on the level of socio-economic development of a given country. The current level of this rural development in Poland means that the idea of sustainable development cannot be effectively implemented, as it may lead to a decrease in the welfare of society (Matysiak and Struś, 2015). On the other hand, there are strong legislative barriers and social contraindications for the continuation of land consolidation

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processes. It can therefore be concluded that the idea of integrating producers can provide a solution to the problem of the choice between industrial policy and sustainable development in agriculture.

THEORETICAL BACKGROUND

The agricultural issue is treated differently in underdeveloped countries, where the most acute problem is the insufficient growth of food production in relation to the demand at the existential minimum level, and differently in developed countries, where there is a significant disparity in the income of the agricultural population in relation to non-agricultural activities, a lower rate of return on capital employed and lower labour productivity of those employed in agriculture (Czyżewski and Guth, 2016). Developing countries, which also include Poland, solve agrarian issues using the model of industrial agriculture. It allows for an increase in agricultural production, which in turn allows the demand for food to be met. The undisputed successes in terms of increased production, efficiency and productivity made a positive impression. Such agriculture with a high level of concentration and specialisation, a large scale of production and high outlays of industrial resources is considered modern (Zegar, 2010).

From such a model of agrarian economy as industrial agriculture the idea of integration of agricultural producers is derived, as a kind of 'counterbalance' to the developing monopolies on the side of agriculture environment. Since the concentration processes in the sectors serving the agricultural sector are becoming stronger year by year, in the situation of a fragmented agrarian structure, the market position of the farmer is worsening. There is a kind of asymmetry of concentration which affects them to the disadvantage of others. According to Czyżewski and Guth, the power of farmers may be strengthened by producer groups and organisations. Unfortunately, the strength of these groups is too weak to defend the interests of farmers in real terms and to balance their position in the food production chain (Czyżewski and Guth, 2016).

However, it can be noted that after Poland's accession to the EU, the average size of agricultural holdings increased. As the area of land increases, the benefits of specialisation increase. The relation between the size of agricultural holdings and economic effects is explained by the farmers' determination to increase the scale of production (Smędzik-Ambroży, 2015). These factors contribute to a rapid increase in productivity and a question arises as to how to reconcile the need to increase agricultural production in order to meet the world's food challenges with care for the environment (Sobczyński, 2015). The model of industrial agriculture dominating in developed countries is based on microeconomic rationality and not on social rationality. The nature of the market mechanism requires the implementation of an industrial model in agriculture, however, attention is drawn to the need for alternative models. The model of sustainable agriculture is increasingly indicated, which requires the involvement of an institutional factor – state interventionism (Zegar, 2010).

In a globalised world, the potential for interventionism is diminishing and the market is moving towards microeconomic efficiency without solving either food or income problems. The evolution of CAP instruments is the strongest manifestation of the transition from the paradigm of industrial agriculture to its sustainability (Czyżewski and Guth, 2016). Although the level of support received by agriculture has been steadily decreasing in recent years, it is still high. On the one hand, the evolution of CAP instruments is a sign of a shift from the paradigm of industrial agriculture to its sustainability, and on the other hand, its universal nature is not conducive to achieving the objective of sustainable development of the agricultural sector (Smędzik-Ambroży, 2015).

The concept of sustainable development is derived from the concept of eco-development, which was created as a response of the international environment to global natural problems arising at the turn of the 70s and 80s of the 20th century, when industrialised agriculture gradually violated its former harmony with the natural environment (Czyżewski and Smędzik-Ambroży, 2013). According to the new paradigm of the agrarian economy, the discrepancy between the micro and macro criteria is underlined by the contradiction between market and social competitiveness (Czyżewski and Czyżewski, 2015).

The paradigm of sustainable agriculture as part of the new agricultural economy integrates social and environmental economic objectives, taking into account not only maximising the economic surplus for the needs of agricultural holdings. Attention is also paid to balancing the role of agriculture as a generator of food products benefiting from technological and biological progress, while at the same time reducing environmental pressures and increasing food quality and safety. Agriculture should be developed, but in a sustainable way. Industrial agriculture guarantees a growing supply of food, cheaper but with decreasing marginal usability due to highly intensive production methods, genetic modifications and a degraded environment. Sustainable agriculture is less efficient, relatively more expensive, but it guarantees the preservation of natural well-being (Czyżewski, 2007). Therefore, the industrial development path of agriculture was defined by Czyżewski and Guth as a 'quantity paradigm', and the model of sustainable agriculture as a 'quality paradigm' (Czyżewski and Guth, 2016). The two concepts are combined in a dual model. It combines the concepts of industrial agriculture, which strongly emphasizes the increase of work efficiency and the intensity of management of production resources, as well as socially sustainable agriculture taking into account environmental or health requirements (Henisz-Matuszczak, 2007).

MATERIALS AND METHODS

The aim of this study was to assess whether the integrated Polish horticulturists meet the requirements of the sustainable agriculture paradigm. Therefore, on the basis of a review of the literature and data from the Central Statistical Office, Ministry of Agriculture and Rural Development and the Agency for Restructuring and Modernization of Agriculture, changes in the fruit and vegetable market, the process of integration of fruit and vegetable producers in the long-term (12-year) period, were analysed. By means of correlation and dynamics analysis, the characteristics of the fruit and vegetable market were presented, which are shown in graphical and tabular form.

RESULTS AND DISCUSSION

In order to ensure sustainable development, attention should be paid to the need for alternation in the options exercised. The pendulum 'principle' allows for inhibiting or dynamising stimulators of economic development (Czyżewski, 2007). It is not easy, however, as the effects of institutional hysteresis connected with the liquidation of the centrally managed economy system are mentality issues hindering integration processes (Czyżewski, 2007). According to Grzelak, farmers in Poland appreciate the lower institutionalisation of their activities, understood as independence in terms of the possibility of choosing the channels for marketing their products, higher than the possible benefits resulting from membership in a production group (Grzelak, 2007). This thesis can be confirmed by the fact that the instruments of the support programme for newly established fruit and vegetable producer groups introduced in 2007 encouraged horticulturists to integrate, while radically changed in 2012 slowed down this process (Fig. 1). Polish gardeners were granted the amount of PLN 7.875 billion under this measure during considered period (including PLN 7.515 billion to cover part of eligible investment costs included in the approved recognition plan)[3]. According to many researchers (Krzyżanowska, 2011; Sobczak, Jabłońska and Olewnicki, 2013; Kopiński and Czernyszewicz, 2014), the period after Poland's accession to the European Union was a time of prosperity for Polish integrated producers of fruit and vegetables. Machine and technology parks have been modernized, the quality of the products offered and the efficiency of production and sales have improved.

Assuming that the industrial model is more efficient, but not conducive to the long-term development of agriculture, and that the paradigm of sustainable development prefers smaller farms as the

[3] Agency for Restructuring and Modernization of Agriculture and Rural Development website armir.gov.pl [Accessed 20.01.2018].

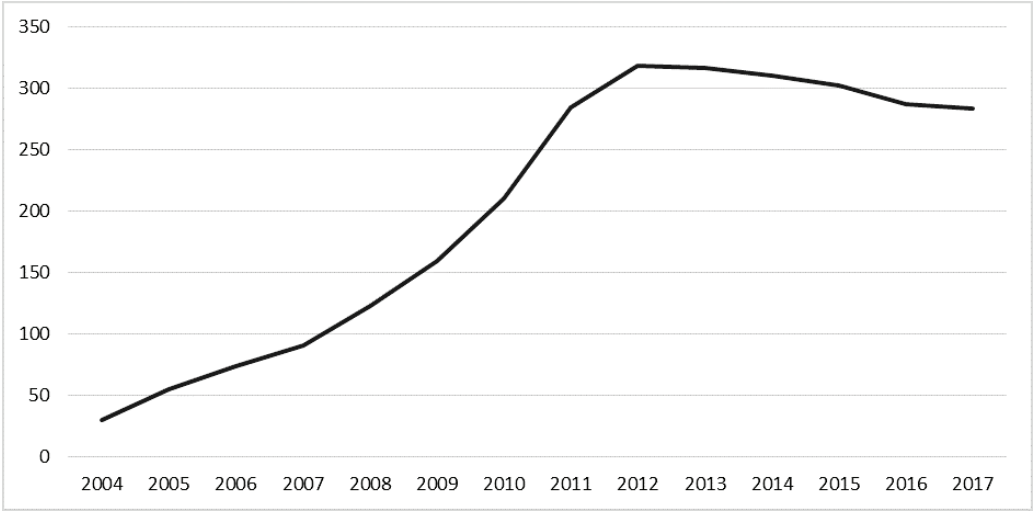

Figure 1. Number of producer groups and organizations from 2004 to 2017

Source: own study based on data from the Agency for Restructuring and Modernization of Agriculture and Rural Development (ARMA) and the Ministry of Agriculture and Rural Development (MRDA).

more efficient ones, the concept of creating producer groups and organisations combines the advantages of both agrarian theories. As smaller producer groups, producer groups set up within the framework of institutional interventionism make it possible to take advantage of the advantages of the industrial trend while maintaining the often family type of agriculture which cares for the well-being of the environment. In Poland, producer groups and organizations are conducive to the implementation of the sustainable development paradigm, as we are mostly dealing with small, often family organizations (Fig. 2).

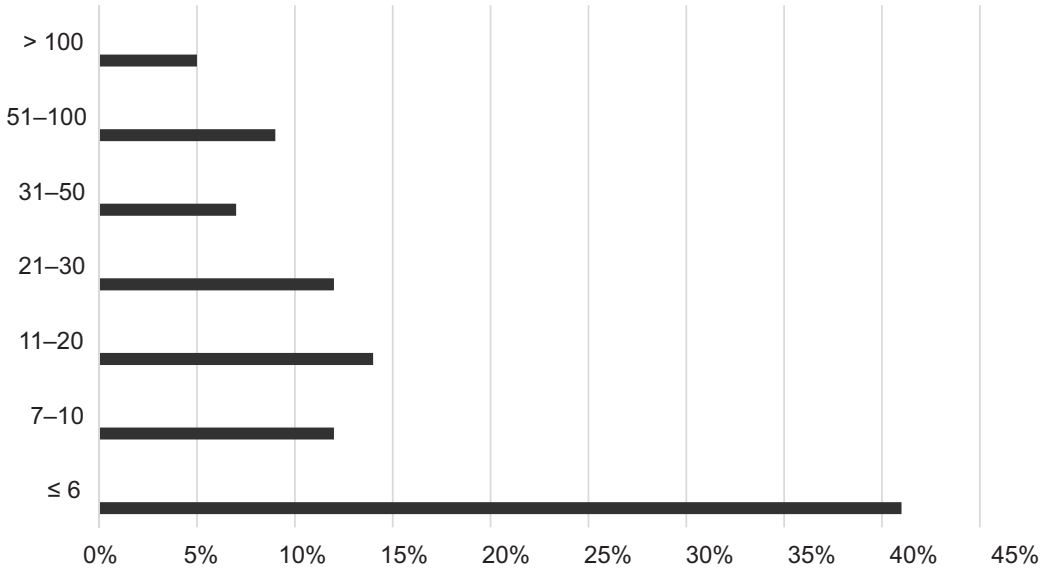

Figure 2. Structure of fruit and vegetable producer groups and organizations by number of members (situation on 2 January 2018)

Source: see Figure 1.

However, it should be remembered that only the process of ownership changes without adequate institutional solutions will not automatically ensure sustainable economic development (Czyżewski ed., 2007). As mentioned earlier, the functioning of fruit and vegetable producer groups and organizations in Poland was initiated by institutional procedures. Their appearance undoubtedly had an impact on the fruit and vegetable market. The average annual rate of changes in selected factors characterizing this market in the years 2004–2016 is presented in Table 1.

On the basis of this information, we can see that fruit and vegetable producers reduced their area of land dedicated mainly to vegetables on average each year during the period under analysis (the area devoted to fruit production decreased very slightly). Despite the changes in the cultivated area, the yield increased on average by 2.3% per year for fruit and slightly for vegetables. Taking into account the fact that the consumption of both fruit and vegetables decreased on average by 0.5% annually, it is not surprising that the importance of an open market and the possibility of exporting fruit and vegetables have increased. The increase in export value emphasized the advantages of Polish horticulture products, as its annual average value increased by approx. 8%. The following indicates whether there is a correlation between the selected characteristics and the number of fruit and vegetable producer groups and organizations. The data for the period 2004–2016 have been calculated using Statistica with a materiality level of $p < 0.05$ and are presented in Table 2.

Table 1. Average annual rate of changes in selected factors on the fruit and vegetable market in the years 2004–2016

Area under vegetables (thous. ha)	Area under fruit (thous. ha)	Vegetable yield (thous. tonnes)	Fruit yield (thous. tonnes)	Average annual household consumption of vegetables and processed vegetable products (kg *per capita*)	Average annual household consumption of fruit and processed fruit products (kg *per capita*)	Value of vegetable exports (EUR million)	Value of fruit exports (EUR million)
–0.0142	–0.0005	0.0003	0.0233	–0.0057	–0.0053	0.0821	0.0786

Source: own study based on data from the Central Statistical Office (GUS).

Table 2. Correlations between selected characteristics of the fruit and vegetable market and the number of producer groups and organizations 2004–2016

Description	Average annual consumption of vegetables and processed vegetable products by households	Average annual household consumption of fruit and processed fruit	Volume of vegetables production (million tonnes)	Volume of fruit production (million tonnes)	Value of vegetable exports (EUR million)	Value of fruit exports (EUR million)	Volume of vegetables purchased (thous. tonnes)	Volume of fruit purchased (thous. tonnes)	Area under vegetables (thous. ha)	Area under fruit (thous. ha)
Correlation rate	–0.8099	–0.4967	–0.0629	0.6078	0.9155	0.9218	0.9382	0,8867	–0.8669	0.4421

Source: own study based on data from the Central Statistical Office (GUS) and the Agricultural Market Agency (ARMA).

Relations between the growing number of fruit and vegetable producer groups have been noted, despite decreasing internal demand. This phenomenon is explained by the very strong positive correlation between the growing fruit production and its purchase and export. The intensive production of fruit by individual producers is demonstrated by the lack of a significant correlation between integrated producers and the size of the fruit-growing area. Different relationships were noted for vegetables. Newcomer groups and producer organizations were not correlated with a decrease in internal demand or with a decrease in the volume of vegetable production. The intensification of vegetable production is evidenced by a strong correlation between the number of groups/organizations and the decreasing area of land allocated for vegetable production. Moreover, it should be noted that there was a dependence indicating the role of groups and organizations in increasing the volume of vegetables purchased and the value of their exports. This confirms the effectiveness of modernization processes in Polish integrated horticultural farms, mainly in the vegetable sector.

CONCLUSIONS

To sum up, we can state that institutional regulations of the fruit and vegetable market since the accession of Poland to the EU caused the initiation of concentration processes indicating the predominance of the idea of industrial agriculture. However, the number of Polish fruit and vegetable producer groups and organizations is conducive to the implementation of the concept of sustainable agriculture. The characteristics of the fruit and vegetable market over the period under analysis confirm an increase in the number of products marketed, which is an indication of the characteristics of industrial agriculture. The dual model, which combines the advantages of industrial production with those of resource-conscious farms in terms of environmental or health requirements, can be a concept that should be promoted institutionally. However, experience with the scheme so far has shown that support for the fruit and vegetable market should be of a long-term character. Research shows that the possibility of benefiting from a high 'political rent' has encouraged many horticulturists to integrate, which was later corrected by the market. Without further intervention one can fear that as soon as the groups/organizations started to appear on the Polish market, they may disappear from it just as quickly. It would be a pity if modernized farms/enterprises were taken over by partners geared strictly towards the industrial economy.

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ROLE OF LARGER FARMS IN POLAND AND SELECTED EUROPEAN UNION COUNTRIES IN 2005 AND 2016

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ABSTRACT

The rates of increase in labour costs in non-agricultural sections and prices of means of production for agriculture, which are higher than selling prices of agricultural products in countries with a market economy have resulted in a decrease in unit profitability of agricultural production. Farmers wishing to obtain a satisfactory income must increase their production scale, mainly by increasing farm area. The study covers two intentionally selected groups of countries differing with regard to economic development specified by gross domestic product (GDP) value *per capita*. The reason for this selection is the dependence of the farms' economic strength on the national economy level of analysed countries. The first group of countries with a high level of this indicator (GDP) includes: Denmark, Sweden, Ireland, the Netherlands, Austria, Germany, Belgium, Great Britain and France. The second group covers – Slovenia, the Czech Republic, Slovakia, Lithuania, Latvia, Poland, Hungary, Romania and Bulgaria. Analyses covered the changes in average farm area, share of farms with an area of 30 ha of UAA or more in the total number of farms, land use, employment and standard production in 2005 and 2016. In both groups, the following increased in the analysed period: the average farm area and share of larger farms in land use and production. In the majority of analysed countries, the share of farms with an area of 100 ha or more, when it comes to production, exceeded 50%.

Keywords: farms, UAA, agricultural production
JEL codes: O13, Q12, Q18

INTRODUCTION

Farms are affected by two types of 'forces'. The theory of forces affecting farms was developed by the German agricultural economist Theodor Brinkmann (Brinkmann, 1922). He distinguished two types: 'Integrierte Kräfte' and 'Diferenzierte Kräfte'. The first type means the integrating forces inside the farm. They make the farm conduct multilateral production in order to make even and full use of land, work and technical means. Differentiating forces, on the other hand, are what constitute the environment which consists of the supply and outlet market as well as the institutions which create so-called farm operation

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rules. Recipients of agricultural products, agricultural trade and processing enterprises demand many uniform raw materials of specified quality and size from suppliers. In order to meet these requirements, farmers are forced to specialise in production, as well as increase the intensity level, and, in the longer term, also increase farm area. Trends in the evolution of labour costs in the national economy, the prices of means of production purchased by farmers and the selling prices of agricultural products also have a significant impact on farmers' decisions. Labour costs in the national economy (their main component being salaries) indirectly influence labour costs in agriculture. The trends in the evolution of these costs and selling prices of agricultural products are shown in Figure 1.

During the analysed period (1995–2016), the labour costs in the national economy rose almost six-fold; the prices of means of production purchased by farmers rose more than three-fold and the selling prices of agricultural products more than doubled. The price scissors index during this period was around 70%, which means that the rate of the rise in the prices of means of production for agriculture was by 30% higher than the rate of increase in the selling prices of agricultural products and resulted in a decrease in production profitability.

Another significant factor influencing farmers' decisions is technical progress, manifesting itself in an increase in tractor power and efficiency of machinery. The rational use of these means causes farmers to increase farm area. These trends make farmers reorganise activities in the ever-changing farming conditions, mainly by increasing farm area and production intensity level. Hence, there is a need to study the role of larger farms. The increase in farm size is a result of the disappearance of poorly managed farms or those lacking successors.

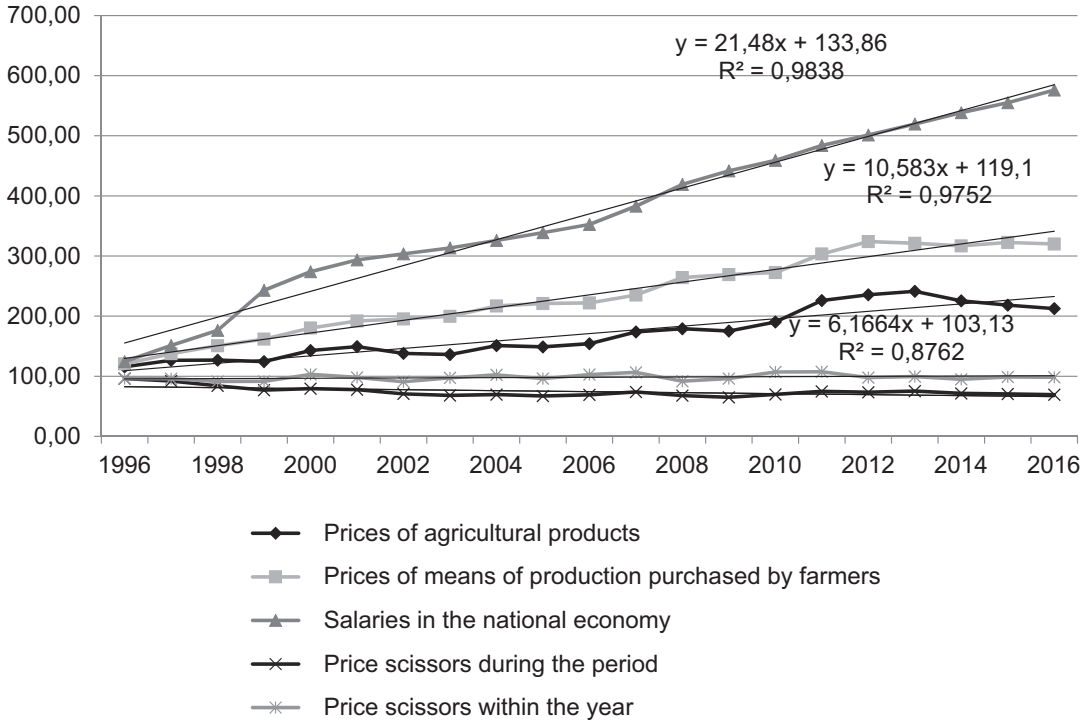

Figure 1. Trends in the evolution of labour costs in the national economy, prices of means of production for agriculture and prices of agricultural products in Poland between 1995–2016

Source: Ziętara and Adamski (2018).

OBJECTIVE OF THE PAPER, SOURCES OF MATERIALS AND METHODOLOGY

The objective of the paper is to assess the share of larger farms in several areas: the number of farms, the use of agricultural land, employment and production and also to assess land and labour productivity when compared to the average level of these indicators. The subject of the studies are larger farms from selected European Union countries. The assessment covered farms with the following area: 30–50; 50–100 and 100 ha or more of UAA. The area of 30 ha, as the lower limit, was adopted conventionally, following existing trends. The studies covered farms from two groups of selected countries differing in economic development level specified by GDP *per capita* in 2014. The first group included countries with a GDP *per capita* exceeding EUR 30 000. In contrast, the second group with low GDP included countries where GDP was within the range of EUR 5.9 to 18.1 thousand *per capita*.

The adoption of this criterion resulted in the fact that Group 1 included the EU-15 countries (the 'old' EU) while Group 2 – the countries which joined the EU in 2004 and later. By adopting GDP as a criterion for the selection of countries to be analysed, the relationship between the country's economic development level and the economic strength of farms has been followed (Sikorska, 2013). The list of the analysed countries is shown in Table 1.

Table 1. Gross domestic product *per capita* and average farm size in the analysed countries in 2014

		Country	GDP (EUR thous. *per capita*)	Farm area averaged (ha)	SO in 2013 (EUR thous. per farm)	Farm size* averaged
GDP	high	Denmark	47.0	67.5	250.2	large
		Sweden	46.6	45.2	69.7	medium large
		Ireland	41.9	35.5	35.9	medium small
		the Netherlands	39.3	27.4	303.	large
		Austria	38.7	19.2	40.4	medium small
		Germany	36.1	58.6	162.3	large
		Belgium	35.9	34.6	226.6	large
		Great Britain	35.0	93.6	119.2	large
		France	32.3	58.7	120.5	large
	low	Slovenia	18.1	37.7	13.9	small
		Czech Republic Republic	14.9	132.8	169.4	large
		Slovakia	14.0	80.6	79.9	medium large
		Lithuania	12.5	16.7	11.2	small
		Latvia	10.7	23.0	12.1	small
		Poland	11.2	10.1	15.2	small
		Hungary	10.6	9.5	11.3	small
		Romania	7.6	3.6	3.3	very small
		Bulgaria	5.9	18.3	13.1	small

* Farm size adopted according to FADN.

Source: Statistisches Jahrbuch über Ernährung, Landwirtschaft und Forsten (2015).

Group 1 is dominated by larger, medium-large and large farms. Group 2 – by very small and small farms. The exceptions are farms in the Czech Republic and Slovakia, large and medium large, respectively. The studies covered the years 2005 and 2016. This period makes the analyses of the dynamics of changes possible. The studies used the comparative method. The source of study materials was statistical data contained in statistical yearbooks and Eurostat[4].

CHANGE IN THE ROLE OF LARGER FARMS IN LAND USE AND AGRICULTURAL PRODUCTION IN 2005 AND 2016

The studies conducted led to the following results (Józwiak, Mirkowska and Ziętara, 2018). In the analysed years, 2005 and 2016, in all analysed countries, a decrease in the total number of farms was observed. In Group 1 countries, the number of farms ranged from –5% (Great Britain) to –17% (Sweden). In Group 2 countries with low GDP *per capita*, the decrease in the number of farms was larger and ranged between –9.4% (Slovenia) to –62.5% (Slovakia). A consequence of the decrease in the number of farms has been an increase in average area. In Group 1, it was between 5.3% (Austria) and 61.0% (Great Britain). In Group 2, this increase was higher, from 11.1% (Slovenia) to 331.8% (Bulgaria). The area of farms in Group 1 was by far larger than in Group 2, with the exception of the Czech Republic and Slovakia. In most countries in Group 1, there was a decrease in the share of farms with an area of 30–50 ha in total. The exceptions were: Austria, the Netherlands, Germany, Belgium and Great Britain. In the second group, there was an increase in the share of this class of farms in overall and an increase in number, with the exception of Lithuania and Latvia.

In the farm class 50–100 ha, in Group 1, there was an increase in share in the total number, excluding Denmark, Sweden and France, while reducing their number. In Group 2, all countries were characterised by an increase in share of this class of farms in total as well as an increase in number.

In the class of farms of 100 ha and more, all countries showed an increase in share in the total number of farms and an increase in number. The reverse situation was in Austria where an increase in the share involved a decrease in the number of farms.

During the analysed years, there were changes in the share of the individual size classes of farms in land use. In Group 1 countries, there was a decrease in the share of farms with an area of 30–50 ha in land use. The exception was Austria. In Group 2, the share of this class of farms in land use increased, except for Lithuania and Latvia. In the farm class of 50–100 ha of UAA, in Group 1 there was a decrease in land use, except for the Netherlands, Austria and Belgium. In Group 2, the share of this class of farms in land use increased. In the class of farms of 100 ha and more, in Group 1, share in land use increased, except for Austria. In 2016, the share of those farms in land use ranged from 17.9% (Austria) to 74.6% (Great Britain). In Group 2, the share of this class of farms in land use increased, except for the Czech Republic and Slovakia, where the share was very high and in 2016, amounted to 87.5 and 88.6%, respectively. In Group 1, there was an increase in average farm area with the exception of the Netherlands, Austria and Germany. The average farm area in this class ranged between 152.5 ha (the Netherlands) and 311.4 ha of UAA (Great Britain). In Group 2, apart from Latvia and Bulgaria, there was a decrease in average farm area. In 2016, the average farm area ranged from 276.6 ha (Lithuania) to 697.6 ha (Slovakia).

The share of employees in farms of 30–50 ha in the total number of agricultural employees in Group 1 decreased in the analysed years, while in Austria and all Group 2 countries it increased. In both groups, there was a decrease in employment per 100 ha of UAA. This was stronger in Group 2. Similar trends occurred in the class of farms of 50–100 ha. In the class of farms of 100 ha or more, in both groups, there was an increase in total employment share. The exceptions were Sweden and Ireland, from Group 1, and the Czech Republic from Group 2. In most countries, both groups experienced a decrease in employ-

[4] Eurostat website http://ec.europa.eu/eurostat/data/database [Accessed 24.04.2018].

ment per 100 ha of UAA, and was stronger in Group 2. Despite this, the level of employment in Group 2 countries was about twice as high than in Group 1.

In the analysed years, in Group 1, the share of farms from the class 30–50 ha, when it comes to the total agricultural production, decreased. The exceptions were Austria and the Netherlands. In Group 2, apart from Latvia, the share of this class of farms in production increased. In both groups, the production level per farm increased. The trends were similar for farms of 50–100 ha. The exceptions were Denmark, Sweden, Great Britain and France from Group 1 and Slovakia, from Group 2, where there was a decrease in the share of this class of farms in total production. In this class of farms, there was also an increase in production value per farm. The exceptions were Denmark and Slovakia. In the class of farms of 100 ha and more, in all countries, there was an increase in share in total production. In Group 1 countries like Denmark, Sweden and Great Britain, this share exceeded 60%. In Group 2 countries, the largest share was observed in the Czech Republic, Slovakia and Bulgaria, where it was 78.8, 79.5 and 62.1%, respectively.

There were significant differences in land productivity, between Group 1 and 2: in Group 1, it was about twice as high. In the class of farms of 30–50 ha, in Group 1, land productivity was lower than the average in those countries. The exceptions were Austria, Germany and France. In Group 2, land productivity was similar to the average. In farms of 50–100 ha and 100 ha or more, land productivity was lower than the average in both analysed years.

Labour productivity in all farms in Group 1 was by far larger than in Group 2. In 2005, in farms with the lowest productivity in Group 1, it was 8.3 times higher than the similar productivity in the second group and in farms with the highest productivity it was 7 times higher than in Group 2. The respective values in 2016 were 4.5 and 4.0. Labour productivity in farms of 30–50 ha in Group 1, with the exception of the Netherlands, was lower than the average. On the other hand, in Group 2, it was higher than the average except for the Czech Republic. In the class of farms of 50–100 ha only Denmark and Sweden noted labour productivity lower than the average. In the class of farms of 100 ha or higher, labour productivity was higher than the average in all countries. The labour productivity differences between Group 1 and 2 in this class were smaller. The analogous figures for 2005 were 2.4 and 2.7 and for 2016: 2.5 and 4.3.

CONCLUSIONS

1. The processes of adaptation of farms to variable farming conditions, irrespective of the economic development level in the countries, consisted of an increase in the production scale, by increasing the farm area and increasing the production intensity level.

2. In some Group 1 countries with a higher GDP level (Denmark, Sweden, Great Britain and France), the share of farms of 30–50 and 50–100 ha, when it comes to the number of farms, land use and production, decreased. They became auxiliary farms.

3. In all the analysed countries, the share of farms of 100 ha and more in land use and production increased in the years 2005–2016. In most countries, the share in production exceeded 50%.

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MARKETING STRATEGY FORMATION FOR THE DEVELOPMENT OF ORGANIC PRODUCTION IN THE UKRAINE

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ABSTRACT

The article examines the state and prospects of organic production by agricultural enterprises in the Ukraine. Existing natural, climatic and soil potential for the production of organic agricultural products as well as their export and consumption in the domestic market are characterized. It was noted that the development of organic production is one of the main priorities of the agrarian sector of the Ukrainian economy. State support for the development of this type of production is being implemented, as reflected in '3 + 5' as a strategy for the development of the agrarian sector of the economy for the period until 2020. Attention is drawn to the instability of the environment, insufficient development of demand and limitations of financial resources, which hinder the realization of Ukraine's potential in this segment of the agrarian sector. The conclusion on the necessity of applying marketing strategies for promoting and marketing organic products on domestic and foreign markets is drawn. The model of forming a marketing strategy of organic production development in the Ukraine is offered.

Keywords: marketing strategies, organic production, organic product sales, government support
JEL code: M31

INTRODUCTION

The current problem of organic production development in the Ukraine stems from the deterioration of the ecological situation in the world, thus organic products are gaining popularity. Simultaneously, considerable attention is paid to food products, the consumption of which benefit human health. Domestic consumers are striving to improve the quality and safety of food products. The development of organic production contributes to environmental, economic and social benefits of this area of activity. In addition to assessing the state of organic production, the goal is to develop marketing strategies for the development of the organic products' market. To achieve these goals, marketing strategies are given an important place in the management system of this area of activity. The main objective of the strategy is to increase sales, market share and profit.

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THEORETICAL BACKGROUND

The study of domestic and foreign sources proves that in today's economic theory and practice, marketing development is a prerequisite for achieving a company's market goals. First of all, it concerns the production and sale of new types of goods, including organic products. The legal and economic basis for the production and circulation of organic agricultural products and raw materials in the Ukraine is determined by the Laws of Ukraine aimed at ensuring the proper functioning of the market for organic products and raw materials, as well as guaranteeing consumer confidence in the quality of products and raw materials, marked as organic (Law of Ukraine, 2013).

Comprehensive propaganda of values and outlooks, inherent to supporters of the world organic movement, increase the efficiency of agricultural production together with the simultaneous development of the modern world and domestic safety for natural and human technologies, thus promoting the development of the organic movement in the Ukraine, focusing more specifically on production, processing and export of organic products, as well as the formation of the domestic consumption market (Federation of Organic Movement of the Ukraine, 2010).

The only way to achieve the goals of an enterprise in terms of turnover, profit, and return on investment is to meet consumer concerns. Marketing, as a management function, has a special role in this process. Planning marketing strategies involves analysing a company's capabilities and making decisions about marketing activities and their implementation (Harkavenko, 2002).

MATERIALS AND METHODS

The following documents and materials are used to conduct research on the state of development of the organic production market in the Ukraine:

- materials of the Federation of Organic Movement of the Ukraine;
- materials from the Ministry of Agrarian Policy and Food of the Ukraine;
- materials of marketing research on the demand and supply of organic products in domestic and foreign markets.

In the course of this research, the following methodological approaches were used: materials of the Federation of Organic Movement of the Ukraine:

– materials from the Ministry of Agrarian Policy and Food of the Ukraine;
– materials of marketing research on the demand and supply of organic products in domestic and foreign markets.

In the course of this research, the following methodological approaches were used:

– study of consumer behaviour in the markets of organic products, enabling the determination of consumer needs, requirements and wishes.
– the method of system analysis giving insight into the market situation and enabling an estimation organic production development dynamics;
– the method of economic-mathematical modelling enabled the assessment of the prospects of developing the organic products' market and, taking into account existing factors of the external and internal environment, the development of a model for the formation of a marketing strategy for the development of organic production in the Ukraine.

RESULTS AND DISCUSSION

Assessment of the state of production of organic products

Organic production in the world, as a separate business, began with a small number of farmers producing clean, natural products for a particular circle of traditional consumers. For more than 80 years of existence, it has become a powerful international process, which includes not only the production of agricultural products, but also strictly controlled conservation, processing, transportation and sale (Federation of Organic Movement of the Ukraine, 2010).

The Ukraine has the largest area in Europe, where almost all land is suitable for agriculture. There are more than 41 million ha of agricultural land, of which about 8 million hectares of relatively clean soil. With significant natural, climatic and soil potential for organic agricultural production, its export and con-

sumption on the domestic market, producers have achieved results in developing their own organic production (Pavlenko, 2016).

According to the Ministry of Agrarian Policy and Food (Baker Tilly, 2018), as of 2017 in the Ukraine, the total area of agricultural land certified as organic is 421.5 thousand ha (Fig. 1). Almost half of organic land (48.1%) is occupied by grain crops, which places the Ukraine in seventh place among producers of organic grains. More than 16% is covered by oil – fifth place in the world; 4.6% by beans – seventh place; vegetables cover 2% of the land – 10th place; fruit – 0.6%, and grapes – 0.1%. Among other crops that cover 28.6% of land, mustard, flax, nuts and berries, etc., are grown.

According to Organic Standard, as of 20 August 2017, 485 entrepreneurs received a certificate of organic production in the Ukraine, of which 244 are engaged in plant production. Recently, a considerable part of new certification pertain to the production of niche crops, including raspberries and other berries (Agropolit, 2018).

According to research conducted, since 2006 there is a tendency to actively fill the domestic market with own organic products at the expense of establishing own processing of organic raw materials. Within 11 years it has increased from EUR 400 thousand in 2006 to EUR 21.2 million in 2016 (Kovalchuk and Mandro, 2017).

Support for organic production is one of the main priorities reflected in the agrarian sector development called '3 + 5', as a strategy for the agrarian sector of the Ukraine's economy until 2020 (Ukrainian government portal, 2016).

Formation of marketing strategy for the development of organic production

Organic agricultural production is the most sustainable agricultural sector model. Within the implementation of the Law of Ukraine on the Production and Circulation of Organic Agricultural Products and Raw Materials, great attention should be paid to the formation of a holistic, scientifically sound system of organization and management of enterprises producing organic products (Law of Ukraine, 2013).

Such a system could be reflected in the marketing management of enterprises that meets the needs and demands of the market, responds to changes in a flexible and adequate way in an external and internal market environment as well as increases the profitability of production and activities of the enterprise as a whole.

The effective introduction and use of marketing at organic enterprises of the Ukraine requires, first of all, the proper definition of a general programme of actions of enterprise production. The development and implementation of a marketing strategy in the management of organic production of enterprises is a vital

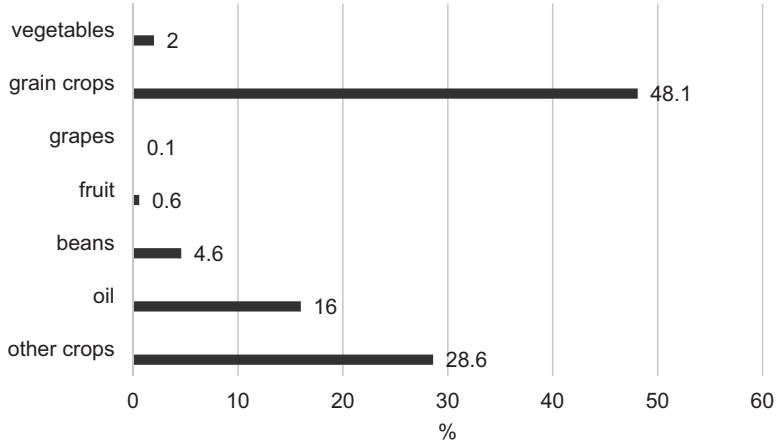

Figure 1. Areas of organic agricultural land (421.5 thousand ha) in terms of crops
Source: author's own research based on Baker Tilly (2018).

need for the functioning of domestic agricultural producers (Kucher, 2011).

The theory of marketing has evolved, and in practice, models of making strategic decisions are used. Each model embodies a certain approach to developing marketing strategies. The determination of marketing objectives makes it possible to decide on the choice of marketing strategies to achieve these goals (Harkavenko, 2002).

Research has shown that the effective development of the organic product' market involves the organization of production and marketing on the basis of a system of marketing techniques and tools. For the effective production and sale of organic produce by agrarian enterprises, a model for forming a marketing strategy for the development of organic production in the Ukraine is proposed (Fig. 2).

1. *The strategy of market coverage involves the placement of goods in the distribution network using intensive and selective distribution.*
   Intensive distribution involves the placement and sale of goods through the largest possible number of retailers. At present, the implementation of organic products is carried out through specialized departments of supermarkets and small stores in Kyiv, city-millionaires and regional centres. These are supermarkets, small specialized stores, and on-line stores where consumers can get product information and make orders. Given the increase in demand, it is necessary to increase the number of places where organic products can be purchased (Kosar and Kuzo, 2016).
   Selective distribution involves the conclusion of an agreement with the manufacturer not with all intermediaries, but with those who are interested in the implementation of the product. To achieve this, it is necessary to thoroughly investigate demand on domestic and foreign markets for organic products, to ensure effective sales and profit.
2. *The strategy of intensive growth* includes the choice of growth directions where, depending on sales, the following options are used: the strategy of deep penetration into the market; market development strategy and product development strategy.

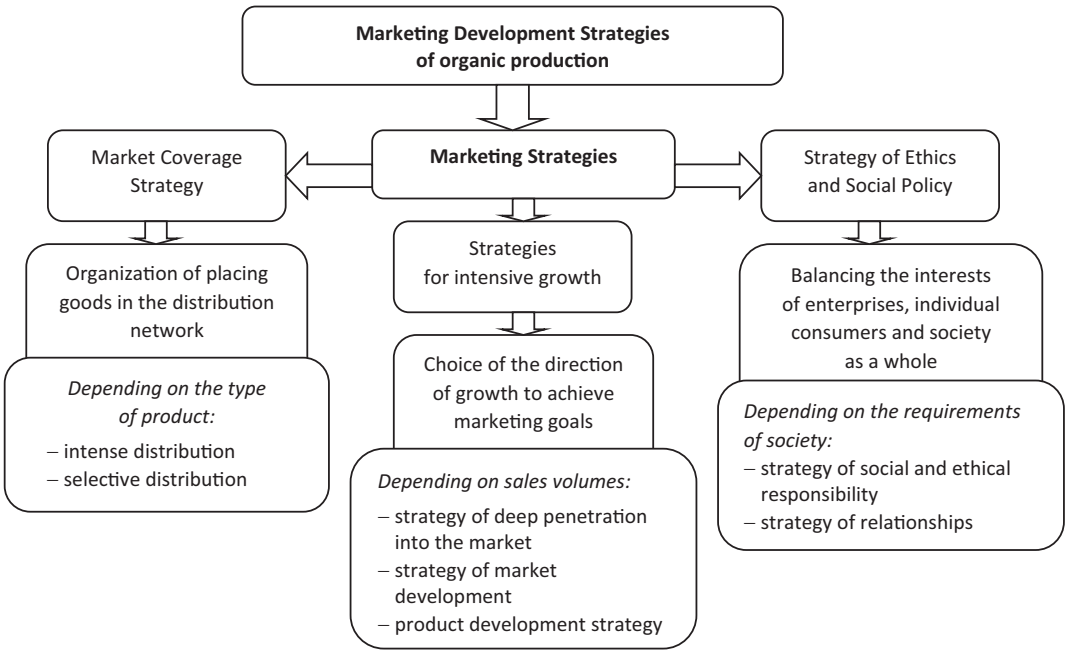

Figure 2. Model of formation of a marketing strategy for the development of organic production in the Ukraine
Source: author's own work.

The strategy of deep penetration into the market implies an increase in sales volume, market share and profits on existing markets due to available goods. To do this, it is necessary to promote the product in order to increase the desire of existing consumers and entice new customers who have not yet used the product, and convince consumers to use a larger amount of goods. An important channel for the marketing of organic products should be specialized stores of healthy eating.

The market development strategy implies the company's penetration into new markets by identifying new areas of product use, entering new segments of the market, new territorial markets and offering goods through new sales channels. In addition, it is necessary to form future markets that do not yet exist, but need to be presented and *created for specific products*.

The product development strategy implies an increase in sales as a result of introducing new goods in existing markets. A promising direction for the supply of new organic products is niche crops. The most demanded niche products, both in the domestic market and European Union market, are sorghum, spices, nuts and berries, fresh herbs, and garlic.

3. *The strategy of ethics and social policy* is responsible for balancing the interests of enterprises, individual consumers and society as a whole, and includes the following areas: a strategy of social and ethical responsibility and a strategy of interactions.

   The solution of this issue is reflected in the principles of organic agriculture. They are composed of ethical principles and include the principle of health, the principle of ecology, the principle of justice and the principle of care (Organic UA, 2010).

   The principle of health implies that organic agriculture must support and improve the health of soil, plants, animals, people and the planet as a single and indivisible whole.

   The principle of ecology means that the impact on the environment should be reduced through efficient material and energy management in order to maintain and improve the environmental quality of products and resources. Organic farming should be based on the principles of natural ecological systems and cycles, working, co-existing with and supporting them.

   The principle of justice is based on the notion that the production of organic products should be based on a relationship guaranteeing equity, taking into account the interests of the environment and living conditions. Justice is characterized by objectivity, respect, correctness and economic attitude, both between people and in relations with other living beings.

   The principle of care argues that organic farming management should have a preventive and responsible nature to protect the health and well-being of both present and future generations and the environment. Therefore, new technologies have to undergo a system of evaluation, and existing methods require constant review and, if necessary, appropriate measures need to be taken.

The proposed strategies allow producers of organic products to take into account the requirements of the market environment. The organic products' market is a promising segment of the agro-industrial market. This is an incentive for the development of organic farming and the cultivation of organic produce by Ukrainian farmers.

CONCLUSIONS

In recent years, the Ukraine has followed world trends and is developing organic production. Conducted research has shown that effective production of organic products should, first of all, be based on systematic and objective research and the formation of marketing strategies for its development. In order to increase the demand for organic products, it is necessary to implement an effective marketing policy, to stimulate its development and organize production in accordance with all international requirements and standards. For the effective production and sale of organic products by agrarian enterprises, the authors developed a model for forming a marketing strategy for the development of organic production in the Ukraine.

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ENVIRONMENTAL SUSTAINABILITY IN AGRICULTURE: DIFFERENT WAYS OF QUANTIFICATION

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ABSTRACT

The main goal of the article is to compare three approaches to measuring environmental sustainability in agriculture: (1) environmental burden index, (2) sustainable value of eco-efficient production and (3) sustainable value of eco-effective farm, applied by the authors to the sample of 125 EUFADN regions in 2015. The study indicate a fundamental problem: the notion of environmental sustainability in agriculture differs depending on the criterion we apply. The authors recognized a principle trade-off in CAP which consist of compensating strain on the natural environment with production or with public goods provision. The choice between these two effects is crucial to draw a consistent development path for the Common Agricultural Policy.

Keywords: environmental burden, eco-efficiency, eco-effectiveness, sustainable development, agriculture, EU regions
JEL codes: Q01, Q56, J43, O13

INTRODUCTION

Discussions on the sustainable development of agriculture, the methods and measurement indicators, evaluation and indicative values, etc. are nothing new (Kates et al., 2005; Zegar, 2012). In the literature, the issue is most often analysed in its economic, social and environmental aspects. While the first two are not difficult to measure and evaluate (mostly from the perspective of income, employment, education), some dilemmas arise in the context of environmental sustainability. One of the major dilemmas, if not the most important, is whether (1) to decrease the overall environmental burden of agriculture no matter production effects, (2) to generate the highest production in relation to the polluting means used (e.g. fertilisers, plant protection products) and gases emitted (e.g. greenhouse gases) during production (eco-efficiency), or (3) to adopt a consensus consisting in the fact that the products used in agricultural production are

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unfavourable for the natural environment, so simultaneously shall be compensated through agri-environmental activities, which create environmental public goods (eco-effectiveness). Unfortunately, there is no universally accepted research methodology however, the eco-efficiency approach (2) is dominant in the literature. The aim of the article is to compare three approaches to measuring environmental sustainability: (1) environmental burden index for agriculture, (2) sustainable value of eco-efficient production and (3) sustainable value of eco-effective farm, applied to the sample of EUFADN regions in 2015.

THEORETICAL BACKGROUND

Synthetic measure of environmental burden in agriculture

The construction of a synthetic measure of environmental burden in agriculture is a problematic issue. Reytar, Hanson and Henninger (2014) point out 25 various indicators related to environmental sustainability. Variables referring to water consumption, agricultural subsidies, climate change, agricultural production, ecosystem biodiversity, and land use were deemed to be of key significance.

According to the OECD (2001), in turn, environmental indicators for agriculture should include water and soil quality, biodiversity, greenhouse gas emissions, land conservation, wildlife habitats, and landscape. Zhen and Routray (2003) specify the measurement of farm sustainability in the environmental aspect, bringing it down to two areas: water management and arable farming structure. The authors cited here proposed the following measures: amount of fertilisers/pesticides used per unit of agricultural land, amount of irrigation water used per unit of agricultural land, soil nutrient content, depth of groundwater table, quality of groundwater for irrigation, water use efficiency, nitrate content of groundwater and crops. Other approaches point to the issues of pesticide, herbicide, and fungicide use in agricultural production, the use of organic fertilisers, the use of synthetic fertilisers and plant protection products or crop rotation (Saltiel, Baunder and Palakovich, 1994; Hayati and Karami, 1996; JEPE, 2018). Studies on Dutch or Danish agriculture, reveal that high stock density (particularly in the case of poultry, cattle, and pigs) per ha of agricultural land (AL) does not create favourable conditions for environmental sustainability due to relatively high emissions of nitrogen or phosphorus compounds or carbon oxides (European Commission, 2000).

A concept of eco-efficient production

The term 'eco-efficiency' appeared in the 1990s as a practical tool to measure sustainability. It was introduced by the World Business Council for Sustainable Development in 2000 to identify a management philosophy aimed at encouraging businesses to search for environmental improvements that yield parallel economic benefits. In other words, companies are asked to be more environmentally responsible and more profitable. The OECD (1998) refers to eco-efficiency as the efficiency with which ecological resources are used to meet human needs, which can be measured as the ratio of an output divided by an input, where the output is expressed by the value of products and services produced by a firm, sector or economy as a whole, while the input is the sum of environmental pressures generated by the firm, the sector or the economy. Therefore, an output increase, for a given level of inputs, or an input decrease, for a given level of outputs, leads to an improvement of eco-efficiency. However, does a change in eco-efficiency reflect a corresponding change in terms of overall sustainability, since what this ratio measures is only the relative level of environmental pressure in relation to the volume of economic activity? (Bonfiglio, Arzeni and Bodini, 2017) In the authors' opinion sustainability is more related to absolute levels of environmental pressure (Czyżewski, Matuszczak and Muntean, 2018).

Eco-effective versus eco-efficient

As aforementioned, the eco-efficiency approach may be somewhat contradictory to the idea of environmental sustainability, which should take into consideration the actual environmental effect in farms. In addition, the common agricultural policy is evolving and, next to its original assumptions related to the assurance of quantitative and qualitative food safety, support for agricultural incomes etc.,

sets goals related to the respect for the environment or the creation of public goods, in particular environmental. Therefore, it is interesting to what degree the support for agriculture, from various CAP programmes, national and regional policies, affects the increase in eco-efficiency of farms and to what extent is affects their eco-effectiveness. At this point a certain conflict between eco-effectiveness and eco-efficiency might be expected, as the programmes supporting agriculture surely include such that have a strong impact on eco-efficiency issues, but also such wherein eco-effectiveness will be dominant. This conflict impedes the sustainable development of agriculture. The results of this research, then, will contribute to the discussion regarding the future of the EU's common agricultural policy after 2020, but also the national and regional agricultural and environmental policies in the context of its evolution. The crucial questions is what should be the output measure in the input-output (I-O) approaches used to assess the environmental sustainability? It is also not certain to what extent the hitherto funding of agriculture facilitates the implementation of goals regarding its sustainable development, and to what extent it consolidates the industrial model of production, where issues of efficiency will be of key importance.

MATERIALS AND METHODS

Synthetic measure of environmental burden in agriculture

Taking into account above-mentioned remarks, the following variables from the EU FADN database may be used and actually were applied in our study for the construction of a synthetic measure (EUFADN codes in brackets):

- stock density per 1 ha (SE120);
- fertiliser use intensity in crop production (SE295/ /SE136);
- plant protection product use (SE300/SE136);
- total production energy intensity (SE345/SE131);
- woodland area per 1 ha of AL (SE075/SE025).

The above set of variables fits in with the discussion on the environmental sustainability of agriculture relatively well represented in the literature (Latruffe et al., 2016). The indicators were converted into stimulants. Synthetic measures of the environmental sustainability for an average farm in a region is in this study determined by Hellwig's method (Poczta-Wajda and Poczta, 2016), but a choice of possible methods is very wide here. We also recommend TOPSIS-CRITIC method (Czyżewski and Kryszak, 2017). Hellwig's method consist of the following procedure: the distance from the pattern was determined for each object P_i (region), cf. formula (1):

$$d_i = 1 - \frac{D_{i0}}{D_0} \quad (i = 1,\ 2,\ ...,\ n) \tag{1}$$

where:
D_{i0} – the distance of the *i*-th object from $P_{0;}$
x_{ij} – are the empirical values in the I *th* region.

$$D_{i0} = \sqrt{\sum_{j=1}^{m} \left(z_{ij} - z_{oj}\right)^2} \tag{2}$$

$$z_{ij} = \frac{x_{ij} - \min_{x_{ij}}}{\max_{x_{ij}} - \min_{x_{ij}}} \tag{3}$$

Sustainable value of eco-efficient production

Estimating sustainable value with frontier benchmarking (ESV, authors' original methodology) was carried out assuming a trade-off of productivity versus environment. Environmental Sustainable Value (ESV) is a value-oriented method, developed as a means of measuring agricultural eco-efficiency at microeconomic level (e.g agricultural farm). This enables a synthetic assessment of a farm's contribution to farming sustainability, taking into account the efficiency resulting from using economic, social and environmental resources in comparison to the opportunity cost (Figge and Hahn, 2005; Van Passel et al., 2007; Illge Hahn and Figge, 2008; Burja and Burja, 2016). In the authors opinion ESV has many advantages comparing to the standard DEA approach, since it also measures the monetary value of 'contribution to the sustainability' that should be borne to achieve it or was paid in surplus. Thus, it gives much more information useful for policymakers than a linear ordering. However, the authors propose to

engage DEA technic to identify a benchmark unit for ESV. In the literature, the use of DEA techniques to measure eco-efficiency in different sectors, as well as for the assessment of the environmental performance of farms and the agricultural sector, is widely known (Gadanakis et al., 2015). Conversely, there are not so many studies which estimate eco-efficiency at farm level using the DEA approach (Picazo-Tadeo Gómez-Limón and Reig-Martínez, 2011; Gómez-Limón et al., 2012; Picazo-Tadeo et al., 2012; Berre et al., 2015; Gadanakis et al., 2015; Pérez Urdiales, Lansink and Wall, 2016).

The calculation formula for determining the ESV of the farms in regions is as follows:

$$SV_i = \frac{1}{m}\sum_{j=1}^{m} r_{ij}\left(\frac{y_{ij}}{r_{ij}} - \frac{yb_{ij}}{rb_{ij}}\right) \quad (4)$$

where:
SV_i – sustainable value afferent to a farm from region i;
r_{ij}, rb_{ij} – resource quantity of type j and region i of the analysed farm, i.e. of the farm considered as reference system;
y_{ij}, yb_{ij} – return of resources of the analysed and benchmark farm;
$i = 1, ..., n$ – region;
$j = 1, ..., m$ – type of analysed resource.

Through its contents, SV indicates the absolute size of the value created in a sustainable manner by the agricultural farms of various countries of the EU. To take into account the size effects and to make comparisons between farms of various countries, we can calculate the indicator *Return to cost ratio* (RTC_i). This one shows the relative contribution of farms from various countries to the sustainable performance compared to the benchmark:

$$RTC_i = \frac{y_i}{y_i - SV_i} \quad (5)$$

where:
y_i – created output;
SV_i – sustainable value of the average agricultural farm of country i.

The advantage associated with the use of DEA in measuring eco-efficiency or eco-effectiveness for ESV indicator is the identification of a set of optimal weights for inputs (r) determined at farm level which maximize the eco-efficiency or eco-effectiveness score relative to the other farms in the sample. Optimizing formula used to identify benchmark units is orientated as follows, for the eco-efficiency:

$$\max_r OUT = \frac{\sum_{k=1}^{n} y_{ij}}{\sum_{j=1}^{m} r_{ij}} \quad (6a)$$

and for the eco-effectiveness (due to the constant resources of public goods):

$$\min_y INP = \frac{\sum_{k=1}^{n} y_{ij}}{\sum_{j=1}^{m} r_{ij}} \quad (6b)$$

where:
OUT – output indicator;
INP – input indicator;
y_{ij} – output j of a farm i;
r_{ij} – value of polluting capital as input indicator;
$k = 1, ..., n$ – type of analysed output.

In the eco-efficiency approach as a trade-offs productivity versus environment we use the similar set of variables as described in the previous point: the input indicator will be polluting capitals (crop protection, fertilisers, energy, non-wood area, stocking density) and as an effect indicator – total output, including shares of total output crops and total output livestocks.

Sustainable value of eco-effective farm

In the second ecological approach we have employed environmental public goods as the effect indicator (y), assuming 'institutional' valuation of public goods by CAP subsidies (Czyżewski and Matuszczak, 2016; Czyżewski, Przekota and Poczta-Wajda, 2017; Czyżewski and Matuszczak, 2018). Hence, we used the same formulas (4)–(6), and the input indicator will be polluting capitals (as above) and as the effect indicator – environmental subsidies. 125 European regions (excluding the Canaries, Cyprus, Malta and Luxembourg – outliers) were analysed in 2015, as the

last available year in FADN, since we are treating this as a pilot study.

RESULTS AND DISCUSSION

Based on the analyses carried out, three rankings of EU regions were made, classifying them according to the synthetic measure of environmental burden, eco-efficiency and eco-effectiveness of the agricultural activity conducted in the average farm in EUFADN region.

Only Italian regions and Austrian reoccur in three/ /two 'top 10' rankings (Table 1). However it is worth noting that the similarities of agrarian structures in the rankings concerns only 'environmental burden' and 'eco-effectiveness approach. This suggests that 'eco-efficiency' criterion tells us a completely different story. A majority of regions from the top eco-efficiency list (except Italian) doesn't appear among those which exert the lowest pressure on the environment or provide a sufficient value of public goods to compensate for polluting capital used. On the other hand, the low pressure on the environment means sometimes being very eco-inefficient – for instance Comunidad Valenciana (ESP) which is in the 'top 10' of the lowest environmental burden and simultaneously in the 'bottom 10' of the eco-efficiency. Meanwhile, Finnish regions appears as very eco-effective, but exerts however very big pressure on the environment (which is compensated by the public goods provision). The rankings of 'bottom 10' for the eco-efficiency and eco-effectiveness are much more similar then 'top 10s' while dominated by Romanian regions, which seems to be neither efficient in terms of production, nor effective in the provision of the environmental goods requested by CAP.

It was also observed that the most intensive European agriculture (Dutch, Danish, Belgian, French) enjoys the highest degree of environmental sustainability according to the eco-efficiency approach, where the effect is the total output value. A high position in this ranking means that agricultural producers from these regions achieve relatively the best ratio of the above-mentioned total output to the polluting capital input used. To put it differently, the productivity of the polluting capital (fertilisers, plant protection products, energy, etc.) is relatively the highest in the case of farms from this group of EU regions. At the bottom of this ranking, there are also Greek regions close to the Romanian ones, being the least efficient in terms of eco-productivity. Table 1 also shows ESV, expressed in euros, brought in by farms from individual EU regions – for instance, the best French farms (from Provence-Alpes-Côte d'Azur region) or Dutch make as much as accordingly EUR 79,004 and 172,937 of surplus environmental sustainable value considered from the point of view of eco-efficiency. On the other hand, in the case of farms which are the weakest according to this criterion (Comunidad Valenciana), the value remains at a relatively high, negative level (EUR –248,037). It can therefore be assumed that the value reflects the level of inefficiency in the use of the polluting capital input relative to the total output achieved which may be balanced in this approach by the adequate growth in output. At the same time, when using eco-effectiveness approach, the amount can determine the value of environmental public goods which these farms should deliver in order to compensate for the negative effects of their activity.

Yet. the highest environmental sustainability according to the idea of eco-effectiveness, where the result is the amount of environmental subsidies obtained, can be observed in the case of agriculture which can be considered as extensive. This can be found in the Finnish, Swedish, Italian, and Austrian regions. On the opposite side, we find farms from regions which clearly do not participate in CAP's environmental scheme. Farms with a positive, relatively high ESV according to the eco-effectiveness criterion are characterized by lower use of fertilisers (eight times lower), plant protection products (more than twenty times lower), and energy (four times lower). Stock density seems not to be of much significance, yet it should be noted that in the case of these farms, there are five times higher relation of wooden area to utilized agricultural area (UAA). It can be said that the philosophy of the operation of farms achieving a high ESV level according to the eco-effectiveness criterion lies in the lowest possible strain on the natural environment, which clearly does not go hand in hand with the highest production results and which

Table 1. Top and bottom 10 environmentally sustainable EU regions according to synthetic environmental burden measure, eco-efficient, and eco-effective approach, (benchmark units calculated using DEA, 125 EUFADN regions, 2015)

Environmental burden		Eco-efficiency			Eco-effectiveness		
Region	H	Region	RTC	SV (EUR)	Region	RTC	SV (EUR)
Top 10							
Alto Adige (ITA)*	0.52	Provence-Alpes-Côte d'Azur (FRA)	1.69	79 004	**Aosta (ITA)**	2.53	4 100
Trentino (ITA)	0.42	the Netherlands (NED)	1.65	172 937	Pohjois-Suomi (FIN)	1.99	6 221
Liguria (ITA)	0.38	Alto Adige (ITA)	1.59	23 687	**Etelä-Suomi (FIN)**	1.59	3 808
Aosta (ITA)	0.31	Languedoc-Roussillon (FRA)	1.45	42 297	Sisä-Suomi (FIN)	1.53	2 809
Slovenia (SVN)	0.26	**Trentino (ITA)**	1.44	1 6883	**Austria (OST)**	1.45	1 522
Calabria (ITA)	0.24	La Rioja (ESP)	1.43	26 426	**Pohjanmaa (FIN)**	1.38	2 959
Toscana (ITA)	0.24	**Toscana (ITA)**	1.39	22 800	Lan i norra (SVE)	1.32	1 739
Comunidad Valenciana (ESP)	0.20	Denmark (DEN)	1.38	91 343	Cantabria (ESP)	1.26	1 245
Ipiros-Peloponissos-Nissi Ioniou (ELL)	0.20	Bretagne (FRA)	1.38	77 347	Skog ligger Mellskogs (SVE)	1.25	1 694
Austria (OST)	0.20	Vlaanderen (BEL)	1.38	75 854	Alentejo i Algarve (POR)	1.07	202
Bottom 10							
Thueringen (DEU)	0.089	**Centru (ROU)**	0.61	–7 285	Małopolska and Pogórze (POL)	0.006	–2 759
Severen tsentralen (BGR)	0.089	Thessalia (ELL)	0.61	–14 996	**Nord-Vest (ROU)**	0.005	–2 791
Severozapaden (BGR)	0.088	**Nord-Est (ROU)**	0.61	–6 046	**Nord-Est (ROU)**	0.002	–2 319
Wielkopolska and Śląsk (POL)	0.087	Makedonia-Thraki (ELL)	0.59	–16 186	**Centru (ROU)**	0.001	–2 430
Schleswig-Holstein (DEU)	0.086	Sud-Est (ROU)	0.56	–11 713	Vest (ROU)	0	–3 939
Saarland (DEU)	0.086	**Nord-Vest (ROU)**	0.52	–8 832	**Sud-Vest Oltenia (ROU)**	0	–4 409
Severoiztochen (BGR)	0.082	**Sud-Muntenia (ROU)**	0.46	–14 905	**Sud-Muntenia (ROU)**	0	–4 462
Sachsen (DEU)	0.082	**Vest (ROU)**	0.43	–14 391	Bucureşti-Ilfov (ROU)	0	–5 737
Etelä-Suomi (FIN)	0.078	**Sud-Vest-Oltenia (ROU)**	0.34	–14 938	Malta (MLT)	0	–11 094
Pohjanmaa (FIN)	0.072	**Comunidad Valenciana (ESP)**	0.18	–248 037	Scotland (UK)	0	–15 125

* Bolded regions are duplicated at least in two rankings.

Source: own calculation based on EUFADN.

can be observed in the group of farms with the highest ESV according to the eco-efficiency criterion. It is also very likely that eco-effectiveness goes in the line with the low environmental burden measure, except some cases mentioned above. Thus, we should ask the question of which concept of environmental sustainability we are striving for within CAP principles?

CONCLUSIONS

The aim of the article was to compare three different approaches to measuring sustainability of agriculture in terms of the methodology as well as the results of empirical study carried out on the sample of EU regions. The study indicate a fundamental problem: the environmental sustainability of European farms differs depending on the criterion we apply. If we compare the synthetic measure of the environment pressure with I-O approaches we have to concede the superiority to the latter. We shall admit that there are trade-offs in CAP which consist of compensating strain on the natural environment with… and here you are the principal question: with production or public goods? We do not attempt to answer this question now but we hope the article will inspire a broader discussion on this issue. If we assume the eco-efficiency criterion, it is the highest where the adopted polluting input produces relatively the highest effect in the form of the total output. When it comes to the eco-effectiveness criterion, however, there is a different priority – not production, but the share of environmental subsidies, assuming they follow a provision of environmental public goods, which make up for the polluting capital used by farms.

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ECONOMIC ACTIVITY AS ONE OF THE SMART AND SUSTAINABLE DEVELOPMENT TRENDS IN RURAL TERRITORIES

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ABSTRACT

Rural territory is an important part of the community's living space, moreover, it is a living space for sustainable and smart development. With the growing public demand for a healthy living environment and healthy food, the role of rural territory as a living space for community and the necessity to maintain its sustainable development is increasing. However, the sustainability of rural territories as a living space will be preserved only when residents are ready for changes and if national institutions and local governments are promoting trends politically and practically. The aim of the research: to examine economic activity in the rural areas of Latvia with regard to promoting the sustainable and smart development direction during 2009–2016 and to assess the results achieved. An analysis of the information on entrepreneurship expansion used in the research allows making a number of conclusions. Even though Latvia has the lowest competitiveness rating among Poland, Lithuania, Latvia and Estonia, at the same time, it is characterised by the highest growth rates and small distances among these countries. The reduction of these differences was significantly influenced by economic activity expansion, including the knowledge economy segment in Latvia. The growth of the economy in the rural territories surpasses the growth rates in major cities. The rural space has confirmed its suitability for the innovative functioning and growth of the economy.

Keywords: rural territories; sustainable development; economic activities
JEL codes: O4, P17

INTRODUCTION

Issues pertaining to rural areas as a space and to sustainable smart development in the rural areas are a set of challenges to be tackled in the 21st century. Rural areas as a necessary component of living space for the population is an increasing focus both in official documents of various EU institutions and in research investigations. Both the documents (Council of Europe, 2017; ESPON 2018) and the research papers (Jordan ed., 2017; Rönkkö and Aarrevaara, 2017) stress the necessity to enhance and maintain the viability of rural areas. The status of rural viability shall also constitute the theoretical background of this research.

In the characteristics of viability, an important position is given to economic activity. The health of the local economy is regarded as one of the key factors for maintaining the viability of a community in a populated place (Grigsby, 2001; Scott, 2010). Creative and

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diversified economic activities have to be fostered in order to ensure employment and therefore retain population in the particular territory. At present, Latvia lags behind such Baltic Sea eastern coast countries as Poland, Lithuania and Estonia, even though the countries developed in a similar way during the last century. For this reason, the authors, first of all, focused on a comparative analysis of the economic competitiveness of the mentioned countries. However, the key task of the research is to examine economic growth in the rural areas of Latvia with regard to promoting the sustainable and smart development direction during 2009–2016 and to assess the results achieved.

The EU has integrated economic sectors and strong local economies (Rural Coalition, 2010; Naldi et al., 2015). As regards economic development, the following priorities have been set: developing an economy based on knowledge and innovation, promoting a more resource efficient, greener and more competitive economy and fostering a high-employment economy delivering economic, social and territorial cohesion (European Commission, 2010). As Latvia joined the European Union in 2004 and integrated into the OECD country group in 2016, the formation and development of economy has become a practical task and an object of research according to economic competitiveness indicators (Global Competitiveness Index).

The Latvian Rural Development Policy for 2014–2020 (Ukrainian Ministry of Agriculture, 2015) has been used as the methodological base of the research. The data were processed by quantitative and qualitative statistical analysis, as well as the grouping methods. As information sources for the analysis was used: the Global Competitiveness Index (World Economic Forum, 2010, 2016); the Eurostat classification of industries (NACE Rev. 2, 2008); LURSOFT and CSB data on changes in the national economy; survey results on the contribution of 'growth agents' to the sustainable and smart development of rural areas.

RESULTS AND DISCUSSION

I Promotion of economic growth in Latvia as an urgent priority

Since 2004 when Latvia became a member state of the EU with a very open economy, the competitiveness of the national economy under the free market economy has become an important indicator showing the progress of the society towards smart growth. A comparison of the competitiveness index (World Economic Forum, 2010, 2016) of the four Baltic Sea eastern coast countries made in the research led to two considerable findings.

First, Latvia was ranked the lowest and had the lowest score according to both the report 2010/2011 and the report 2016/2017 – Estonia dominated, while Poland and Lithuania exchanged their places in the ranking. Nevertheless, Latvia demonstrated the fastest changes in terms of competitiveness, and a difference between the highest and lowest index values in the period of analysis decreased. The ranking of competitiveness of the economies of Estonia and Poland climbed three places in the index and that of Lithuania – 12 places, while Latvia improved its performance by 21 places. This, of course, is a positive result.

Table 1. Changes in the competitiveness performance of the selected countries

Item	Estonia		Lithuania		Latvia		Poland	
	rank	score	rank	score	rank	score	rank	score
2010/2011	**33**	4.61	**47**	4.38	**70**	4.14	**39**	4.51
2016/2017	**30**	4.78	**35**	4.6	**49**	4.45	**36**	4.56
Growth	**+3**	+ 0.17	**+12**	+ 0.22	**+21**	+0.31	**+3**	+0.05

Source**:** Global Competitiveness Index 2010/2011; 2016/2017.

II Economic activity expansion in Latvia in the period 2009–2016

The increase in competitiveness, according to the calculations, could occur owing to fast entrepreneurship expansion in the period of analysis. The number of economically active enterprises almost doubled; their net turnover rose by half, even though the number of employees increased by less than 20%.

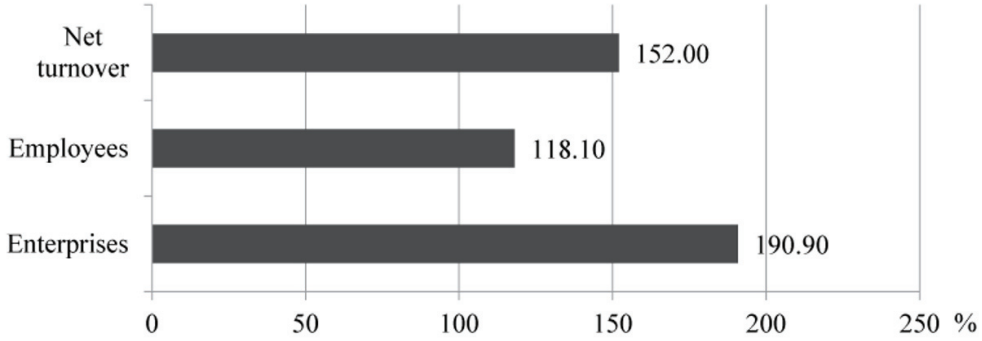

Figure 1. Entrepreneurship expansion in Latvia in the period 2009–2016

Source: LURSOFT data 2009/2016.

The changes could be viewed from two perspectives. On the one hand, the expansion of economic activity was not so significant to reduce the low competitiveness of the national economy of Latvia among the selected countries. On the other hand, modernisation indications could be observed in economic growth processes, as an increase in the net turnover exceeded that in the number of employed individuals, which indicated innovative changes in economic activity.

III Economic activity rates are higher in rural areas than in cities of national significance

Since the viability of rural space is an urgent problem in the entire European Union in order to shape a vital rural area and to contribute to smart growth there, the authors focused on economic growth in the rural space of Latvia that was comprised of 110 rural municipalities with 49.2% of the total population. A comparison of growth in economic activity in nine cities of national significance and in the 110 rural municipalities preformed in the research revealed that the economic development processes occurred at higher rates in the rural space than in the major cities.

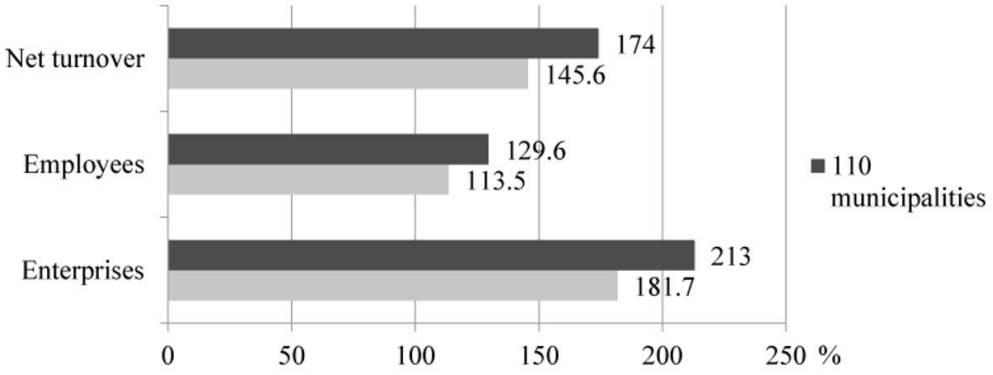

Figure 2. Entrepreneurial performance in the cities and rural municipalities

Source: LURSOFT data 2009/2016.

Entrepreneurial performance represents increases in the number of enterprises, employed individuals and net turnover. The analysis revealed that the rural areas as a living environment did not increasingly lag behind the cities – they gradually reduced the economic gaps with the cities, which gives an opportunity for the rural areas to strengthen their viability.

IV Deeper insight into the development of the rural space indicates differentiation

The comparison of growth in economic activity between the rural space and cities of Latvia deals with only averages. Average indicators, on the one hand, are informative, while on the other hand, they are 'misleading', i.e. too generalised. For this reason, the authors performed a detailed analysis of economic activity in the rural municipalities. Three statistical indicators (number of enterprises, number of employees and total net turnover) employed to analyse the situation with entrepreneurship allowed grouping the municipalities. In the result, an analysis of the data for 2016 identified three groups. The first group represented municipalities with high entrepreneurial performance (three municipalities), the second one (23 municipalities) had moderate entrepreneurial performance, while the third group performed the worst – it had the smallest number of enterprises, the lowest employment and the lowest net turnover (84 municipalities).

The second and third group municipalities were located in all the statistical regions of Latvia. Three municipalities where knowledge intensive services dominated in economic activity, of course, were located in Pieriga region. This region also had the largest number of moderately performing municipalities. At the same time, more than half of Pieriga region's municipalities performed poorly. The processed data lead to a conclusion that the proximity of the capital city affects the processes, yet it is not the only factor affecting entrepreneurship expansion, which is confirmed by the locations of moderately performing municipalities in the rural areas of Latvia.

Explicit distinctions among the groups of municipalities could be identified if analysing the groups by kind of economic activity. High entrepreneurial performance was specific to the municipalities where knowledge-based economic activities (HT, MHT and KIS) dominated, whereas low entrepreneurial performance was observed in the municipalities in which agriculture and forestry as well as low technology manufacturing enterprises made up relatively higher proportions.

The processed data allow convincingly drawing up at least three conclusions. First, the data confirm the need for growth in the knowledge-based economy in order to raise the quality of the national economy and consequently enhance the competitiveness of it. Second, the data also confirm the need for associating agriculture and forestry with innovative technologies, so that these kinds of economic activity shift from the primary sector to the secondary sector by using as modern technologies as possible. This could pave the way for an increase in the competitiveness of the bioeconomy in particular in both the EU and the global markets.

Table 2. Geographic locations of the three groups of municipalities

Region	Number of municipalities	Municipality group performance		
		low	average	high
Pieriga	28	15 – 53.6	10 – 35.7	3 – 10.7
Vidzeme	25	21 – 84.0	4 – 16.0	0
Zemgale	20	15 – 75.0	5 – 25.0	0
Kurzeme	18	15 – 83.3	3 – 16.7	0
Latgale	19	18 – 94.7	1 – 5.3	0
Rural space	110	84 – 76.4	23 – 20.9	3 – 2.7

Source: authors' calculations based on LURSOFT data for 2016.

Table 3. Kinds of economic activity of total broken down by group of municipalities

Kind of economic activity	Municipality group performance		
	high	moderate	low
	%		
(F) Construction	9.86	**10.4**	9.0
(B) Quarrying	0.39	**5.77**	0.7
(A) Agriculture, forestry, fisheries	2.0	6.98	**22.2**
(E) Water supply, sewerage, waste management	0.5	**0.54**	0.51
(D) Electricity, gas supply	0.44	0.73	**1.1**
(C) High-technology	0.18	**0.19**	0.1
(C) Medium-high-technology	**1.0**	0.73	0.8
(C) Medium-low-technology	**2.8**	2.7	2.3
(C) Low technology	4.5	7.1	**8.7**
Knowledge-intensive services (KIS)	**28.8**	20.3	15.4
Less knowledge-intensive services (LKIS)	**49.5**	44.5	39.2
Total	**100**	100	100
Agriculture, forestry, fisheries	2.0	6.98	**22.2**
Manufacturing	8.48	10.72	**11.9**
HT and MHT group	**1.18**	0.92	0.9
Knowledge intensive services	**28.8**	20.3	15.4

Source: authors' calculations based on LURSOFT data for 2016.

Third, the rural space is a favourable environment for the expansion of knowledge intensive services, which is observed even in the group of poorly performing municipalities, as only e-environment infrastructure and competent personnel are required for it.

Traditional economic success in the rural space is associated not only with its proximity to cities but also a higher population density (number of inhabitants per 1 km^2). The calculations performed in the research call into question the dominance of this factor. If municipalities with similar population densities belong to both the group of well performing municipalities (Kekava municipality – 83.4 inhabitants per 1 km^2) and the group of poorly performing municipalities (Carnikava municipality – 86.1 inhabitants per 1 km^2) and if municipalities with a population density of 11–12 people per 1 km^2 belong to the group of moderately performing municipalities, other factors affecting smart development have to be sought.

A survey of experts, which was based on the same methodology, conducted in Latvia, Lithuania and Poland in 2016 indicated such factors (Rivza et al., 2017). As a positive factor, the experts mentioned the skill of national institutions and local governments to acquire and use European Union funding. However, the experts referred to the following significant shortcomings in the activities of performance agents:

- the legal framework and the tax system that regulate entrepreneurship and ensure stability (national institutions);
- insufficient cooperation with local residents and entrepreneurs (local governments);
- insufficient readiness of residents themselves for economic collaboration and continuous learning in order to comprehend and follow on-going changes in economic activity (residents of municipalities).

It is possible that this particular set of factors specified by the experts can explain the way how to achieve an average development level in the municipalities located quite far away from the capital city and the cities of national significance and in the areas where the population density is quite low. Therefore, a focus has to be placed on the factors promoting growth, the competences of governance institutions in managing the processes entrusted to them have to be built up and the knowledge and skills of rural residents have to be enhanced under the new economic conditions caused by the beginning of a new economic growth stage. Knowledge and skills and their territorial transfer are still an urgent problem to be tackled in order to contribute to the sustainable viability of rural space (Council of Europe, 2017).

CONCLUSIONS

Economic development occurred in Latvia in the period of analysis – the number of enterprises and the number of employed individuals rose and the net turnover of the enterprises increased as well. These processes developed faster in the rural space than in the cities of national significance. This means that vitality prevailed in the rural space of Latvia, which ensured this change.

A question remains whether this vitality is sufficient to strengthen the viability of rural space in a long-term if populations decrease in the rural space in all the EU Member States, the ageing of the populations is observed and poor living conditions exist there. According to the survey of experts conducted by the research, to date all opportunities have not been used to raise local community capacity in order that local governments and local residents as well as the local residents themselves could closely cooperate in order to enhance their living space based on innovative ideas and modern activities. Vitality in the rural space is observed in limited areas; therefore, continuing reducing disparities between the cities and the rural territories as well as among the rural regions and the rural municipalities in particular becomes an urgent priority. Opportunities and the most effective ways to reduce the disparities, the necessary skills and knowledge in particular and the ways of learning the knowledge are important priorities of further research.

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THE ROLE OF ENTREPRENEUR COMPETENCIES IN THE DEVELOPMENT OF RURAL AREAS

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ABSTRACT

The article substantiates that entrepreneurship is the basis of the country's economy, a prerequisite for the revival of rural areas. It represents environmental factors that impede the formation of a competitive business environment in the Ukraine, and, accordingly, the achievement of indicators of efficiency of entrepreneurial activity. The essence of competence of the entrepreneur and its components is also considered. Different points of view of scientists are generalized and a list of competencies, which should be owned and developed by an entrepreneur in the course of his/her activity in order to harmoniously grow as a socially responsible person is also presented in the paper. The expediency of forming entrepreneurial competence in the process of vocational training of young people to life in society, their future activity in new market conditions, as well as the logical sequence of using the skills and abilities of an entrepreneur through the implementation of key competencies is substantiated. The methodical aspects of assessing the level of competence of the entrepreneur are provided. The results of this will allow to develop directions and measures for improving the process of forming the entrepreneurial competence of employees, increasing the quality of the work force, and providing competitive advantages through the use of human resources in the agricultural sector of the economy.

Keywords: entrepreneurship, competency, entrepreneur, rural areas
JEL code: L2, M5

INTRODUCTION

The dynamic conditions of the modern world make entrepreneurial activity in any country of the world act as a driving force that generates national wealth by creating jobs, increasing GDP, stimulating competitiveness and innovation potential of a country's economy. Entrepreneurship, in the agrarian sector of the economy, plays an extremely important role in ensuring food security, the evolution of commodity production, the development of rural areas and raising the welfare of the rural population.

However, for a long period of time, most governmental initiatives focused on improving the manage-

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ment of rural areas in Ukrainian society face major challenges. This concerns the implementation of programmes for subsidizing housing construction in rural areas, financial incentives for farms and social initiatives aimed at developing rural infrastructure, etc. The solution of the above-mentioned problems is hampered by the lack of adaptability of entrepreneurs and entrepreneurs of agricultural enterprises to the conditions of a competitive environment, outdated approaches to personnel work, management, assessment and the promotion of personnel, and a lack of work-out methodological tools for the development of entrepreneurial skills in the agrarian sector of the economy.

THEORETICAL BACKGROUND

The study of entrepreneurship as a social phenomenon is devoted to a large number of treaties, monographs and textbooks of famous classics of economic doctrines R. Cantillon, M. Weber, P. Drucker, K. Marx, A. Marshall, F. Knight, A. Smith, J. Schumpeter and others. The directions of solving the problems of youth professional training in entrepreneurship; the interpretation of the concepts of 'competence', 'professional competence', 'entrepreneurial competence' and the structure of entrepreneurial competence of specialists are disclosed in the research of N. Balovsiak, Yu. Bilova, M. Boiko, N. Boliubash, V. Cherevko, T. Furman, V. Maykovska, N. Pasichnyk, V. Prykhodko, L. Robles, M. Strelnikov, M. Zárraga-Rodríguez, and many others.

However, the analysis of scientific work proves that little attention is paid to the study of the role of an entrepreneur's competence in the development of rural areas and the peculiarities of the formation of respective competencies in the process of educational preparation and practical activity.

STATEMENT OF THE PROBLEM

The purpose of this study is to determine the role of entrepreneurs in the development of rural areas and to develop methodological guidelines for determining the level of competence of an entrepreneur.

METHODOLOGY

In the course of the study, a dialectical method of knowledge was used to collect, analyse, evaluate information and form conclusions, as well as monographical – in the process of systematization of approaches to structuring competencies, the definition of their criteria and classifications. The determination of the level of competence of an entrepreneur is proposed to be carried out with the use of an expert assessment, using the classical structure of expert research.

RESULTS

Entrepreneurship involves the presence of an environment necessary for its effective functioning. The decline of rural areas in the Ukraine is a confirmation of the absence of favourable conditions for conducting entrepreneurship, the lack of an organizational mechanism based on the orientation of the future specialist in achieving the best result in economic activity based on the competitiveness of products, personnel resources and technologies.

Unfavourable trends in the deterioration of the quality of life in rural areas are reflected in various areas of public life. According to official statistics, only since the last census in the Ukraine (5 December 2001), by 2017, the rural population has decreased by 17.5%, which is almost twice the corresponding rate of urban depopulation (9.5%)[4]. For the Ukraine as a whole, and for its rural areas in particular, the regressive type of age structure of the population, in which the share of persons aged 50 and older is slightly higher than the share of children (under the age of 14) is common. At the same time, during the last 15 years, for the virtually unchanged share of people aged 15–49 in the rural population of the Ukraine, there is a significant reduction in the proportion of children, which, by the beginning of 2016, is more than twice as low as the proportion of persons aged 50 and older (Borshchevsky, Mahas and Tsymbalista, 2017). Thus, against the backdrop of deepening of general tendencies of population aging and the corre-

[4] State Statistics Service of the Ukraine website http://www.ukrstat.gov.ua.

sponding increase in mortality, there is a violation of the natural reproduction of the population in general and the inhabitants of rural areas in particular.

In addition to the influence of indirect environmental factors that determine the conditions of an entrepreneurial environment, the problem of low awareness and immediate resolution is the problem of low motivation to reveal entrepreneurial initiative and an inadequate level of formation of readiness for entrepreneurship among young people and graduates of educational institutions.

Entrepreneurial competence as a component of professional competence that ensures the focus of a future specialist's activity on success in business and further self-realization of professional activity in the field of entrepreneurship, requires productive economic thinking (understanding basic economic and financial categories, possessing skills of effective economic activity, knowledge of current economic legislation), developed motivation to reveal entrepreneurial initiative, the ability of the individual to self-realization, self-improvement and social responsibility. New products and services can only be generated when they are generated through the practical realization of knowledge, skills and understanding of innovative technologies of entrepreneurs who own a high competence potential.

Today's challenges require an adequate response of specialists in the agrarian sector, and these are directly inhabitants of rural areas, who have expertise in the peculiarities of growing agricultural products, are aware of the dependence on natural and climatic conditions, are owners of land plots etc., and on innovative technologies that are increasingly becoming a prerequisite for the development of the industry, the country and the world food market. Thus, within the framework of the Techstars Startup Week Kyiv 2017, which brought together entrepreneurs from different industries to find new solutions and jointly realize their capabilities, new technologies that were actively used by farmers in developed countries as well as some Ukrainian agricultural producers were considered. Among the agricultural equipment available to agricultural producers, drone and unmanned aerial vehicles, farmland meteorological stations, modern irrigation systems, satellite monitoring and so on should be noted (BusinessViews, 2017).

Since an entrepreneur can acquire an overwhelming number of competencies in the course of their activity and development, the issues of professional preparedness of young people for life in society and their activity in new market conditions are becoming more and more relevant. Particularly relevant conclusions were highlighted by us in previous studies (Balanovska and Gogulya, 2017) regarding the issue of the peculiarities of the formation of future specialists (managers) of the agrarian sector in the context of the needs of the modern labour market, which make it possible to distinguish entrepreneurial professional competencies in rural areas. And also, in previous studies, the following 10 human skills most demanded by 2020 when working in the field under the influence of rapid development of technological process were outlined, namely: solving complex problems; critical thinking; creative abilities; managerial talents; coordination with others; emotional intelligence; the ability to reason and make decisions; service orientation; negotiating skills; cognitive flexibility (Gogulya, 2017).

The formation of entrepreneurial competence in the modern manager of an agricultural enterprise as a combination of personal and business qualities, skills, knowledge, a certain model of behaviour, the possession of which helps to successfully solve various business tasks and achieve high performance is a prerequisite for a high level of competitiveness. Unlike quality, which reflects a certain level of potential, the category of competitiveness reflects the ability of an entrepreneur to realize his/her competency potential. Therefore, the competitiveness of a specialist in the agrarian sector is determined not only by a certain level of competence potential, but also by the ability to realize this potential in practice, as well as the availability of appropriate conditions for this (Wyrzykowska, 2016).

Figure 1 reflects the logical sequence (step by step) of the use of skills (as a set of skills and abilities) of an entrepreneur through the implementation of key competencies in the context of rural development.

The analysis of overall professional competence of a person-entrepreneur will help to assess the

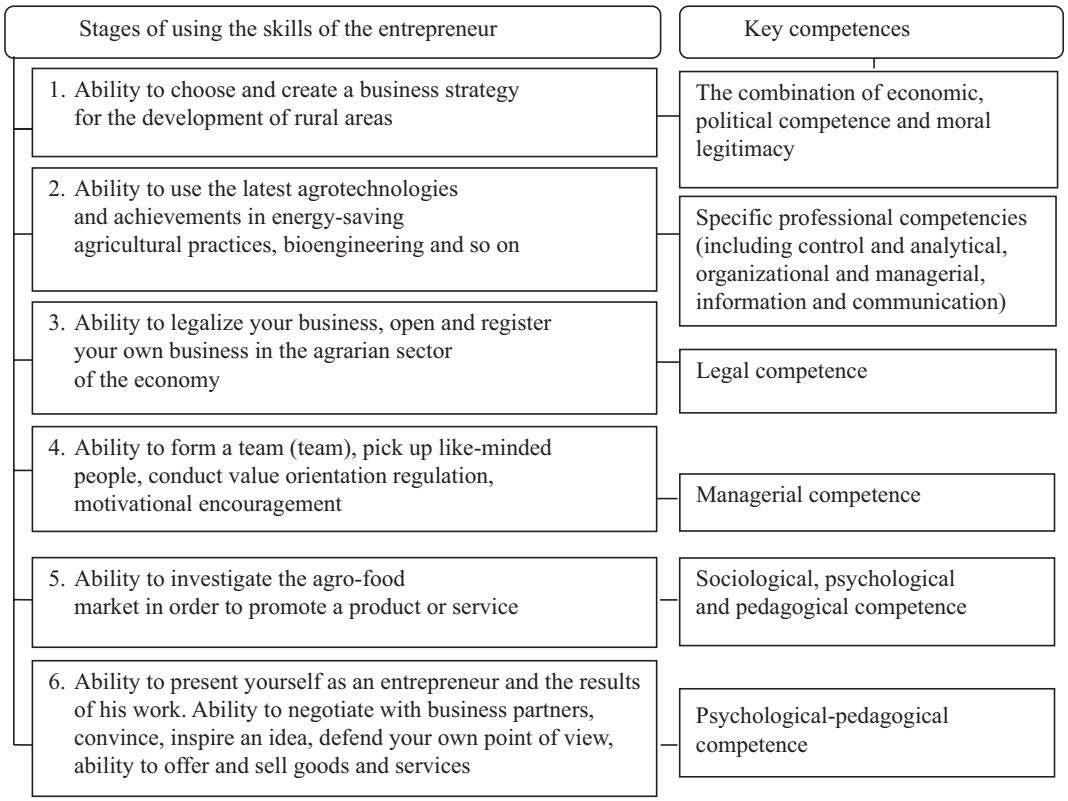

Figure 1. The role of entrepreneur competencies in the development of rural areas

Source: own elaboration.

business and professional features of an entrepreneur in the agrarian sector of the economy:

- economic competence is differentiated depending on the specialization of the entrepreneur and should include an assessment of the ability to apply different types of analysis of key economic concepts;
- political competence and moral legitimacy implies an understanding of the nature of the basic social functions and organizational structure of modern states, the principles and forms of democracy, the nature of the interaction between different branches of government, the role of political parties in society and economic processes in the country and its borders;
- legal competence is formed in the course of basic vocational training, which relates to the main branches of law and is based on the skills of its professional application in various spheres of economic activity;
- sociological competence is connected with the awareness of the entrepreneur of the concept of the social structure of modern society, its dynamics and influence on political and socio-economic processes;
- managerial competence includes knowledge of management methods, value orientation regulation, integrated management of labour motivation, development of creative potential, etc.;
- psycho-pedagogical competence is the basis for effective communication contacts, when it is necessary to understand people, their interests, motives and intentions, to find an individual approach to them.

Mastering such knowledge and skills should be a benchmark for the basic training of modern entrepreneurs and meet the requirements of the qualities of entrepreneurs.

It is the interpretation of the notion of 'entrepreneurship' that outlines clear benchmarks for under-

standing the role of entrepreneur competencies. Here is a classical interpretation of 'entrepreneurship' as a special type of activity, which is based on a number of prerequisites and requirements: the entrepreneur initiates the combination of land, capital and labour into a single process of production of goods or services; the entrepreneur takes on the complex task of making key decisions in the process of producing goods or services that determine the course of the enterprise; the entrepreneur assumes responsibility for the results of the production of investment, expenses of time and labour, business reputation and their future profits; the entrepreneur acts as an innovator, who commercially introduces the new products, new production technologies, new forms of enterprise organization, etc. (McKonnell and Brue, 2003).

According to research, the scholars (Robles and Zárraga-Rodríguez, 2015) present 20 competencies that are important and influential in achieving business efficiency: risk aversion, autonomy, information search and analysis, work quality, communication, confidence, self-development, social network development, dynamism, change management, initiative, innovation, integrity, leadership, self-control, results orientation, social mobility, negotiation, troubleshooting, responsibility and teamwork. However, some researchers consider the above list to be too detailed and agree on the desirability of outlining the following: risk aversion, initiative, responsibility, dynamism, troubleshooting, information search and analysis, results orientation, change management and quality of work.

On the basis of the analysis of scientific works of Ukrainian and foreign scholars (Bilova; 2013; Robles and Zárraga-Rodríguez, 2015; EntreComp, 2016; Maykovska, 2017), different points of view are summarised and a list of competencies to be owned and developed by an entrepreneur for harmonious growth as a socially responsible person, professional manager of an organizational entity or business owner are formulated (Table 1).

In determining the level of entrepreneurial competence among graduates of educational institutions,

Table 1. List of competencies of the entrepreneur

1. Honesty 2. Purposefulness 3. Tolerance 4. Communicativeness 5. Thriftiness 6. Freedom of choice 7. The desire for self-realization 8. Inventiveness 9. Risk capability 10. Creativity 11. Innovation 12. Responsibility 13. Resistance to physical and psychological stresses 14. Ability to act in conditions of uncertainty 15. Exposure, self-possession in situations of uncertainty 16. The ability to openly share your feelings and experiences 17. Level of consciousness, respect for laws, social order, state power	1. Understanding the essence of the economic sphere of life of modern society 2. Theoretical knowledge of basic concepts and methods of entrepreneurial activity 3. Ability to choose an effective business idea and forms of entrepreneurial activity 4. Ability to present own projects, conduct constructive business dialogue 5. The willingness to solve creative problems in the field of entrepreneurial activity 6. Ability to manage and control the progress and results of entrepreneurial activity 7. Ability to understand your own emotional state in the situation of finding and implementing business projects 8. Management experience of the enterprise. Ability to create a team of like-minded people and work with it 9. Knowledge and compliance with ethical standards of treatment, greetings, organization and support of business contacts 10. Skills in sales and product promotion 11. Ability of financial planning and cash flow management; justification of business plan; finding sources of funding and attracting investment 12. Skills to organize own labour and entrepreneurial activity and collective work, to be familiar with norms and ethics of labour relations

Source: own elaboration.

rural residents, those interested in starting entrepreneurship in the countryside, etc., it is necessary to use comprehensive assessment.

This assessment is based on the use of scores, the significance of the criteria used for it and an aggregate of indicators:

$$EntreComp = \sum_{i=1}^{n} \left(\lambda_i \cdot \alpha_{ij} \cdot \beta_i \right)$$

where:

EntreComp – a complex assessment of the level of entrepreneurial competence of the person;
λ_i – weight of the category in assessing the level of entrepreneurial competence of a person;
α_{ij} – points that put the experts in line with the person being evaluated;
β_i – significance of the used criteria;
i – competence;
j – expert;
n – number of evaluated competencies.

In the role of criteria (λ_i) for the assessment of competencies, it is suggested to use the indicators summarized in Table 1.

In this case, the weight of the evaluation criteria can be distributed as follows: weight of general indicators (competencies) – 0.4; weight of acquired indicators (competencies) – 0.6.

The practice of personnel management shows that the assessment of employees is successful in cases where methods and criteria are chosen depending on tasks, the situation, wishes of managers and coordinated with employees.

In this case, the task of assessing entrepreneurial competence is to identify those entrepreneurs who, taking into account the current state of the agrarian sector, will be able, using their knowledge and experience to improve rural areas, to start their own business by providing new jobs by investing in objects of industrial and social infrastructure. Therefore, the importance of acquired competencies – a result of perseverance, efforts in obtaining education, improving qualifications and the desire to raise the cultural level – must be higher than innate ones, which are often not used, or are used to a small extent.

It should be noted that the composition of indicators (β_i) and their significance are not constant values. They can be determined by experts who carry out such an assessment, depending on the specifics of the business direction, the activity of the enterprise, the importance and significance of those or other indicators in a particular industry, positions and management levels.

The resulting integral indicators of the level of entrepreneurial competence of a person are compared either with the average by industry direction, or by the maximum obtained values of the estimated. The results of the assessment allow us to develop the directions and measures to improve the process of forming entrepreneurial competence of employees, and, consequently, the quality of the workforce. The definition of the organization's needs in professionally qualified, competent employees involves the introduction of professional guidance and professional training and forecasting of personnel in the structural subdivisions of enterprises in the professional and qualification sections.

CONCLUSIONS

The results of the conducted research give ground to conclude that the competence of the entrepreneur provides the possession of the personality means and techniques that allow him/her to effectively organize personal and collective entrepreneurial activity. However, it is necessary to take into account the fact that the process of forming entrepreneurial competence is subjective and objective – each person produces his/her own attitude to economic, social and political realities, his/her own view of existing socio-economic relations and the prospects for their development, in some way outlining their role, status and own potential opportunities in the relevant sphere of public life.

In light of the above, it is believed that only the purposeful formation of entrepreneurial competence among the inhabitants of rural areas as well as the assessment of the achieved level of competence by the entrepreneur at a certain stage of his/her life will contribute to the full development of a personality that is ready to change and improve living conditions in the countryside, freely choose his/her way of life, proceeding from personal aspirations, abilities and qualities.

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INNOVATIVE DEVELOPMENT OF UKRAINE

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ABSTRACT

It is determined that in economic science there is no single approach to the interpretation of the concept of 'innovation'. It is suggested that taking into account the radical changes that are in the world economy today it is necessary to use the extended concept of innovation, which should be understood as the results of the development transformation, research, ideas and their combination into a radically new or improved technological, economic, social solution, the results of which can be applied in practice. The main indicators that determine the level of innovation development of a country or region and provide an opportunity to determine the impact on economic development are covered. The place of Ukraine in such ratings according to indicators of innovative development in 2017, 2018 and problems that cause their low level are defined.
The improvement directions of the innovative development level of the country are defined and the real steps taken by the government of the country to correct the negative trends through the introduction of digital transformation of the country's economy, the transition from raw material to high-tech production and the basis of innovative IT technologies and communications are shown.

Keywords: innovation, innovative development, strategy, digital economy
JEL code: O30

INTRODUCTION

The purpose of any developed society should be the construction of a progressive economy, and there the innovations themselves will make the basis of economic profit. In such conditions, only those countries in which enterprises will be able to create and implement new knowledge, technologies, apply them to the production of new goods or services for the needs of consumers will get competitive advantages that will allow them to develop successfully.

Taking into account written above, the objectives of the research are: (i) generalization of scientific approaches to the interpretation of the essence of the concept "innovation"; (ii) analysis of generalizing indicators of determining the innovative development level of the country and the main factors affecting them; (iii) identification of the main strategic directions for raising the level of innovative development in Ukraine through the introduction of a tactical action plan in this direction.

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THEORETICAL BACKGROUND

The reasons of the slowdown of innovative processes in Ukraine are discussed in articles by Ukrainian scientists P. Bubenko and V. Gusev (Bubenko and Gusev, 2009, 2016), the realities and possibilities of economic development of Ukraine in the context of the globalization challenges are in scientific works by V. Onishchenko (Onishchenko, 2015), V. Heyets (Heyets, 2014). However, there is no single approach to the definition and full description of the term «innovation» in the domestic and foreign economic works. Some scientists identified the innovation as a particular object or result of management or activity (Schumpeter, 1989). Other scholars consider it as a process that fills the economic content with a certain new idea, a new product, an invention (Twiss, 1989; Santo, 1990); some of them consider innovation as a set of technical and economic processes that leads to the emergence of radically new technologies and innovations when applied in practice (Todaro, 1997). Other researchers prove that innovation is a set of measures that ultimately leads to the emergence of new technologies, equipment, inventions (Fatkhutdinov, 1998). Modern specialists consider the innovative process as a component of innovation activity of reproduction: it determines the innovative development of the enterprise (Molodozhenya, 2016).

MATERIALS AND METHODS

In the course of this research, the following methodological approaches were used:

- an analysis of the theoretical basis for the definition of innovation that made it possible to distinguish the extended concept of innovation;
- the method of system analysis was used that allowed to analyse the level of innovative development and some issues of the socio-economic situation in Ukraine and evaluate the problems of introducing innovations in the country;
- a method of generalization and comparison that allowed to reflect the strategic directions of innovative development of the country;
- systematic structural analysis was applied that allowed to determine the interrelations between the components of the formation and implementation of the state innovative policy of the country.

RESULTS AND DISCUSSION

Taking into account the radical changes that are currently being made in the global economy, it is necessary to use the extended concept of innovation, which should be understood as the transformation result of development, research, ideas and their combination into a radically new or improved technological, economic, social solution the results of which can be used in practice both in the current activity and in the future.

There are some researches that prove the hypothesis of close relationship between socio-economic development and innovative development (WEF, 2014).

In the context of defining the essence of innovation and its impact on economic growth, international organizations developed the indexes that estimate the country's innovative potential, its development and potential growth opportunities. Such an index can be named, developed by the United Nations Conference on Trade, Innovation Capability Index (from English as index of innovative potential), which evaluates the totality of resources that are necessary for innovative development. A complex index ICI consists of subindexes such as research and development (R&D), human resources, patents, innovations and technologies, balance of payments (BoP) (WIPO, 2017).

An indicator that combines Innovation Input (calculations of conditions and resources valuation for innovative development) and Innovation Output (valuation of innovative activity results) is also the Global Innovation Index developed by the World Intellectual Property Organization and the International Business school INSEAD (WIPO, 2017).

According to the annual report about innovative development of the countries worldwide Global Innovation Index 2017 presented at UN headquarters with the support of the World Intellectual Property Organization by international reputable organizations and business schools, the most innovative countries in 2017 were: 1st place – Switzerland; 2nd – Sweden; 3rd – the Netherlands; 4th – The USA; 5th – the Great Britain.

In 2017 Ukraine took the highest position in the last 7 years – 50th place, being ahead of Thailand, in comparison with the previous 2016 increased by 6 points. In the group by the income level below average Ukraine occupied the 2nd place after Vietnam, Mongolia, Moldova, Armenia and India (WIPO, 2017).

In the report about the innovative development of the countries in the world Global Innovation Index 2018, Ukraine has taken the 43rd place ahead of Thailand, Vietnam, the Russian Federation, Moldova and Turkey, and has risen by 7 points in comparison with the previous 2017. Also, the country has taken the 1st place in the Global Innovation Index in the group according to the income level below average, and has taken the 1st place at the sub-index of innovative production and the rate of innovation efficiency (WIPO, 2018).

Such insignificant but still successes, however, are explained by the more balanced ratio of innovative result to innovative resources in 2017 and 2018, which led to a higher level of index than it was expected at the level of income in our country.

Evaluating the strengths and weaknesses of Ukraine in the Global Innovation Index, it can be noted that the country's traditional strength is human capital, which can be explained by the availability of higher education in Ukraine. However, under the quality evaluation we may lose the positions on this sub-index. The negative point is the low level of spending on science and research and the lack of motivation for scientists, which causes their migration beyond Ukraine. According to the State Statistics Service of Ukraine, for the last 2 years the number of scientists has decreased by almost 18%[4].

Today, more than 1/3 of the rural population of Ukraine does not have an access to broadband Internet. Half of Ukrainian schools and almost all establishments of health care are not connected to the World Wide Web. It is possible to change this situation for the better with the help of public-private partnership projects to achieve broadband Internet coverage of over 80% over a period of several years.

'Our ambitious plan is at least + 5% of GDP for 2021 due to the development of the digital economy' (Ministry of Economic Development and Trade, 2018).

To overcome such negative trends, the Government of Ukraine tries to introduce the digital economy through the development and implementation of the Conception of the Digital Economy Development and Society of Ukraine for 2018–2020. A plan for its implementation that The Ministry of Economy and Development has already approved and developed together with leading IT experts is confirmed.

The developed Conception stipulates the digital transformation of the country's economy, the transition from raw material to high-tech production and based on innovative IT technologies and communications.

Due to the introduction of the proposed Conception it is planned to give acceleration of the economy growth; realize high-tech initiatives, projects, digital initiatives and production; create new opportunities for business development and also to make the most of existing ones; to join the European digital community; stimulate digital transformations in system of education, medicine, ecology, cashless economy, infrastructure, transport, public safety, etc.

It is planned to achieve by economy stimulating and investment attracting, overcoming of the digital inequality, deepening of cooperation with the EU in the digital sphere and building of the country's innovative infrastructure and digital transformation. The additional growth of GDP is expected to grow by 2.5% in 2019, by 3% in 2020 and by 5% in 2021.

The implementation of the Conception measures should provide:

- economy stimulating and investment attracting;
- the basis for the transformation of domestic industries into competitive and efficient ones due to their 'digitalization';
- solving of 'digital divide' problem, bringing 'digital' technologies closer to citizens as well as by providing citizens with access to broadband Internet, especially in villages and small cities;

[4] State Statistics Service of Ukraine website http://www.ukrstat.gov.ua [Accessed 02.05.2018].

- creating of new opportunities for human capital realization, innovative developing, creative and 'digital' industries and businesses;
- development of the export of 'digital' products and services (IT outsourcing) (Order of the Cabinet of Ministers of Ukraine, 2018).

Such measures should become the basis for the transition to the level of innovative countries and the transition to technologies of the 5th–6th technological patterns. So, an important task of the Ukrainian government is to develop medium and long-term strategies for innovative development. As the basis, you can take the successful experience of the United States and China that is already a part of the Top 25 innovative countries in the world. China has become a powerful competitor for developed countries of Western Europe and the United States in just 35 years. The Government of China, since the late 1970's of the twentieth century, has developed step-by-step tactical and strategic plans for 'innovative' perfection on a global scale. The quota of expenditure for the investigation and development in public and private investment is constantly growing – 2.0% of GDP in 2015 (Ukraine has 0.7% of GDP, South Korea has 4.3% of GDP).

Encouragement of scientific and technological progress has become one of the main priorities of US policy. The fundamental achievements in the field of knowledge are officially recognized as the basis of economic growth, as, according to the US estimates, USD 1 spent on R&D has USD 9 in GDP growth. At the same time, in order to improve the business climate, the representatives of scientific and technical and business circles recognize the importance for US corporations to write off the current costs of their own R&D and exclude them from the amount of corporate income taxable of companies, as well as to conduct the accelerating depreciation of their fixed assets – production assets (Figovsky, 2018).

Therefore, it is urgent for Ukraine to identify the priorities of economic development whether we will develop as raw material country or we will make an innovative breakthrough.

The first step for Ukraine should be the development of a tactical plan for 3 years (until 2020). It is based on:

- growth of research and development expenditure to 1.5% of GDP;
- formation of a national innovative system with a market mechanism and a sectoral innovative system for agriculture;
- creation of high-tech zones;
- stimulating of the development of world-class universities;
- formation of intellectual resources of neo-industrial modernization such as information and knowledge that play the role of 'collective brain' accumulating scientific and everyday knowledge of employees, intellectual property and accumulated experience, communication and organizational structure, information networks and the image of enterprises, intellectual abilities of people, together with the material and immaterial means created by them that are used in the process of intellectual work.

The second step is to develop a medium-term strategy by 2025 with the aim of:

- increasing of expenditure in research and development to 2.5% of GDP;
- Integration of the national innovative system into a global one;
- formation and development of sectoral national innovative systems in all sectors of economy and high-tech clusters;
- industry development of creative entrepreneurial potential realization.

The third step is a long-term strategy for innovative development up to 2030, based on:

- increasing of expenditure in research and development to 3.5% of GDP;
- development stimulating of world-class clusters;
- development and implementing of cognitive technologies for effective employment to increase the level of economic development and welfare of the population.

Generally, a group of innovative nature factors and a group of general economic and general social influence factors affect the country's innovative development. To the first group we refer the regulatory documentation on innovation issues, the financing level of scientific activity in general and innovative directions in particular, the effectiveness of existing

mechanisms for providing innovation, etc., to other groups we refer the dynamics of the main macroeconomic indicators, the level of education per capita, the socio-economic and political situation in the country, etc.

Therefore, for effective economic growth there is a need in the high level of efficiency in an effective system of innovative processes in the country and a mechanism of the innovations introduction, an innovative developed cooperation between country and business based on market mechanisms, openness to integration processes, the mobility growth of production factors, global exchange of knowledge due to which it becomes possible to use the resources of the world economy in general, to reduce expenditure on production of high-tech products and to increase competitiveness.

CONCLUSIONS

In consequence of the analysis of the theoretical aspects of the world economy innovative development it may be noted that at the present stage the defining of the primary role of innovation as a source of socio-economic development takes place; innovations are the source of economic growth, encourage the global problems solving of the modern world economy; and methodology construction of economic development innovative research should be based on consideration of the following components: a sector policy and international economic component and the formation of intellectual resources of neo-industrial modernization; creative industry of entrepreneurial potential realization; cognitive technologies of effective employment for increasing the level of economic development and welfare of the population. The following author's researches in this area will be devoted to specifically examination of current experience in the world economy of innovative development and the distinction of general features.

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ENVIRONMENTAL AWARENESS OF POLISH FARMERS PARTICIPATING IN FADN

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ABSTRACT

A prerequisite to manage farms in line with the sustainability concept is to be aware of the potential impact of farming practices on environmental and social issues. In this paper we tried to describe and assess environmental awareness of Polish farmers. Basing on the representative sample of 600 farms participating in the FADN we have carried out interviews concerning the farmers' awareness of environmental problems and potential influence of farming practices on the natural environment, as well as the concept of sustainable agriculture. The results show that the farmers have a relatively high environmental awareness (at least in declarations). Farmers with higher economic potential and participating in agri-environmental schemes are more likely to know the concept of sustainable farming, than the remaining ones.

Keywords: sustainable development, farmers, environmental awareness
JEL code: Q01

INTRODUCTION

The concept of sustainable development became a popular topic for discussions of economists and politicians after the Report of the World Commission on Environment and Development 'Our Common Future' was published. The report contained one of the most commonly used definition of sustainable development: 'to ensure that it meets the needs of the present without compromising the ability of future generations to meet their own needs' (World Commission on Environment and Development, 1987). Implementing this concept in reality is still a challenge and agriculture is no exception. Being aware of the importance of considering jointly economic, environmental, and social issues, in this paper we will focus on the environmental aspect of the problem.

The impact of agriculture on the environment is already widely recognised, because agriculture can produce both positive and negative environmental externalities (Zegar, 2017). It is enough to say that the Agenda 2000 reform of the Common Agricultural Policy made agri-environment measures an obligatory part of the Rural Development Programmes (RDP) of the EU-27 Member States (van Herzele et al., 2013). Of course, the most important decisions and actions that directly affect natural environment are made by the farmers. According to the knowledge approach to sustainable agriculture, the key factor influencing practical implementation of sustainable development

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in farming is the farmer's knowledge (Carreón et al., 2011). When the knowledge is sufficient, its practical implementation becomes an issue. If the policy-makers want to achieve permanent environmental improvements, they need to strengthen the farmers' internal motivation for environmental objectives (van Herzele et al., 2013).

It is not only a common-sense knowledge, that 'farmers make land-use decisions not only in a business context but also in a personal context (…). It relates to individual and social conditions in which the farmer operates, including personal capabilities such as knowledge, skills and power, and attitudinal and psychological dimension' (Greiner, 2015). 'A farmer (…) will weigh up all the influences on him from policy, advisory services, society, his family, friends, peers, the media and based on all these influences and the information available to him forms his beliefs' (Beedell and Rehman, 1999). It is quite obvious that any purposive action has to begin with the awareness of the problem and its causes. Even though the awareness itself does not mean that the farmers will comply with environmental standards, the awareness of the problem play a role in influencing behaviour (Okumah, Martin-Ortega and Novo, 2018). Thus the goal of this paper is to describe and assess the environmental awareness of Polish farmers, especially concerning the farmers' perception of the changes in natural environment in their place of living as well as of potential impact of farming practices on the environment.

MATERIALS AND METHODS

The research was carried out in farms that participate in Polish FADN (Farm Accountancy Data Network). Generally, the Polish FADN sample consists of over 11.1 thousand farms that represent about 730 thousand farms producing for the market. For the purpose of this study a subsample of 600 farms was chosen, considering their representativeness in specialisation of production, standard output, and region, with the use of the Neyman method (FADN, 2008; Wąs, 2013). The subsample is representative to the Polish FADN sample. The FADN database covers such topics as costs, production, financial result, and basic organisational issues of the farms. In 2017, additional information concerning, among others, environmental awareness of the farmers was collected with the use of face-to face interviews.

RESULTS

One of the key issues that is to be faced by agricultural producers is adapting to the changing natural conditions, resulting from climate changes. The first step to adapt is to observe these changes. According to our analysis the vast majority of the farmers did notice climate changes in their place of living within their lifetime. They were asked to assess these changes using the scale from –5 (significant worsening) to + 5 (significant improvement), and the average answer was –1.86. The distribution of answers is given on Figure 1. It is worth emphasizing that merely few farmers noticed positive changes, while almost 15% of farmers observed visibly negative changes (joint answers –4 and –5).

Figure 2 contains information on particular aspects of climate changes observed by interviewed farmers. The most common answers were: lower precipitation in wintertime and higher temperatures in winter, while longer growing season was the least popular answer.

Most of the respondents said that within their lifetimes the state of the natural environment in their surroundings did not change significantly (Fig. 3)[3].

Undoubtedly, farmers' managerial decisions have a significant impact on the natural environment. Improper farming procedures can cause a rise of GHG emissions, decline in biodiversity, eutrophication of the water body, etc. Our analysis shows that most of the farmers are aware of their potentially negative impact

[3] A study carried out by Sullivan et al. (1996) in Michigan on a sample of 13 conventional and 12 organic farmers revealed, that the farmers observe the nature rather closely. In the scale from 1 (not at all) to 5 (very closely) the averages were the following: rainfall (4.84), soil quality (4.76), soil erosion (4.68), change of seasons (4.4), wildlife (4.24), water quality (4.24), insect populations (4.04), cloud types (3.72).

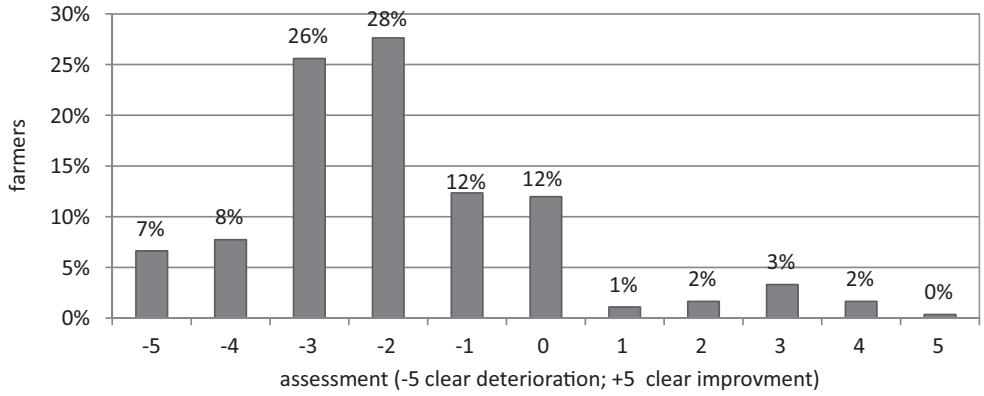

Figure 1. The farmers' assessment of climate changes in their place of living within their lifetimes

Source: own research.

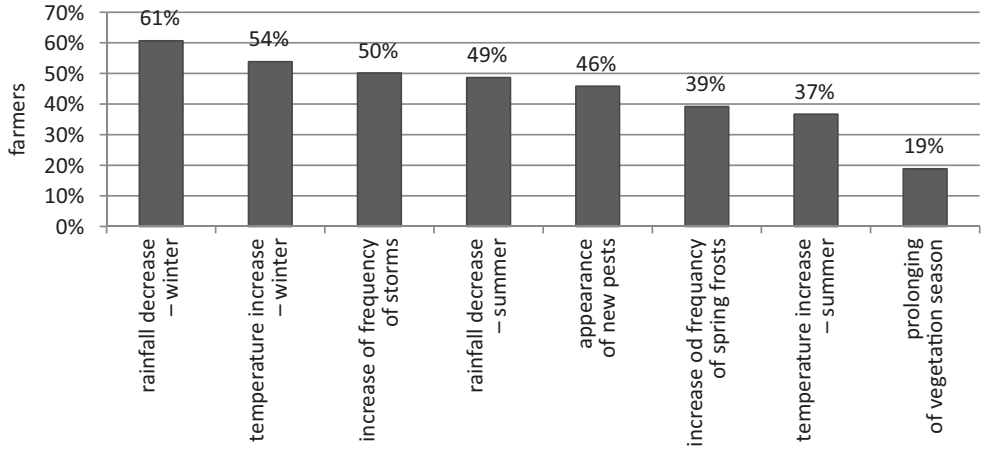

Figure 2. The farmers' observation of different aspects of climate changes in their place of living within their lifetimes

Source: own research.

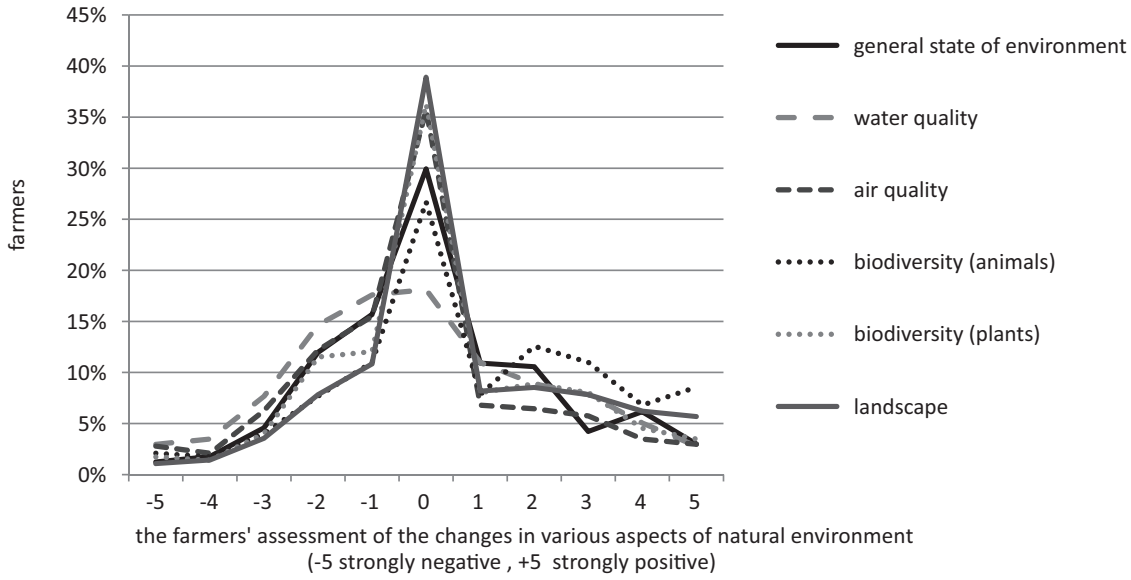

Figure 3. The farmers' assessment of the changes in various aspects of natural environment

Source: own research.

on the natural environment (Fig. 4). This is a positive information, because earlier research showed rather low environmental awareness of the farmers (Majewski, 2001). In 2009 about 1/4 of farmers from a commune in Mazowsze region claimed that farming cannot pollute the environment, and the answers did not differ depending on the level of education (Kałuża, 2009). This change in time could be partly explained by EU's environmental policy toward agriculture (for example reducing single-area payments if the farmers did not follow the cross-compliance or giving a possibility to participate in agri-environmental schemes). Although almost half of the farmers assessed environmental impact of farming as neutral (marked as 0), at the same time more farmers see their potential impact as negative than as positive.

Not only are the farmers aware of the impact of the agriculture on the natural environment, but also most of them have heard of sustainable agriculture. As Table 1 shows, 77% of the farmers declare they have heard this term, while only 14% denied it (9% were not sure whether they have heard it or not). Moreover, vast majority of those that have heard of sustainable agriculture were also able to choose its general goals from a given set of answers. Considering jointly economic, ecological, and environmental issues was chosen by 67% of the respondents, and as many as 74% chose the answer that sustainable agriculture is a way of farming that allows to keep the environment in good condition for future generations. In general, almost 98% of those declaring that they knew the concept of sustainable develop-

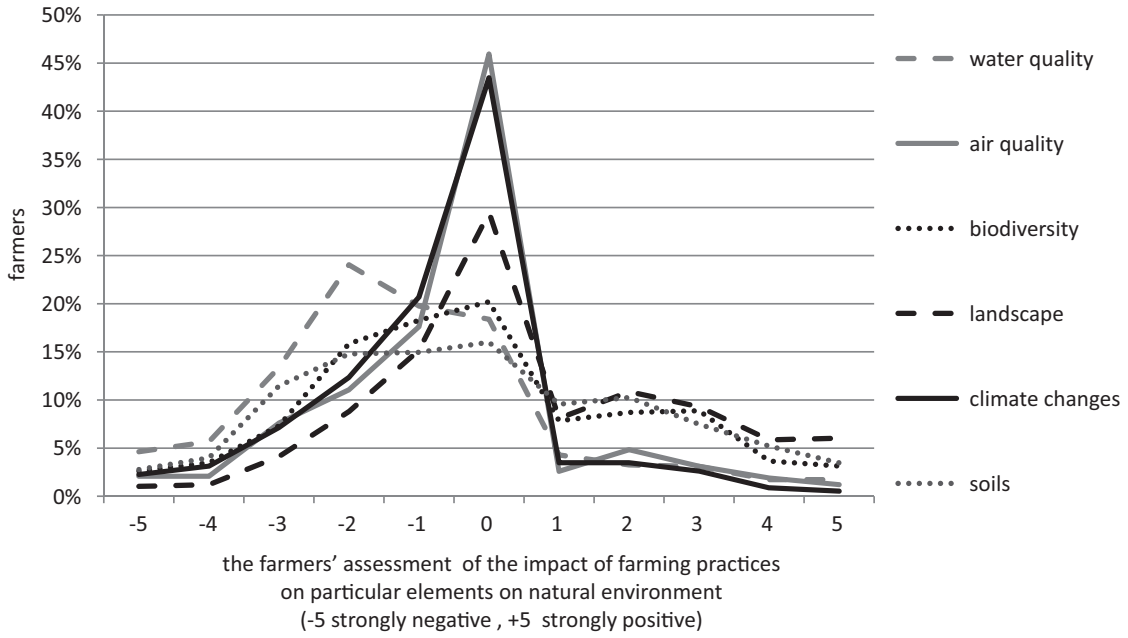

Figure 4. The farmers' assessment of the impact of farming practices on particular elements on natural environment

Source: own research.

[4] In the research carried out in 2007 on a small sample of 100 farmers living in commune Sarnaki in Mazowsze region knowledge of this term was declared by 85% of the respondents (Kałuża, 2009). Another research, carried out on a sample of 100 visiting Regional Exhibition of Farm Animals in Podkarpacie region showed that 78% of interviewed farmers have heard the term 'sustainable development'. At the same time 82% of them correctly defined agri-environmental measures, 64% could give actions within these programs., and only 56% were able to correctly define the code of good agricultural practice (Kostecka and Mroczek, 2007).

Table 1. The comparison of the farmers depending on their knowledge of the term 'sustainable farming'

Specification	Units	Have you heard of 'sustainable agriculture'?			SD	Total sample
		yes	no	don't know		
Share of farmers in the sample	%	77	14	9	–	100
Share of farmers participating in agri-environmental schemes	%	46	23	25	–	41
Agricultural land	ha	39	27	25	49	36
Soil quality	soil quality indicator*	1.07	0.80	0.74	0.34	1.00
Total production	PLN thous.	262	218	176	419	248
Farm income	PLN thous.	83	53	56	129	76
Own capital	PLN thous.	1 304	996	913	1 310	1 226
Livestock	LU	30	35	21	57	30
Costs of mineral fertilisers	PLN thous./km^2	69.3	95.2	76.9	99.1	78
Cost of chemical crop protection	PLN thous./km^2	29.9	23.7	39.8	64.3	29.9
Time of work in agriculture	years	28	27	27	11	28
Time of managing a farm	years	22	21	21	10	21
Share of farmers with university degree	%	17	12	9	–	16
Share of farmers after secondary school	%	44	44	47	–	44
Share of farmers after vocational school	%	35	41	42	–	36
Share of farmers with agricultural education	%	62	66	63	–	63
Heard complaints that the farm was onerous	%	10	12	11	–	11

* The soil quality indicator describes the quality of soils at farm level and reflects the relations of 'comparative fiscal hectare' to physical hectares. This value is determined on the basis of surface area, type and class of farmland based on the land register as well as additions to district of taxes. Value of soil quality index equal 1 reflects approximately average quality of soils in the region.

Source: own research.

ment were able to choose correctly at least one of its features.

Relatively few farmers chose incorrect answers such as 'treating environment as more important than the financial result' or 'sustainable agriculture means organic farming'. To sum up, the farmers' awareness is rather satisfactory. However, we need to remember that the FADN sample covers only farms producing for the market, and not subsistence farms. This might result in a bias toward higher awareness in agro-environmental issues.

There are some significant differences between the farmers that have heard of sustainable agriculture and those who have not. The former have twice as many times took part in agri-environmental measures as the latter (46 and 23%, respectively). It is quite obvious that participating in such plans requires some knowledge of agro-environmental issues, sustainable agriculture among them. Moreover, the farmers who declared knowledge of sustainable agriculture were the owners of farms with relatively higher economic potential: the agricultural land of their farms was two

times higher than in the other group. It is worth noting that the share of relatively large farms applying for agro-environmental schemes in Rural Development Plan 2004–2006 was visibly higher than in the whole country, and the average size of farms applying for funds raised in RDP 2007–2013 (Kociszewski, 2013). Kociszewki (2013) suggested that some of the largest farms could apply for the funds for the land that was not under production anyway. If that was right, participation in the scheme did not affect the natural environment. Newby et al. (1977, cited after Beedell and Rehman, 1999) noticed that farm size could not explain farmers' attitudes towards nature conservation. According to their research 'larger farmers were both more hostile (agro-businessmen) and more sympathetic (gentleman farmers) to conservation than farmers are in general' (Beedell and Rehman, 1999). We could assume that either there are cultural differences between farmers in Poland and in the Great Britain, or being aware of the sustainability concept does not have to be followed by certain attitudes toward the environment.

Average values of own capital, production, and farm income were also higher among those aware of the concept of sustainable development, although the difference was much lower. We could assume that farmers who work on larger scale could be more interested in broadening their knowledge connected not only with particular farming practices, but also more generally with current trends in agriculture. On the other hand, it is also possible that those who like to deepen their knowledge can achieve better financial results. Similarly, the soil quality differed significantly between these two groups of farmers.

The farmers who have heard of the concept had less animals, while having more land, which means their animal production was less intense. Similar conclusion can be drawn from the differences in the costs of mineral fertilisers. It is visible that farmers who have heard of the sustainability concept are relatively better educated. At the same time there were practically no differences when it comes to the farmers' age, time of managing the farm or having agricultural profile of education. There were also very small differences between the groups when it came to the farmers' neighbours complaining on their farms' onerousness (those who have heard of sustainable agriculture faced the complaints slightly less often).

CONCLUSIONS

The results show that the farmers have a relatively high environmental awareness (at least in declarations). Most of them can see that potential influence of agriculture on the environment is rather negative. It is worth emphasizing that their knowledge of the sustainability concept is surprisingly high – most of the farmers that have heard of the concept were able to name properly its main features. This group had also visibly higher economic potential of the farms and was more likely to participate in agri-environmental programmes. These results seem promising when talking about implementing the idea of sustainable development in farming practice. Reducing the impact of farming on natural environment with simultaneous reaching economic and social goals will not be possible without farmers' cooperation, resulting from their knowledge and willingness to choose proper farming practices. Creating and implementing effective polices (dealing not only with environmental protection, but also with rural socio-economic development) should be based on the knowledge of farmers' awareness. The next step is to find the measures that would make farmers use this knowledge in practice.

Acknowledgements

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SOCIAL SUSTAINABILITY IN AGRICULTURAL FARMS WITH DIFFERING ECONOMIC SIZE IN THE EU COUNTRIES

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ABSTRACT

The aim of the paper was to identify different levels of social sustainability in farms of various economic sizes (6 sizes) in the EU countries. The study is based on the Sustainable Value (SV) method, which is value-oriented, measured as the sustainability of agriculture at the micro-economic level (e.g. agricultural farm). To be able to compare farms among themselves, an RTC was calculated. The FADN database for the years 2004–2015 was used in the article, analysing very small (I) and very large (VI) farms more closely. It identifies countries, where farms made a positive contribution to social sustainability and those, compared to the EU average, which need mainly institutional support in order to bridge the gap with the best.

Keywords: social sustainability, agricultural farms, economic size, the EU countries
JEL codes: Q01, Q56, J43, O13

INTRODUCTION

Sustainable development is most often analysed in its economic, social and environmental aspects (Kates, Parris and Leiserowitz, 2005; Zegar, 2012). The social sustainability on which the authors have focused is primarily seen in terms of employment and income. Employment is regarded both in quantitative terms when the employment rate increases, and in qualitative terms when the skills of the workforce are upgraded. Many authors stress the importance of increasing employment in rural areas (supported, among others, by Community funds), which is strongly correlated with the decreasing rate of social exclusion, and thus increasing social governance, by reducing depopulation of these areas and improving the quality of life (Basiago, 1999; Weingaertner and Moberg, 2009; Chatzinikolaou, Manos and Bournaris, 2012; Subić, Jeločnik and Jovanović, 2013). For example, Torres et al. (2016) indicated that running ecological farms improves the situation of the local community

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and is particularly desirable in areas characterised by relatively high unemployment, thus increasing their social order. Also the quality of employment, i.e. qualifications and education, as well as human and social capital in a broad sense are strongly linked to social sustainability, as they have a direct impact on the income of the agricultural population (Wolz, Fritzsch and Reinsberg, 2006; Czerna-Grygiel, 2010; Flora and Roesch-McNally, 2014; Knapik, 2014; Latruffe et al., 2016). The income aspect is also raised in a different context – as a result of sustainable farming. Examples from various countries (Argentina, Austria, Bulgaria and other developing countries, including the Third World) show that sustainable agriculture is better than industrial agriculture because it does not have a negative impact on the rural population, impoverishing farmers and thus depriving them of opportunities for development (McKenzie, 2004; Berlan, 2013; Kwasek, Prandecki and Zegar, 2015; Severi, 2016; Bachev, 2017; Gizicki-Neundlinger and Güldner, 2017). Hediger (2008) and Bacon et al. (2012) note that, i.a. sustainable agriculture reduces some of the social costs of industrial farming, in particular the exposure of workers and rural communities to pesticides, while at the same time leading to an overall improvement in the quality of life in rural areas, maintaining cultural traditions and biodiversity, including through appropriate investment (Bock, 2012). Simultaneously, in a wider context, it is an element of territorial development, which in turn leads to sustainable social development (Hediger, 2008; Wilson, 2009).

MATERIALS AND METHODS

The aim of the paper is to indicate the differentiation of the level of social balance in farms of various economic sizes (6 sizes) in the EU countries. We will use Sustainable Value (SV) method, which is a value-oriented method, developed as a means of measuring agricultural sustainability at microeconomic level (e.g. agricultural farm). This enables a synthetic assessment of a farm's contribution to farming sustainability, taking into account the efficiency resulting from using economic, social and environmental resources in comparison to the opportunity cost (Figge and Hahn, 2005; Van Passel et al., 2007; Illge, Hahn nad Figge, 2008). In the authors opinion ESV has many advantages comparing to the standard DEA approach, since it also measures the monetary value of 'contribution to the sustainability' that should be borne to achieve it or was paid in surplus. Thus, it gives much more information useful for policymakers than a linear ordering. As noted above, the authors pointed to one of the pillars of sustainability – social sustainability. The calculation formula for determining the SV of farms in the regions needs to indicate a benchmark farm, which was the average value of variables adopted for the analysis for the analysed EU countries. The calculation formula for determining the SSV of the farms is as follows:

$$SSV_i = \frac{1}{m}\sum_{j=1}^{m} r_{ij}\left(\frac{y_{ij}}{r_{ij}} - \frac{yb_{ij}}{rb_{ij}}\right)$$

where:

SSV_i – the social sustainable value afferent to a farm from country i;

r_{ij}, rb_{ij} – the resource quantity of type j and country i of the analysed farm, i.e. of the farm considered as reference system;

y_{ij}, yb_{ij} – the return of resources of the analysed and benchmark farm; $i = 1, \ldots, n$ is the country and $j = 1, \ldots, m$ is the type of analysed resource.

Through its contents, SSV indicates the absolute size of the value created in a sustainable manner by the agricultural farms of various countries of the EU in each economic sizes. To take into account the size effects and to make comparisons between farms of various countries, we can calculate the indicator return to cost ratio (*RTCi*). This one shows the relative contribution of farms from various countries to the sustainable performance compared to the benchmark:

$$RTC_i = \frac{y_i}{y_i - SSV_i}$$

where:

y_i – represents the created value (farm net income);

SSV_i – social sustainable value of the average agricultural farm of country i.

The FADN database for the years 2004–2015 was used, analysing very small farms (I), medium small farms (III) and very large farms (VI) in greater detail. We use the following variables as an input indicator: unpaid labour input (SE015), paid labour input (SE020), wages paid (SE370) and as an output: farm net income (SE420).

RESULTS

The conducted analyses indicate that the calculated RTC value for individual economic size of average EU farms allows for their delimitation to those where the rate is relatively high, above 1 for all classes, such as Austria, Belgium, Ireland, Spain or Italy (Table 1). These countries can therefore be considered as making a positive contribution to social sustainability from their farms. This means that the ratio of the allocated outlays and effects is higher than the average in the EU-27. The relatively worst situation is observed in Bulgarian, Cypriot, Danish, Latvian, Polish, Slovak, Swedish and Hungarian farms, where the RTC indicator for the selected research period in all economic size classes are relatively low, below 1. Therefore, it can be concluded that agriculture in these countries requires institutional support that would allow for the improvement of qualifications, education and investment, which could have a positive impact on the efficiency of the labour factor.

Table 1. Average RTC value for agricultural farms of the EU-27 in 2004–2015

Class	Austria	Belgium	Bulgaria	Cyprus	Czech Republic	Denmark	Estonia	Finland	France
I	–	–	0.34	0.49	–	–	2.57	–	–
II	2.51	–	0.21	0.45	1.57	0.22	0.86	1.16	1.02
III	2.21	1.64	0.18	0.34	1.14	0.38	0.80	1.68	1.04
IV	2.12	1.62	0.16	0.29	0.97	0.59	0.82	1.24	1.01
V	1.66	1.77	0.19	0.57	0.41	0.41	0.50	0.88	0.89
VI	–	1.41	0.82	0.66	0.30	0	0.49	0.62	0.96
×	Greece	Germany	Hungary	Ireland	Italy	Lithuania	Luxembourg	Latvia	Malta
I	1.94	–	0.65	4.79	1.19	1.64	–	1.00	1.74
II	1.41	–	0.66	2.56	1.11	1.52	–	0.74	1.62
III	1.09	0.86	0.63	2.46	1.10	1.77	0.55	0.50	1.09
IV	0.90	1.16	0.65	2.35	1.09	1.26	1.12	0.44	0.93
V	0.82	1.15	0.60	2.05	1.34	1.01	1.63	0.35	0.87
VI	–	0.64	0.53	–	3.27	0.96	1.07	0.58	–
×	Poland	Portugal	Romania	Slovakia	Slovenia	Spain	Sweden	Netherlands	United Kingdom
I	0.99	0.99	0.94	–	0.15	1.52	–	–	–
II	0.78	0.74	0.76	0.60	0.75	1.21	0.60	–	1.78
III	0.93	0.66	0.66	0.16	0.99	1.10	0.52	0.56	0.89
IV	0.98	0.75	0.64	0.15	1.06	1.11	0.89	0.35	0.98
V	0.79	0.78	0.74	0.01	0.97	1.12	0.67	1.02	0.93
VI	0.78	1.22	2.78	0	–	1.51	0.23	0.69	1.22

Source: own study based on FADN data.

It should be noted that the calculations of SSV and then RTC indicator were carried out horizontally, i.e. within each economic size separately, so for example the social sustainability of very small farms was considered between EU countries in the years 2004–2015, where farms of this size were located. Against this background, the best results were reported by Irish households (4.79), and the lowest by Slovenian households (0.15) and Bulgarian households (0.34) (cf. Table 1). This was due to the fact that in Ireland the average annual employment of the labour force in these farms is about twice lower (0.75 AWU) than in Slovenia or Bulgaria, additionally the average annual income from Irish agricultural family farm (EUR 3,527) is thirteen times higher than in Slovenia (very small Slovenian farms had negative incomes in 2008, 2014 and 2015) and about twice as high as in Bulgaria. The group contributing to social sustainability also includes Estonian, Greek, Spanish, Italian, Lithuanian and Maltese farms.

For comparison, very large farms can be identified with the highest RTC indicator in Italy (3.27 and positive SSV) and the lowest RTC indicator in Slovakia (0). Such drastic differences are due, firstly, to the fact that the average annual income from a Slovak agricultural farms was negative (EUR –18,600) in the analysed period, while in Italy it was EUR 360,200. Secondly, the approach to employment of labour was radically different – in Italy 6.2 AWU, in Slovakia 56.1 AWU. Thirdly, the relation between own and hired work was also different – in Italy it was in relation of 2 to 4 AWU, in Slovakia it was of 0.2 to 56 AWU. As a result, the wage costs were completely different, while in Slovakia they were two and a half times lower per one employee. All these observations explain the highest position of Italian farms in the group of very large farms and the lowest of Slovak farms, which, like others with a low RTC indicator (where SSV is negative), require the attention of both national and Community institutions.

Dynamic analyses were also made in the researched period, which generally show, first of all, that the position of farms of a given economic size in the 'old' EU countries is relatively stable and with a few exceptions it is most often above 1, second, the position of some countries of the 'new' EU (e.g. Poland, Hungary) was growing in the analysed period (Fig. 1), which may prove that they are making up for 'losses' to the best. This observation can only be partially confirmed in the case of the largest farms, i.e. while half of the countries of the 'old' EU achieve RTC above 1 in the analysed period (i.e. SSV is positive, they contribute to social sustainability), there are no such countries among the 'new' farms (except in the outgoing Romanian case). In addition, we can say that the level of RTC indicator remains relatively stable (Fig. 2), which perpetuates the distance in social sustainability of this class of farms in the EU countries.

As was mentioned above, the analyses did not refer to vertical comparisons – between economic size classes. So we are not deciding in this article which farms – small, medium-sized or large – are more socially sustainable. It can be assumed that this is mainly due to the fact, that individual farms with different economic size were organised differently. For comparison, the smallest farms are based primarily on their own, family labour resources, not taking advantage of almost completely employed work and not paying salaries to employees. It can be concluded that these are primarily family farms, which are part

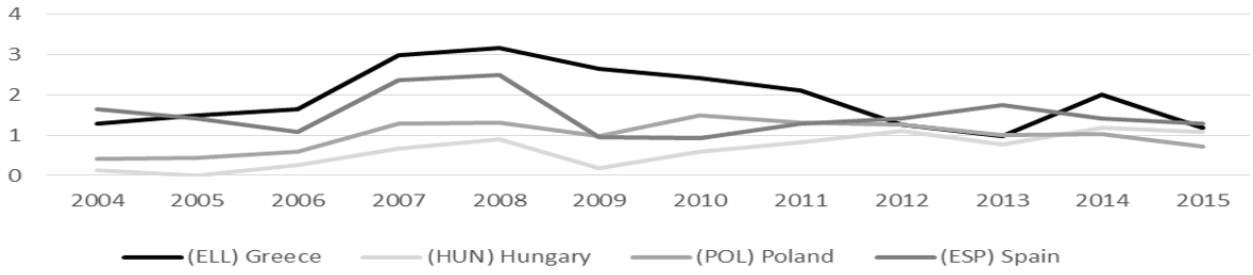

Figure 1. Average value of SSV for very small farms (class I) in selected EU-27 countries in the years 2004–2015

Source: own study based on FADN data.

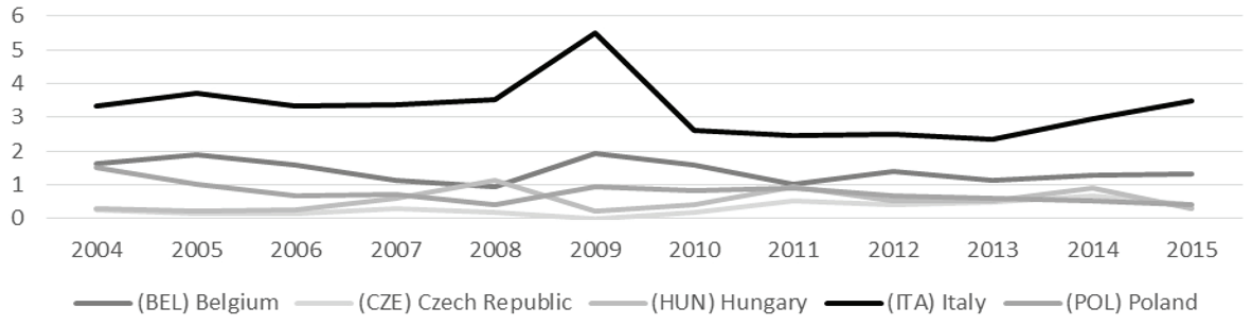

Figure 2. Average value of SSV for very large farms (class VI) in selected EU-27 countries in the years 2004–2015

Source: own study based on FADN data.

of the European agricultural model (Davidova and Thomson, 2014; Burja and Burja, 2016).

Depending on the country, they occupy a more or less significant place in the agrarian structure, however, they constitute a vast majority of the total EU population and although their income is relatively low, which may have a negative impact on social sustainability, they perform many social functions (creation of jobs for owners and family members, protection against poverty, ensuring food security) and environmental (protection of agricultural land with high natural value, preservation of biodiversity and attractiveness of the area, shaping the rural landscape). On the other hand, the largest farms, most often organised in the form of enterprises or cooperatives, are mainly based on hired work, generating usually satisfactory incomes (Bachev, 2017), often being the only employer in rural areas.

CONCLUSIONS

The conducted analyses allow to identify countries, where farms make a positive contribution to social sustainability by considering the relation between the inputs (unpaid labour input, paid labour input, wages paid) and the results obtained (farm net income) in agricultural activity. Generalising it can be concluded that positive SSV, and thus RTC indicator above 1, in all classes of economic size of farms occurs only in a few countries of the 'old' EU. Against this background, farms from the 'new' EU countries look worst. Dynamic analyses of the analysed period show that the position of farms of a given economic size in the 'old' EU countries is relatively stable, while the position of some countries of the 'new' EU (e.g. Poland, Hungary) was growing in the analysed period, which is a positive phenomenon.

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TRENDS IN ROMANIAN AGRITOURISM IN THE CONTEXT OF SUSTAINABLE TOURISM DEVELOPMENT

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ABSTRACT

Agritourism plays an important role for sustainable development, acting as integrator for other economic sectors, like agriculture, transport, services, preserving the traditions and historical heritage. This study presents the analysis of the evolution of the agritourism infrastructure and of the main tourism indicators for Romania as agritourism travel destination, emphasizing the importance of this sector in the development of the tourism industry. Quantitative and comparative analyses were carried out regarding the total number and the existing accommodation capacity for tourist boarding houses and agritourist boarding houses and the numerical evolution for domestic arrivals and international arrivals throughout the period between 2006 and 2016. In conclusion, Romania is an important agritourism destination, well known at national and international level for its natural and anthropic resources in rural areas.

Keywords: agritourism, agritourism infrastructure and accommodation capacity, tourist arrivals, sustainable development
JEL codes: O18, Q56, Z31, Z32

INTRODUCTION

In European Union, rural tourism is a concept that includes tourist activity organized and led by the local population, based on a close connection with the natural and human environment (Caratus Stanciu, 2017). Agritourism is directly linked to agricultural activities, being practiced by small farmers and these activities carried out in their own household are the main source of income.

At this moment, both in our country and in the European Union, rural tourism and ecotourism are among the most dynamic forms of tourism, a result of the advantages which it offers to both tourists and host communities. Rural areas are rich in ecological and rural diversity (Dorobantu and Nistoreanu, 2012) to which adds up the tourism resources (natural, cultural and human) and the tourism facilities and equipment, including tourist boarding houses and agritouristic farms as well (Nistoreanu, 2007).

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Agritourism plays a significant role for sustainable development. In this regard it is important to analyse the evolution of the development of the agritourism in Romania, in order to outline and propose new directions of development and strategic approaches, dedicated to this field.

THEORETICAL BACKGROUND

The current Romanian legislation has defined tourist boarding houses as establishments of tourist reception with an accommodation capacity of up to 15 rooms, having a total of maximum 60 beds, operating in the citizens dwellings or in independent buildings and which provide tourist accommodation and conditions for preparing and serving meals in special set up places (Foris, 2011), and agritourist boarding houses as establishments of tourist reception with an accommodation capacity of up to 8 rooms, in the rural area, operating in the citizens dwellings or in independent buildings and which provide tourist accommodation and conditions for preparing and serving meals in special set up places and the possibility to attend the household's activities.

The exceptional tourism potential of Romania has two main components: the natural component, represented by spectacular landscapes, varied configuration of the relief, favourable climate conditions and lots of natural therapeutic spas, and the historical component, represented by traces of succeeding civilizations that had lived on Romanian territory since ancient times, monuments and lay or religious art objects, museums and museum collections, beautiful and original ethnographical and folklore elements and actual prestigious achievements (Sumovoschi and Moraru, 2015).

Agritourism was initially practiced by peasants who had additional accommodation and since then, this form of tourism is constantly expanding and has also become a direction for action in order to achieve a sustainable development of the countryside. Romania is actually following the successful models developed in Western Europe, where agritourism occupies a leading position in the tourists preferences (National Institute of Statistics, 2017). That is given to the fact that it is among the countries with a real agritourism potential, and it has become more and more visible at the European level in the latest years, especially thanks to the landscapes and the wild nature, to which the modern people now want to return. Romania is a country with a genuine agritourism potential (Ciurea, 2011) with multiple traditions which were preserved along the centuries and which have been integrated by the technological revolution in the Western Europe.

Establishments of tourists reception with functions of tourists accommodation such as tourist boarding houses and agritourist boarding houses can be classified as small enterprises, which have played and still play a vital role in any national economy, representing an important factor of economic growth (Chitu and Tecău, 2012).

MATERIALS AND METHODS

The analysis was carried out on the basis of the statistical data provided by the National Institute of Statistics published in the Romanian Tourism – Statistical Summary for the period between 2006 and 2016. Quantitative and comparative analyses were carried out regarding the total number and the existing accommodation capacity for tourist boarding houses and agritourist boarding houses and the numerical evolution for domestic arrivals and international arrivals throughout the period between 2006 and 2016.

RESULTS AND DISCUSSION

We started by analysing the numerical evolution for tourist boarding houses and agritourist boarding houses in Romania.

During the analysed period, we find a steady increase for the number of tourist boarding houses and agritourist boarding houses. A decrease can be noticed for agritourist boarding houses in 2011, which can be attributed to the global economic crisis. From 2012, there can be noticed a significant increase for agritourist boarding houses, a situation that may be caused by the implementation of the National Rural Development Program of Romania (PNDR) 2007–2013 and 2014–2020. Among the activities of the program PNDR 2007–2013 was the 'Measure 313

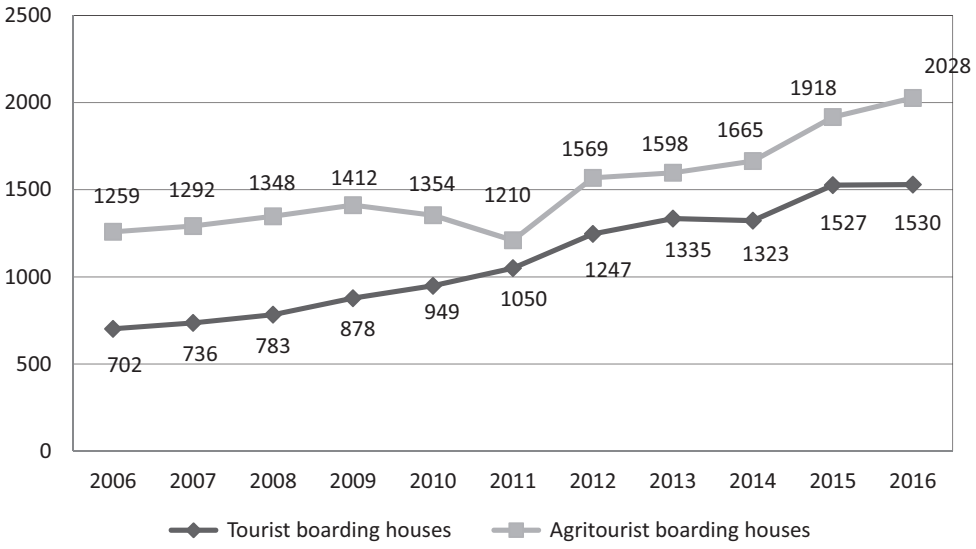

Figure 1. Establishments of tourist reception with functions of tourist accommodation by type of establishments (tourist boarding houses and agritourist boarding houses)

Source: adapted National Statistics Institute (2018).

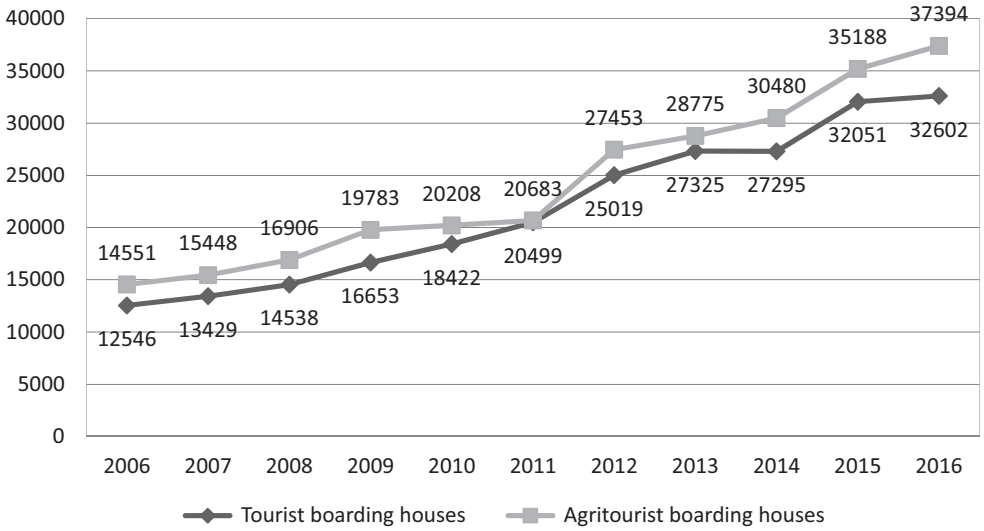

Figure 2. Establishments of tourist reception with functions of tourist accommodation and the tourists' accommodation capacity for tourist boarding houses and agritourist boarding houses

Source: adapted the National Statistics Institute, Tourism of Romania – statistical summary 2006–2017.

– Encouragement of tourism activities', which was framed under Axis III 'Improving the quality of life in rural areas and diversification of the rural economy' (Ministry of Agriculture and Rural Development, 2012).

Analysing the tourists' accommodation capacity for the studied period, we notice a significant increase regarding agritourist boarding houses (156%) and tourist boarding houses (159%). It is also necessary to mention that the increase of the units can be

based on the fact that in 2014 started the National Rural Development Programme of Romania 2014––2020 (National Rural Development Program, 2017). The sub-measure 6.2 'Support for the establishment of non-agricultural activities in rural areas' included in the Programme, aims to support diversification by setting up and developing micro-enterprises and small businesses in the non-agricultural field in rural areas. The main objective of these activities is to create jobs, to contribute to sustainable economic development and to reduce poverty in rural areas.

In order to determine the sustainability of agritourism in Romania, it is necessary to analyse the demand for this type of activities. For this reason, we will analyse the number of tourist arrivals during the period 2006–2016 in tourist boarding houses and agritourist boarding houses.

Analysing the tourists' arrivals in tourist boarding houses and agritourist boarding houses for the studied period, we notice a significant increase. In the case of the tourists' arrivals, the influence of the economic crisis can be also noticed, leading to a small decrease in arrivals during 2008–2010 both for foreigners and Romanian tourists. After 2011 there have been steady increases in the flow of arrivals for both the domestic and the international tourism flows but an slow evolution of the number of international arrivals.

Agritourism plays an important role for sustainable development, but the question is, if agritourism plays an important role in the Romanian tourism industry. In this regard, we will conduct an analysis to determine the contribution (in percent) of the number and accommodation capacity of tourist boarding houses and agritourist boarding houses in the total number and accommodation capacity of accommodation units in Romania.

In Table 1 we represented the numerical evolution of the establishments of tourist reception with functions of accommodation in Romania. We notice that in 2006 the total number of registered units was 4,710, of which 1961 were represented by tourist boarding houses and agritourist boarding houses. In 2016 the total number of units was 6,946, of which 3,558 were tourist boarding houses and agritourist boarding houses, namely 51.22% of the total number of units and compared to 2006, their number increased by 9.59%, the results following a positive trend. It is important to keep in mind that in most cases hotels, hostels, bungalows, etc. are located in or near urban

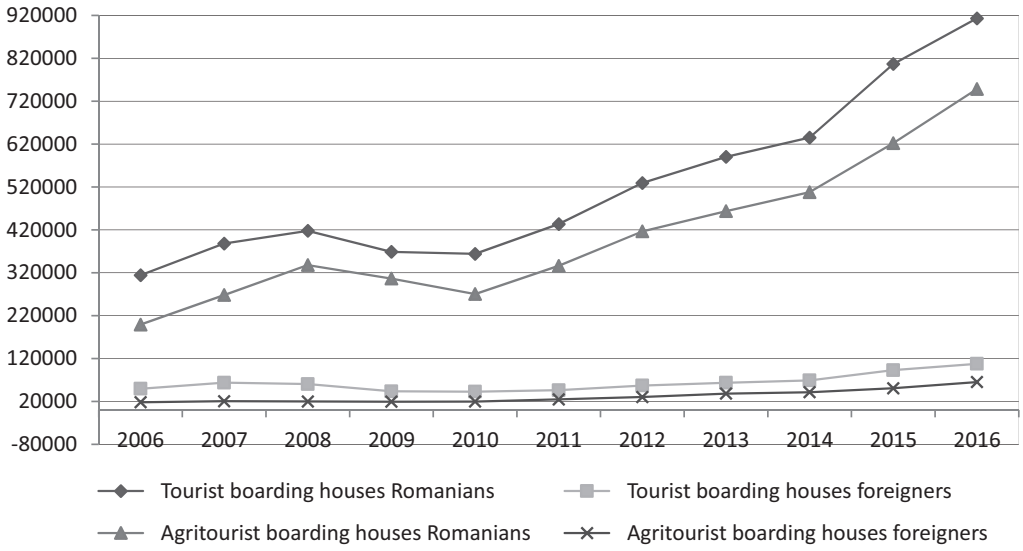

Figure 3. Tourists' arrivals in the establishments of tourists' reception with functions of tourists' accommodation by type of establishments – tourist boarding houses and agritourist boarding houses

Source: adapted National Statistics Institute (2018).

Table 1. The contribution of the number and accommodation capacity of tourist boarding houses and agritourist boarding houses in the total number and accommodation capacity of accommodation units in Romania

Reference year	Number of establishments of tourists reception with functions of tourists accommodation	Number of tourist boarding houses and agritourist boarding houses	Contribution (%)	Accommodation capacity for establishments of tourists reception with functions of tourists accommodation	Accommodation capacity for tourist boarding houses and agritourist boarding houses	Contribution (%)
2006	4 710	1 961	41.63	2 87 158	27 097	9.44
2007	4 694	2 028	43.20	2 83 701	28 877	10.18
2008	4 840	2 131	44.03	294 210	31 444	10.69
2009	5 095	2 290	44.95	303 486	36 436	12.01
2010	5 222	2 302	44.08	311 698	38 630	12.39
2011	5 003	2 260	45.17	278 503	41 182	14.79
2012	5 821	2 816	48.38	301 109	52 472	17.43
2013	6 009	2 933	48.81	305 707	56 100	18.35
2014	6 130	2 988	48.74	311 288	57 775	18.56
2015	6 821	3 445	50.51	328 313	67 239	20.48
2016	6 946	3 558	51.22	328 888	69 996	21.28

Source: adapted National Statistics Institute (2018).

areas, and at present, rural areas in Romania cover 87.1% (Management Authority for PNDR, 2013) of the country's territory, so there are perspectives for more favourable development of agritourism.

The values for the total accommodation capacity for existing establishments of tourist reception with functions of accommodation are also highlighted in Table 1. In 2016, 21.28% of the total accommodation capacity was represented by the tourist boarding houses and agritourist boarding houses and their number has increased by 11.48% compared to 2006.

Various development strategies have been developed over time in Romania, which concerned also the agritourism field, such as certain actions provided by the National Tourism Development Master Plan 2007–2026, one of them is Action 35, about encourage and facilitate the formation of the destination of rural areas. There are also actions targeting agritourism in the Strategy of Ecotourism Development in Romania (National Institute for Ecotourism Development in Romania, 2009), one of them refers to the simplification of the autorization procedure for rural tourism, but we consider that agritourism requires a dedicated strategy for a steady, sustainable and efficient development.

CONCLUSIONS

During the period 2006–2016, agritourism has experienced a real development in Romania.

Romania continued the development of agritourism accommodation units, thus increasing the number of both internal and international arrivals. A big share in the development of this tourism sector was constituted by the support provided to entrepreneurs through the development programs, by

providing non-reimbursable funds for the development of tourism in rural areas.

In this regard, but given the potential existing at the moment, a strategy dedicated to agritourism is more than necessary in Romania. The agritourism development strategy should include several lines of action, covering sustainable development; transport and accommodation infrastructure areas; educating entrepreneurs to deliver high-quality services; educating tourists and guiding them to rural areas by presenting the advantages during tourism fairs or by promoting them on all existing channels, creating a positive international image by establishing links with organizations, travel centres and international travel agencies, in order to facilitate the exchange experience, promoting and encouraging the diversification of cultural activities and traditional events through organizing various thematic events. In this respect, the paper opens up topics for future research.

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SAMPLE SELECTION WHEN ESTIMATING WELFARE MEASURES

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ABSTRACT

In this paper issue of estimation of welfare measures using survey sampling is discussed. Two strategies of sample selection were described. Precision of estimation of the measures depending on chosen sample selection was presented. First sample selection strategy that was discussed is popular simple random sampling without replacement scheme. The second is stratified random sampling. Both sample selection methods were compared with respect to precision of estimation of unknown parameter in the population. Precision of estimation is measured by variance of estimator. It is desirable that the variance of estimator is as small as possible. In such case estimation of welfare measures is the most accurate.

Keywords: welfare measures, sampling methods, efficiency of estimators
JEL codes: D60, C83

INTRODUCTION

Measurement of wealth is a very important issue when talking about theory of welfare economics. Until now among economists there is no definite agreement on which aspects should be taken into account when measuring socio-economic wealth. In this paper issue of accuracy of estimation of welfare measures depending on sample selection strategy is discussed. In the first part theoretical basis of measurement of wealth are presented. Subsequently, two methods of sample selection together with estimators of welfare measures were showed.

In the empirical part accuracy of estimation of welfare measures depending on chosen sample selection strategy was presented with the help of computer simulation. The research hypothesis assumes, that chosen sample selection strategy has a great impact on precision of estimation of welfare measures.

THEORETICAL BACKGROUND

Theoretical reflections concerning wealth economy are centered around wealth measurement. Measuring wealth and expressing it with a number brings much needed knowledge and lets draw conclusions. Some economists tend to interpret welfare as a psychic sphere. A basic tool they use to measure welfare are surveys. Surveys bring questions that enable subjective evaluation of income utility or level of satisfaction of respondents. It soon became clear that social welfare is not only related to income. What is crucial are also non-economic aspects. That is why specific indicators and measures were introduced.

In economic research basic knowledge is brought by social indicator (Panek, 2007). Several definitions are distinguished. One of them establishes, that social indicator is a numeric rating of social effects of economic growth and is considered to be understood

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broader than a measure (Luszniewicz, 1982). The other one defines social indicator as a measure of direct effects – mainly as welfare, which can be comprehended as a level of satisfying the needs of an individual and a family (Przeciszewski, 1987). Some say that social indicator is the key, strategic or summary measure of social changes (Jońca, 1991). In a quantitative approach social indicators are distinguished as numbers which describe studied phenomenon. These numbers are obtained due to different cognitive methods (Frąckiewicz and Frączkiewicz-Wronka, 2001). Many studies treat indicators and measures as synonyms, but some researchers distinguish one from another. Specific numeric rating is understood as a measure, however if this rating is used to describe changes of e.g. social states, it is defined as an indicator (Panek, 2007). It can be therefore assumed, that numeric information that is measured empirically is called a measure, whereas if this information is interpreted on account of rating social-economic phenomenon, it should be called an indicator (Panek, 2007). Three types of social indicators can be identified: single indicators, such as e.g. unemployment rate, level of education; synthetic (indices), generally an average from simple indicators; multiple indicators, e.g. set of some number of observable empirical indicators, which describe unobservable feature (Panek, 2007).

Specific indicator values are obtained when concluding survey sampling. They include, for instance, percentage of the population that received higher education or percentage of households that possess at least two houses. In such cases, the main task comes down to estimating structure indicator of the studied population.

MATERIALS AND METHODS

In this paper data from Central Statistical Office of Poland was used (GUS, 2018). Data concerns number of population broken down by place of residence – city, village and year of birth as of 31 December 2017. Number of people aged 25 or more at that time equalled 29,018,116 people, out of which 17,875,105 people lived in cities and 11,143,011 people lived in the village. The aim of the research is to estimate number of people with higher education.

Estimation of this type of measures can be made with tools of survey sampling. This method is one of mathematical statistics sections and its main interest concerns finite populations (Bracha, 1996). To formalize the problem of estimation of percentage of people with higher education, let us consider finite population $U = \{u_1, \ldots, u_N\}$ – which contains people aged 25 or more. In this population objects (people) with higher Education are observed (these objects are somehow differentiated). Let $\boldsymbol{Y} = \{Y_1, \ldots, Y_N\}^T$ denote vector of variable value in a population, where for $k = 1, \ldots, N$

$$Y_k = \begin{cases} 1, & \text{if } k\text{-th person has higher education} \\ 0, & \text{otherwise} \end{cases}$$

Let $M = \sum_{i=1}^{N} Y_k$ denote number of people with higher education. The purpose is to estimate, based on the sample drawn, percentage of individuals with a higher education $\theta = \frac{M}{N}$. After establishing the main aim of the research it is crucial to decide which sampling scheme will be used to draw sample from the population.

One of the most popular techniques of sample selection is simple random sampling without replacement scheme. In such a case every object of the population can be drawn only once. In the sample the number of people with higher education is a random variable with a hypergeometric distribution. Further in this research this random variable will be denoted as a ξ. Unbiased estimator with minimal variance of percentage of people with higher education equals $\hat{\theta}_c = \frac{\xi}{n}$. Variance of such an estimator equals for $D^2_\theta \hat{\theta}_c = \frac{\theta(1-\theta)}{n} \frac{N-n}{N-1}$ each value of percentage of people with higher education θ.

Another broadly used technique related to sample selection is stratified random sampling. It is based on dividing researched population into separate groups called 'strata' and drawing a sample out of each strata independently. Let us assume that we divide popula-

tion U into two strata – depending on a place of residence: city/village. First strata contains N_1 people, second strata – N_2 people and naturally $N = N_1 + N_2$. When taking into account such a division of the population into strata, real percentage of people with higher education equals (Cochran, 1977)

$$\theta = \frac{N_1}{N}\theta_1 + \frac{N_2}{N}\theta_2$$

where θ_1 and θ_2 denote percentage of people with higher education in cities and in the village, accordingly. Let n_1 and n_2 denote sample sizes from the first and the second strata, respectively. The whole sample size equals $n = n_1 + n_2$. Now it is necessary to consider two random variables describing number of people with higher education in samples drawn from each strata

$$\xi_1 \sim H(N_1, \theta_1 N_1, n_1), \xi_2 \sim H(N_2, \theta_2 N_2, n_2)$$

It seems intuitively obvious to take as our estimate of proportion of people with higher education θ

$$\widehat{\theta_w} = \frac{N_1}{N}\frac{\xi_1}{n_1} + \frac{N_2}{N}\frac{\xi_2}{n_2}$$

The variance of the estimator $\widehat{\theta_c}$ equals:

$$D^2_{\theta_1,\theta_2}\widehat{\theta_w} = \frac{\theta_1(1-\theta_1)}{n_1}\frac{N_1 - n_1}{N_1 - 1} + \frac{\theta_2(1-\theta_2)}{n_2}\frac{N_2 - n_2}{N_2 - 1}$$

When stratified random sampling is used, issue of dividing sample into strata occurs. This problem is called a sample allocation. One of best known approaches is proportional allocation (Bowley, 1926), which assumes division of the sample that is proportional to size of the strata, i.e.

$$n_i - n\frac{N_i}{N} \text{ for } i = 1, 2$$

In both methods of sample drawing estimators that are used are unbiased, therefore to make estimation more accurate, it is needed to compare efficiency of estimators. Let

$$\text{reduction} = \left(1 - \frac{D^2_{\theta_1,\theta_2}\widehat{\theta_w}}{D^2_{\theta}\widehat{\theta_c}}\right)\cdot 100\%$$

denote relative reduction of variance. In the next part of the research accuracy of estimation with use of both estimators will be compared in the numerical study with the help of computer simulation.

RESULTS AND DISCUSSION

The standard way of estimation of percentage of people with higher education is to take a sample of size n due to the scheme of simple sampling without replacement. In the sample the number of answers 'yes, I have higher education' is counted. Let us denote this number as x. Evidently the standard estimator of the θ is $\frac{\xi}{n}$.

Suppose that size of the sample equals 1,000 and in the whole sample 600 'yes' answers were obtained (i.e. 600 people have higher education). The point of estimation of percentage of people with higher education equals $\widehat{\theta_c} = 0.6$ and its variance may be estimated as

$$\hat{v}(x) = \frac{\widehat{\theta_c}(1-\widehat{\theta_c})}{1{,}000}\frac{29{,}018{,}116 - 1{,}000}{29{,}018{,}116 - 1}$$

where x is the number of answers 'yes' in the sample. Hence $\hat{v}(600) = 0.000239987$. If the stratified random sampling with proportional allocation is used, it is necessary to determinate sizes of samples: $n_1 = 616$ and $n_2 = 384$. To exemplify, in the sample from first strata there were 250 'yes' answers and in the sample from the second strata there were 350 'yes' answers. The point estimate of the proportion would be $\widehat{\theta_w} = 0.81$. The variance of the estimator $\widehat{\theta_w}$ may be estimated as

$$\hat{v}(250, 350) = \frac{\frac{250}{616}\left(1-\frac{250}{616}\right)}{616}\frac{17,875,105-616}{17,875,105-1} +$$

$$+ \frac{\frac{350}{384}\left(1-\frac{350}{384}\right)}{384}\frac{11,143,011-384}{11,143,011-1} =$$

$$= 0.000238369$$

The relative reduction of estimated variance equals

$$\text{reduction} = \left(1 - \frac{\hat{v}(250, 350)}{\hat{v}(600)}\right)\cdot 100\% = 0.67\%$$

Table 1 shows other possible answers results, assuming that the overall 'yes' answers equals up to 600.

Tables 2 and 3 contain the same results, assuming that the overall 'yes' answers equal to 700 and 800, respectively.

It can be observed, that whatever results of the poll in strata are given, the estimator $\widehat{\theta}_w$ is better than the estimator $\widehat{\theta}_c$.

Table 1. Possible results for $\xi = 600$, $\hat{v}(600) = 0.000239987$

ξ_1	ξ_2	Variance	Reduction (%)
250	350	0.000238369	0.67
300	300	0.000219514	8.53
350	250	0.000179522	25.19
400	200	0.000118393	50.67
450	150	0.000036126	84.95

Source: own calculations.

Table 2. Possible results for $\xi = 700$, $\hat{v}(700) = 0.000244495$

ξ_1	ξ_2	Variance	Reduction (%)
350	350	0.0001821	13.27
400	300	0.0001372	34.65
450	250	0.0000712	66.1

Source: own calculations.

Table 3. Possible results for $\xi = 800$, $\hat{v}(800) = 0.000159991$

ξ_1	ξ_2	Variance	Reduction (%)
500	300	0.00000285	98.22
450	350	0.00007379	53.88

Source: own calculations.

CONCLUSIONS

Based on concluded considerations, it seems that stratified random sampling with proportional allocation is a better sample selection strategy. Accuracy of estimation for a sample selected in such a way was up to 98% better than not including information about dividing population into strata. Given the results obtained it should be established, that set research hypothesis is true, therefore strategy of sample selection in fact has impact on accuracy of estimation of welfare measures. In further research including other methods of sample selection and sample allocation in stratified random sampling is planned.

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TOWARDS SUSTAINABLE AQUACULTURE IN POLAND

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ABSTRACT

In the late 1980s, inland aquaculture in Poland produced about 20 and 4 thousand tonnes of carp and trout, respectively. In 2016, the total volume of the sector's production increased to over 35 thousand tonnes, including 18 and 16 thousand tonnes of the two species and above 1 thousand tonnes of another fish. This constitutes 94% of total catches of inland fish and about 15% including sea fishing. Globally, roughly 50% of seafood supply is produced by aquaculture, and farmed fish production exceeds that of farmed beef. The EU's Blue Growth Strategy identifies aquaculture as a sector which could boost economic growth across Europe. The key challenges in the Polish aquaculture sector is significant production growth to 49 thousand tonnes by 2020 and increasing its competitiveness by using resources more effectively, supporting the market by building distribution chains, improving the quality of products and marketing, as well as increasing contribution to environmental protection.

Keywords: aquaculture, adaptation, sustainability
JEL code: Q22

INTRODUCTION

The FAO (2018) defines aquaculture as 'the farming of aquatic organisms: fish, molluscs, crustaceans, aquatic plants, crocodiles, alligators, turtles, and amphibians. Farming implies some form of intervention in the rearing process to enhance production, such as regular stocking, feeding, protection from predators, etc. Farming also implies individual or corporate ownership of the stock being cultivated'.

World aquaculture already produces roughly 50% of the global seafood supply, and farmed fish production exceeds that of farmed beef (Mair, Hobday and Macleod, 2016). With capture fishery production remaining relatively static since the late 1980s, aquaculture has been responsible for the impressive growth in the supply of fish for human consumption (FAO, 2016).

The EU's Blue Growth Strategy identifies aquaculture as a sector which could boost economic growth across Europe and bring social benefits through new jobs (Science for Environment Policy, 2015). Modern aquaculture growth is not just a matter of new technology. Aquaculture has to be sustainable. It means that it has to be ecologically sound, economically viable and socially acceptable. It involves both the short-run interest of farmers and the long-run interest of society and the environment as a whole.

This article presents the successful adaptation of Polish aquaculture from a centrally controlled one to a modern sustainable market economy.

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MATERIALS AND METHODS

The paper is mainly based on volume and value data collected by Eurostat, EUMOFA (European Market Observatory for Fisheries and Aquaculture Products), FAO, and FEAP (Federation of European Aquaculture Producers). Important sources of information were strategies for the development of aquaculture in Poland and in the EU: Trout Strategy (2013), Aquaculture Strategy (Ministerstwo Rolnictwa i Rozwoju Wsi, 2015), and Strategy of European Aquaculture (2002).

AQUACULTURE IN POLAND

Polish aquaculture has a long history, with the first records of activity from around the 11th–12th century. The oldest carp ponds are located in the territories of Zator, Milicz, Cieszyn and Pszczyna (Guziur, 2018). Despite the fact that these ponds are at least 500 years old, they are still functional.

Today, aquaculture in Poland mainly consist of land-based freshwater fish farms. In 2014, there were 1,242 aquaculture farms and their number increased by 47% compared to 2013. The sector was dominated by small enterprises with less than 5 employees. 70% of Polish farms had less than 5 employees, 18% had 6–10 employees and 12% more than 10 employees, which means that aquaculture farms were mainly managed by micro and small family enterprises or small and medium companies. The total number of persons employed in the Polish aquaculture sector was 7,664 and this number increased by 43% compared to 2013 (Nielsen, Guillen and Carvalhoet, 2016). In 2016, total national aquaculture production reached 35,452 tonnes – a 6% increase compared to 2015 (Fig. 1).

The total value of production was above EUR 91.4 million and there was also an increase of almost 6%. The total volume increased by 5%, whereas the total value increased by only 0.1% compared to the average between 2011–2015 (Fig. 2).

There are two main sections of Polish aquaculture: extensive carp farming in earth ponds and intensive trout farming in different productive facilities.

The biggest section is carp farming. In 2016, common carp stood for 53% of the total volume of production and for 46% of the whole total value of aquaculture production. The volume of annual production of common carp increased to 18.7 thousand tonnes (about 7%) with a value of EUR 42 million (about 9%). Carp can be farmed in a variety of technical and water conditions, in small pools located in home gardens as well as large commercial ponds ranging in size from a few to a few hundred hectares. Carp farms

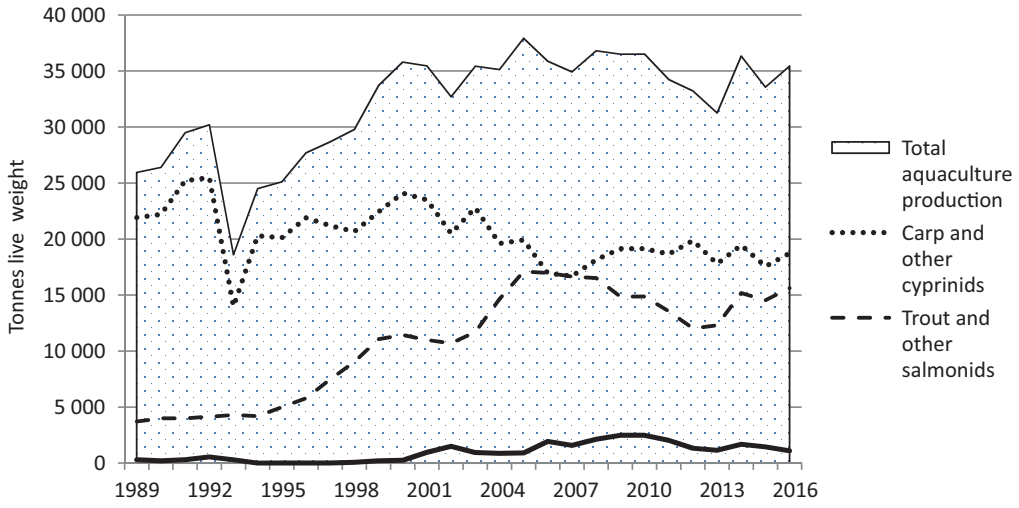

Figure 1. Volume of Polish aquaculture production in the period 1989–2016

Source: developed from Eurostat database.

are widespread all over the country, but the largest facilities are located in central and southern Poland where climatic conditions are warmer, and thus more advantageous.

Total earth pond useable area of production for carp is about 70 thousand ha, the largest in Europe (Turkowski and Lirski, 2010). Rearing carp usually employs mixed species stock (polycultures). The contribution of other cyprinids in the final production of carp amounted to 10%, and other freshwater species additionally constituted 2% (Eurostat database). Together, this amounts to about 12% of other fish species (Ministerstwo Rolnictwa i Rozwoju Wsi, 2015).

The next big section is harvesting rainbow trout (including other salmonids it amounted to about 12%), which contributed 44% of total volume of production and almost 50% of total value of aquaculture production in 2016 (Figs. 1 and 2). The annual output of rainbow trout increased to 15.5 thousand tonnes (about 7%) (Fig. 1). On the other hand, the total value of production was EUR 45.2 million, which corresponds to an increase of 8% (Fig. 2).

Compared to carp, rainbow trout farming is a relatively new industry in the country, having just started in the 20th century. The active development of trout farming started at the end of 1990s, and production has been stagnating over the past few years. Trout production is carried out in intensive fish production facilities (mostly in concrete ponds, so-called raceways) that are supplied with water from rivers or other running sources. Trout farms are located in the north, on the Baltic Sea coast, and in southern Poland in the Carpathian foothills in rich terrain with clear, cool waters. It is estimated that approximately 800 tonnes of salmonids were produced in recirculating aquaculture systems (RAS) (Ministerstwo Rolnictwa i Rozwoju Wsi, 2015). This new technique has also been introduced to the production of such species as sturgeon, barramundi, catfish, wels catfish, pikeperch or eel. They constitute 3% of turnover in aquaculture and have 5% share in production volume (Figs. 1 and 2).

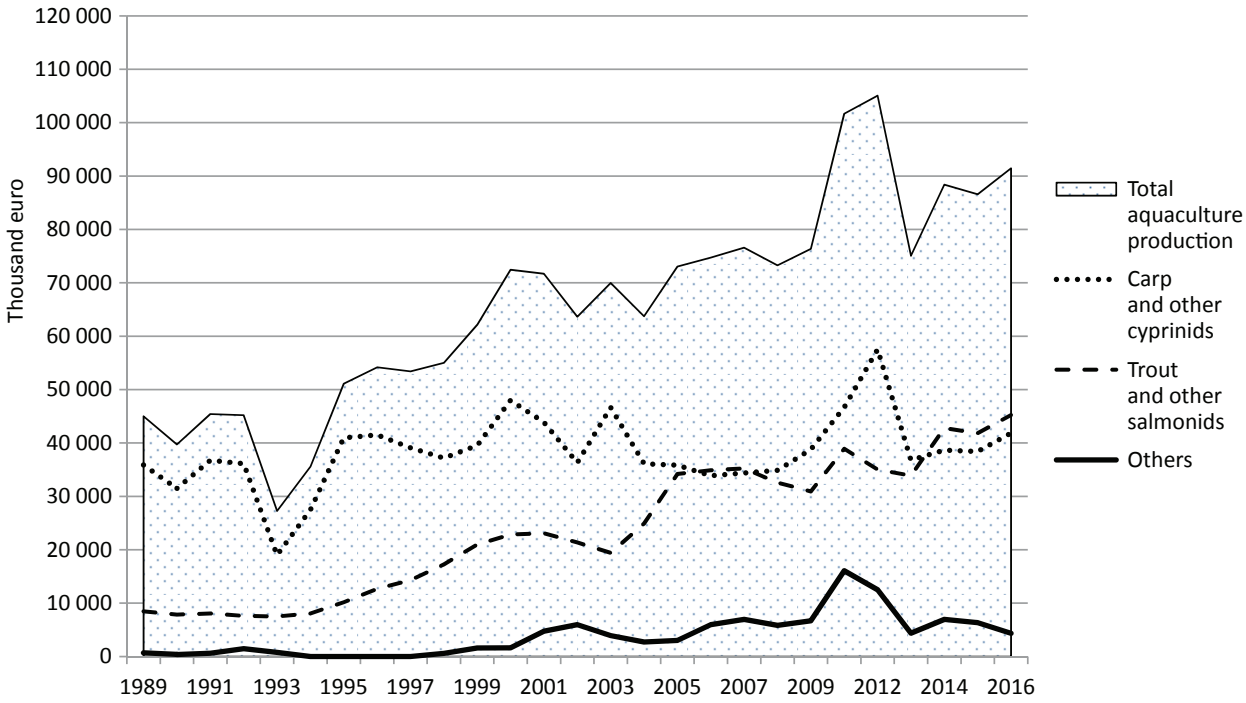

Figure 2. Value of Polish aquaculture production in the period 1989–2016

Source: developed from Eurostat database.

DEVELOPMENT OF POLISH AQUACULTURE

In centrally planned economics after World War II, big fish farms belonged to the State. During that period, major technical development started because government financed all investment. It was a period in which rainbow trout culture developed in Poland thanks to new methods of intensive production and efficient controls of spawning time. The basic principles of fishery management, at that time, was so called rational management, based on environmental sustainable intervention, resulting in higher production of better quality fish, achieved at minimal cost ensuring continuity of fish exploitation (Szczerbowski, 1995). There were no problems with fish marketing because the market, at that time, accepted any quantity of fish on offer.

After the political changes in the early 1990s, privatization of state farms began. New private enterprises or private tenets of fish farms were constrained by limited financial resources, increasingly stringent environmental and tax regulations and weaknesses in marketing. In the first years of transition, there was a major decrease in aquaculture production as a result of political and economic changes and a consequent lack of experience in operations under market conditions. In 1993, total aquaculture production fell to the lowest point of 18.6 thousand tonnes and a value of EUR 27.3 million (Figs. 1 and 2). But soon a gradual increase occurred and eventually production was higher than in the eighties. In the late 1980s, inland aquaculture in Poland produced about 20 thousand tonnes of carp and 4 thousand tonnes of trout. In 2016, the total volume of the sector increased to over 35 thousand tonnes, including 18 and 16 thousand tonnes of the two groups of species and above 1 thousand tonnes of other fish (Fig. 1). This is 94% of total commercial catches of inland fish and about 15% including sea fishing (Hryszko, 2017; GUS, 2018).

This success of Polish aquaculture would have been impossible without gradual adaptation to a market economy, new legal regulations and environmental requirements that are important components of a sustainable aquaculture system (Fig. 3).

The two main sections of Polish aquaculture are quite different. Carp farming has positive ecological impacts (Turkowski and Lirski, 2011) but there is problem with its economic viability. The profitability of this sector should be increased by an average of 10% through financial support for income diversification (Ministerstwo Rolnictwa i Rozwoju Wsi, 2015).

Intensive trout farming may have, if not properly handled, a negative impact on the quality of water. Basic adaptation processes were initiated by technological changes in fish nutrition. Since 1992 extruded feed began to replace wet feed. The use of balanced feed resulted in a number of positive consequences (SPRŁ, 2013):

- the quality of fish meat has improved,
- fish has been growing faster,
- health and conditions of fish have improved,
- the level of organic and chemical waste has decreased significantly,
- anticipation and management of production has become easier.

As a result, national production of trout reached 10 thousand tonnes in 2000 (Fig. 1). Next, the increase in production to 12–17 thousand tonnes, starting in 2004, was the result of other technological developments (SPRŁ, 2013):

- water aeration and oxygenation,
- water full or partial recirculation.

Thanks to the applied solutions, intensive trout farming not only significantly reduces the potential negative impact on the environment but also supports self-cleaning of waters from pollution outside the aquaculture system.

The key challenges in the Polish aquaculture sector is significant production growth to 49 thousand tonnes by 2020; this includes a growth of 20 thousand tonnes from earth extensive ponds and 29 thousand tonnes from intensive fish production facilities (Ministerstwo Rolnictwa i Rozwoju Wsi, 2015). This forecast assumes a wide application of new technologies, such as recirculation aquaculture systems (RAS). These high intensive systems are designed to minimize water consumption, control culture conditions and allow waste streams to be fully managed. They can also provide some degree of biosecurity through measures to isolate the stock from the external environment. EU funds play a significant role in the im-

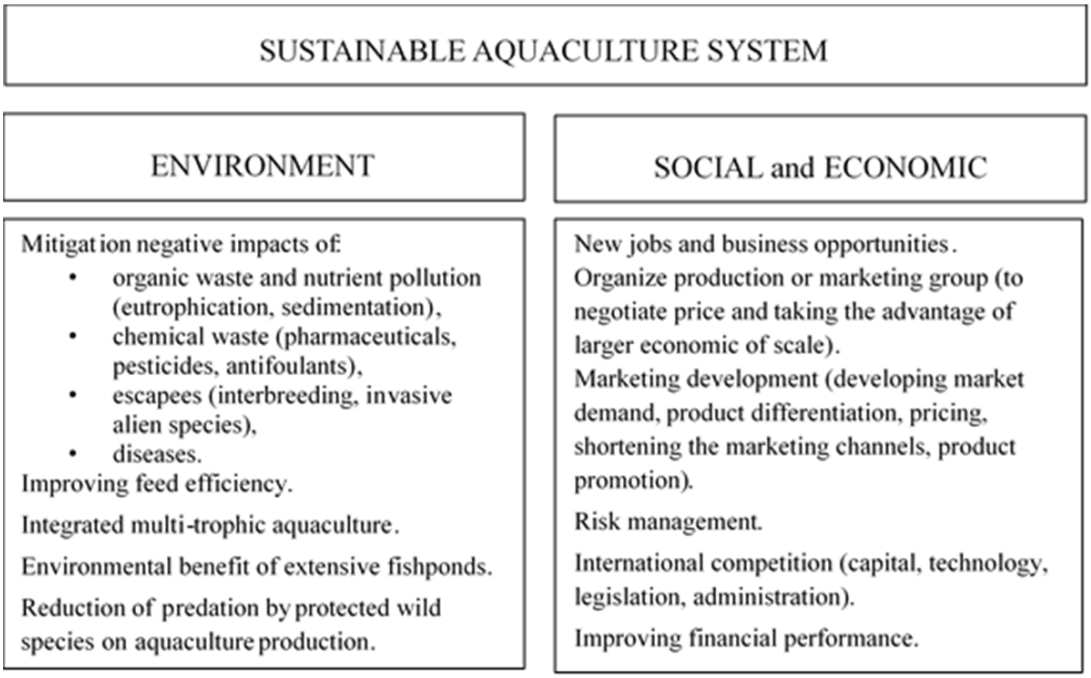

Figure 3. Main components, aspects and problems of the sustainable aquaculture system

Source: own elaboration based on Jeng (2002) and Science for Environmental Policy (2015).

plementation of these modern projects in Poland. In 2012, the largest and most modern fish farm in the country, a closed-circuit water system, was opened in the village of Bońki near Płońsk (Indoor RAS – Poland, 2018). The project was financed with the participation of the European Fisheries Fund (EFF). Another example is salmon fish eco-farm Jurassic Salmon Sp. z o.o. This project was co-financed from public funds of EUR 5.7 million, including EUR 4.2 million from the UE (Jurassic Salmon, 2018).

CONCLUSIONS

World aquaculture has grown at an impressive rate over past decades. It has helped to produce more food fish, kept the overall price of fish down, and made fish and seafood more accessible to consumers around the world. Current production of Polish aquaculture is about one and a half times higher than before the political and economic transformation in the late eighties. What is especially noticeable is the fourfold increase in the production of trout. Efficient adaptation to new market and environmental requirements was possible thanks to timely and effective privatization of fish farms. This made it possible to carry out repairs and modernization. The market economy has forced the efficient use of resources and reasonable investment. According to the national plan for development of sustainable aquaculture production, volume should increase by 53% in 2020. Freshwater fish farming should maintain extensive carp production and double the intensive production volume. Under the Operational Programme 'Fisheries and the Sea 2014–2020' almost EUR 269 million (twice as big an allocation as in the previous programming period) was planned to support the development of aquaculture production. There is also emphasis on extensive aquaculture providing environmental services.

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THE GREY WATERFOOTPRINT OF CATTLE GRAZING: A CASE OF STUDY FOR ITALY

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ABSTRACT

Water footprint accounting has contributed to show that livestock production, and dairy production in particular, have a non-negligible impact in terms of freshwater appropriation (Palhares and Mezzopane, 2015). In this line of research, Allocca et al (2018) have contributed to the scientific debate pointing out that livestock grazing can have a substantial effect in terms of the environment-related grey water footprint (GWF_{env}) originating from microbial contamination. However, cattle grazing can be a source of contamination also for chemical parameters, precisely nitrate, nitrite and ammonium. Albeit the microbial impact of cattle grazing has been documented by Allocca et al. (2018), they did not take into account possible consequences of the grazing activity in terms of chemical contamination, namely nitrates. This aspect is worth to be examined, since nitrates are important parameters to be evaluated when establishing guidelines for protecting aquatic life and/or ambient water quality for recreation use.

Keywords: grey water footprint, cattle grazing, microbial contaminant, karst aquifer, southern Apennines, Italy
JEL codes: Q25, Q26, Q57

INTRODUCTION

Mountain areas are source of important ecosystemic services; in southern Italy, karst Apennines reliefs are among the most important provider of ecosystemic services, and several regional parks have been established there to preserve their natural capital services. Regulation of park areas establish severe restrictions to productive activities that can occur there. One of the allowed production is cattle grazing.

The main goal of this article is to demonstrate that the approach of preserving ecosystemic services by means of simple regulation might not be enough to guarantee a full preservation. Precisely, in this article

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we examine the polluting impact of cattle grazing in karst environment, and we quantify its sustainability in terms of grey water footprint.

Following Allocca et al. (2018), we examine a case of study in a karst environment. Water uses documented in the area of study refer to in-stream uses, namely cattle grazing and recreational activities such as picnicking by the stream, that can be easily extended to other environment with similar geological characteristics. Differently from the evidence provided by Allocca et al. (2018), here we show that when chemicals contamination is taken into account, the recreational fruition of the study area can be at risk in presence of cattle grazing.

THEORETICAL BACKGROUND

It is widely acknowledged that livestock farming is among the major anthropogenic sources of inorganic nitrogen in aquatic ecosystems along with the use of animal manure as fertilizer. As to this latter, Seeling and Nowatzki (2001) recommend as a good management practice, to use dry manure in sandy or gravelly soils that overlay shallow groundwater, because NO_3 dissolved in water can readily leach through the soil profile into groundwater. However, a less debated topic is the effect of nitrogen leaching originated by cattle grazing. In waterfootprint literature, grazing systems, compared to conventional farming, have a lower impact in terms of direct water footprint related to the service water consumed (Mekonnen and Hoekstra, 2012). As a matter of fact, existing water footprint (WF) accounting for livestock finds the main contribution from the green component of WF (Mekonnen and Hoekstra, 2012; Gerbens-Leenes, Hoekstra and Mekonnen, 2014), with the grey component taking a negligible measure. When coming to studies focusing on dairy production systems the grey component becomes important, especially for its possible impact in terms of eutrophication (Palhares and Mezzopane, 2015).

The present research starts from the evidence provided by Allocca et al. (2018) as regards to the environment-related grey waterfootprint (GWF_{env}) of cattle grazing in karst environment, precisely in the study area Acqua della Madonna, Terminio mount, southern Italy. Differently from previous literature that has investigated the waterfootprint of livestock, suggesting that cattle grazing has a limited impact in terms of grey waterfootprint, Allocca et al. (2018) find that there is a non-negligible effects due to microbial contamination, precisely fecal coliforms. In addition to a methodological contribution as concerning the animal footprint, the GWF_{env} examined by Allocca et al. (2018) has the implication of rising valuable recommendations to local authorities a in order to preserve the bacterial quality of groundwater in the karst study area of the Picentini Mounts Regional Park.

MATERIALS AND METHODS

The study area and data

The Acqua della Madonna test site (Campania, southern Italy) lies at an altitude of about 1,200 m a.s.l. in the central sector of the Mt. Terminio karst aquifer and the Picentini Regional Park. The site holds a compartmentalised karst groundwater body, feeding several high-altitude springs. The sub-basin of spring S2 (Fig. 1) is of prime interest for this study, since it contains a small endorheic karst plain where grazing occurs.

Daily precipitation were recorded by a meteorological station for the period from September 2001 to October 2002. For the same period, the discharge of spring S2 was measured weekly or daily by means of a flow meter (SIAP-MICROS Inc., Italy). All the discharge measurements were taken at the outlet of the spring. Water samples for chemical analyses were collected weekly or daily at spring S2 to measure the concentration of nitrate and nitrite (mg/l).

Environment-related grey water footprint

Environment-related grey water footprint (GWF_{env}) represents virtual water needed to absorb the contamination loading originating from cattle grazing. Of course, to calculate the *GWF* in general, and the GWF_{env}, in particular, it is necessary to establish which pollutant is under consideration. In our case we consider NO_2 (nitrite). Thanks to intensive monitoring of water volumes and pollution concentrations,

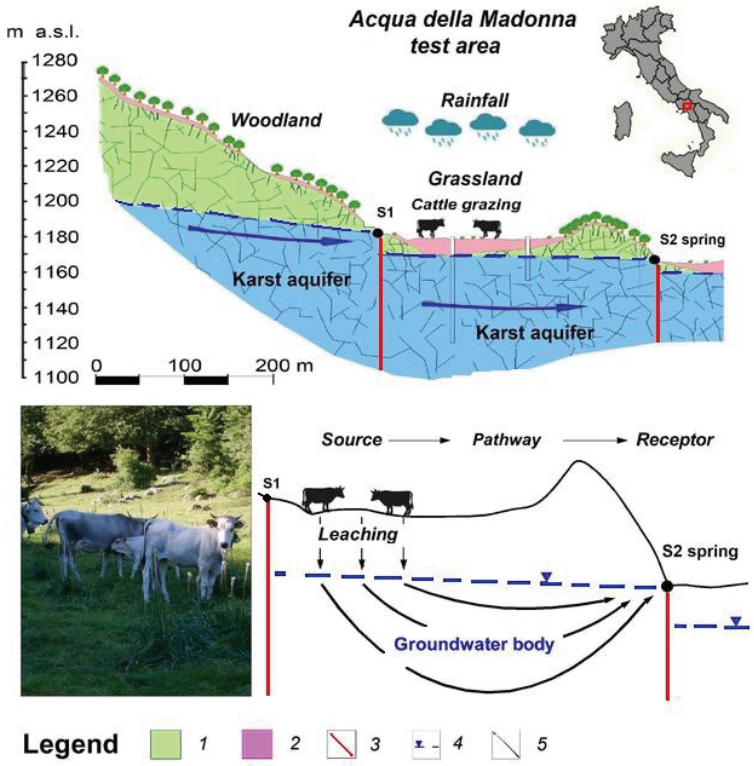

Figure 1. Hydrogeological section of Acqua della Madonna test area and source-pathway-receptor conceptual model for the mechanism of chemical contamination of the groundwater body and S2 spring: 1 – limestone karst aquifer; 2 – pyroclastic-fall deposits; 3 – faults; 4 – water table level; 5 – groundwater flow direction

Source: Allocca et al. (2018, modified).

we can measure GWF_{env} directly from the observed volume of freshwater flowing during the period of contamination. Adapting the modelling of the environment-related grey water footprint recommended by Allocca et al. (2018), we get:

$$GWF_{env} = \frac{Q^*_{(\mathrm{l/s})}\left(\sum_{j=t}^{T} N_{j\,(\mathrm{mg/l})}\right)/T}{\left(N_{\max} - N_{nat}\right)_{\mathrm{mg/l}}}(\mathrm{l/s}) \qquad (1)$$

where:

Q^* – average level of nitrite measured during the interval of contamination;

t – the first week of contamination, that is the first week during which the concentration of nitrite N_j exceeds the threshold $N_{\max}$;

T – the last week of observed contamination.

For this study we adopt as maximum acceptable concentration the standard provided by the *GWF* guidelines 0.06 mg/l, which is based on the guideline for the protection of aquatic life as proposed by the Canadian Council of Ministers of the Environment. As to the level of natural concentration of nitrite, N_{nat}, it has been set to 0.01 mg/l.

RESULTS AND DISCUSSION

If we compare two different periods for which we have a daily monitoring, late 2001 and mid-2002, we get the idea of which are the drivers of chemical contamination: effective rainfall and discharge. The higher the discharge, the more chemical contamination is detected in the water sampled (Fig. 2). In both periods, cattle grazing was absent, however, from the

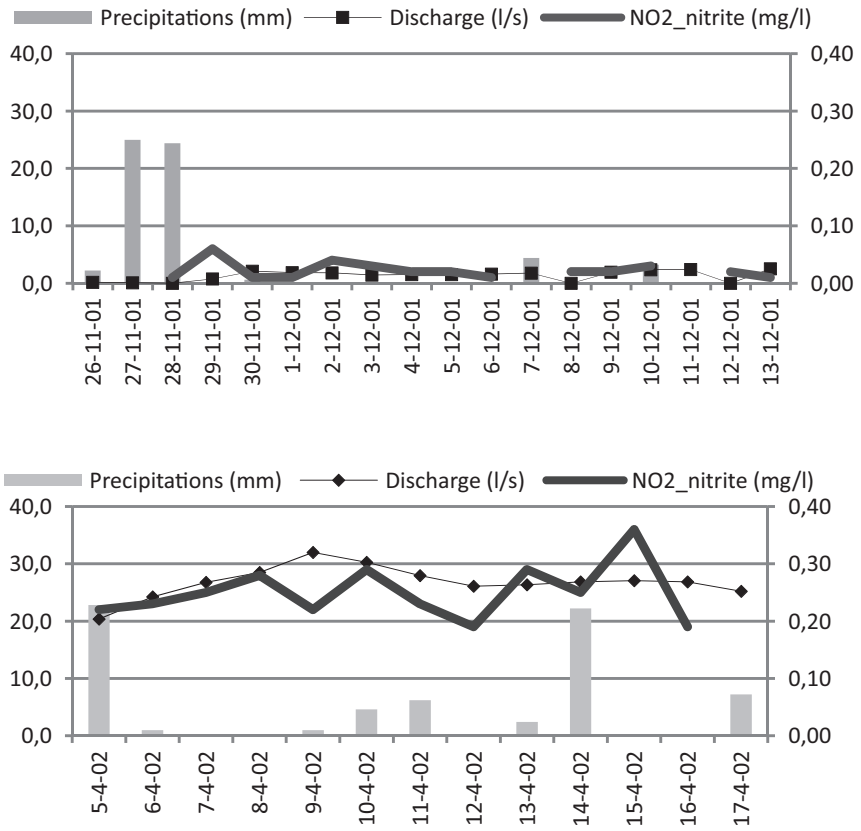

Figure 2. Nitrites contamination at spring S2 (right axis), precipitation and S2 spring discharge (left axis). Interval of monitoring: top graph November 2001; bottom graph April 2002

Source: author's monitoring and Allocca et al. (2008).

Table 1. Environment-related grey water footprint accounting

Specification	Episode 1	Episode 2	Episode 3	Episode 4	Episode 5	Total
Discharge (l/s)	0.321	0	0.752	25.6	14.0	–
Nitrate (mg/l)	0.22	0.17	0.06	0.20	0.61	–
Duration (weeks)	01	01	01	08	01	12
GWF_{env} (m^3/cattle)	2.85	0	1.82	1683	342.4	2 030

Source: authors' monitoring and Allocca et al. (2008).

data presented on the bottom graph we see that NO_2 contamination is quite high, and above the 0.6 mg/l concentration (the ambient water quality standard recommended by Franke, Boyacioglu and Hoekstra, 2013), whereas in the top panel either discharge and chemical concentration are flat in proximity of zero contamination.

By appropriately using Equation (1) to measure the *GWF*, we get the following Table 1, where the estimated *GWF* amounts to about 2,030 m^3 per unit of cattle.

CONCLUSIONS

The local authority of the Picentini Mounts Regional Park (one of the largest Regional Parks in Italy), once aware of these water footprint accounts, would be faced with the need to intervene to control the negative effect that cattle grazing ingenerates on water quality. Since in-stream actions can affect and be affected by water quality, in the case of study the ambient quality of water is the relevant measure to take into account. This evidence also suggest that the approach of preserving ecosystemic services by means of simple regulation might not be enough to guarantee a full preservation. A very simple and easy to adopt policy to preserve ambient quality of water is to introduce restrictions to cattle grazing, imposing cleaning activity of the endorheic plane.

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LOW-CARBON ECONOMY PLANNING IN THE PUBLIC SECTOR

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ABSTRACT

The article presents the results of analysis of low carbon economy planning in public administration, as well as technological and non-technological solutions present in Poland and the EU. The review of documentation, being a formal basis for dealing with problems by public administration and local authorities, and the analysis of sample programmes and plan indicate that the main determinant of low carbon economy development in Poland is the state of the natural environment, particularly air quality and availability of financial support for investments, which is dependent on the possession of specific planning documents. Technological solutions are economically verified as network parity, which indicates the importance of organizational, fiscal and financial solutions.

Keywords: general regional economics, alternative energy sources, government policy
JEL codes: R10, Q42, Q48

INTRODUCTION

Low carbon economy, also called decarbonisation, assumes the use of low emission energy sources and the limitation of greenhouse gas emissions, CO_2 in particular, the reasonable management of resources, also in circular economies, and energy efficiency. The initial background for a low-carbon economy are climate changes (United Nations Framework Convention on Climate Change – UNFCC) and the steady move away from use of traditional, fossil fuels to alternative fuels (OECD, 2010).

Low carbon economy also links to the concept of sustainable development, which is carried out by activities such as the improvement of air quality, the development of energy saving solutions and renewable energy technologies (RES), the promotion of material efficient manufacturing and industrial processes as well as ecological education, including professional and social education (Bednarski et al., 2017). The European Commission claims that 'climate change has long been recognised as one long-term shaping factor where coherent EU action is needed, both inside the EU and internationally' (European Commission, 2011a).

The problem included in the article is low-carbon economy planning in public administration on regional (voivodship) and local (community) levels. The issue is important also from a pragmatic perspective, as it is related to eligibility criteria for funding investment in 2014–2020 from the Operational Programme Infrastructure and Environment, and the influence of clean air on health and life quality. The issue of low emission has a negative impact in this context.

The term low carbon emission pertains to emissions from transport as well as those caused by local coal-based heating systems and individual home boilers. It is assumed that low emission is caused by

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all chimneys up to 40 m of height, that is most building houses, communal and public buildings.

The financial perspective for 2014–2020 is the last Poland can use for supporting infrastructural investment. The role of emission criteria grows when selecting investment and technological solutions, and defining public investment policies. However, having the Low Emission Programme by a community is a required condition for funding investment in the Operational Programme Infrastructure and Environment 2014–2020 within priorities linked to climate protection[2].

The article aims at reviewing and analysing issues linked to the low-carbon economy from the perspective of planning duties in public administration as well as technological and social challenges.

The scope of work includes the review of main EU strategies, national and regional (voivodeship) ones as well as an analysis of low-carbon technologies in the EU and Poland within sectors.

LOW CARBON ECONOMY IN STRATEGIES AND REGULATIONS

The main EU strategic documents are: 'A Roadmap for moving to a competitive low carbon economy in 2050', 'Energy Efficiency Plan 2011'. From the financial perspective 2014–2020, according to rules by the European Regional Development Fund, member states are obliged to spend part of financial means on low-carbon projects. The quota for more developed regions has to be higher than 20%, for regions in transition – higher than 15%, and more than 12% for less developed regions[3].

For respective voivodeships, the following national strategies have to be mentioned: Energy Policy Poland 2030 (Ministerstwo Energii, 2009), National Spatial Development Concept (Resolution No 239 of the Council of Ministers) and Regional Operational Programmes (RPO) 2014–2020.

The main national regulations refer to the legal functioning of communities: Act on local government, Environmental protection law, Act on access to information about the environment and its protection, public participation in environmental protection and environmental impact assessments, Act on spatial planning and development spatial planning and Construction Law. Issues linked with fuel and energy are: Energy Law, Act on Energy Efficiency, Act on renewable energy sources and Act on electromobility and alternative fuels. Moreover, local regulations as detailed by regional operational programmes[4], local low-emission programmes (PGEs) and programmes for limiting low-emissions (PONEs) are of significant importance.

TECHNOLOGIES IN A LOW-CARBON ECONOMY

International Energy Agency prognosis (IEA, 2010, 2017a; b) indicates that among RES solutions currently available, only photovoltaic, on-shore wind and electric cars are technologically and commercially advanced enough to be used in energy transformation. By commercial maturity, we understand the ability to compete with conventional solutions as reaching grid parity, when commercialization is based on pure market rules, without subsidies and public subsidies.

Other low carbon technologies still need more research and development. Thus, non-technological

[2] Sample investment of low-emission are thermo-modernization of buildings, development of utilization of RES and development of public transportation.

[3] Polish territory has a diversified state of regional development and the share of investment for low carbon economy applications is 12.5% from EUR 9,198,911,747.

[4] In Voivodeship Operational Programmes, low carbon economy is linked with the following actions: (1) support for generation and distribution of RES energy (15 voivodeships); (2) promotion of energy efficiency and using RES in companies (12 voivodeships); (3) support for energy efficiency, intelligent energy management systems and using RES in public buildings and private buildings (16 voivodeships); (4) promotion of low emission strategies for all territories, urban areas, including support for sustainable urban mobility and adaptation (16 voivodeships); (5) increase of energy from cogeneration (4 voivodeships). The Lower Silesia region has additional funding possibilities (Wysoglad, 2017).

solutions, resulting also indirectly in reducing emissions are more significant, e.g. outsourcing energy issues to specialized energy service companies, using energy performance contracts.

Sample organizational, fiscal and financial mechanisms, aimed at supporting the reduction of emissions and support decarbonisation are:

- Systems of fees to reduce traffic congestion and pollutants, fees for using transport infrastructure.
- Intelligent spatial planning and development of public transportation, limiting emissions from road transportation, rail and mainland water transportation.
- Emission limits of CO_2.
- Taxation systems considering environmental issues.
- Introduction of legal requirements of energy standards for public buildings.
- Development of the international emission trade system (European Commission, 2011a; Bednarski et al., 2017).

Table 1 summarizes technological and non-technological solutions on a general EU level and detailed solutions customized for Poland (according to economic conditions, technical infrastructure and natural conditions), with sample applications.

Table 1. Innovative solutions in a low-carbon economy

European Union	Poland	
	solution	sample application
1	2	3
Sector: energy		
renewable energy sources (wind, Sun, biomass, heat pumps) intelligent grid, carbon capture and sequestration	modernization of the National Energy System (refurbishment of 200 MW energy blocks modernization of transmission and distribution networks) implementation of highly efficient CHP development of RES continuous improvement of energy efficiency	programme led by the National Center for Research and Development dedicated, particularly, to energy blocks of 200 MWe class essential acts on RES and energy efficiency project of the Act on the promotion of electricity generation in high-efficient CHP
Sector: transportation		
improvement of energy efficiency in the automotive industry alternative fuels alternative fuels for advanced powertrains (electric, hydrogen, fuel cells)	first generation biofuels intermodal transportation electromobility urban Traffic management development of infrastructure supplying electric cars	set of regulations dedicated to biofuels and alternative fuels promotion of the smart city concept low-carbon economy plans the Act on Electromobility and Alternative Fuels

Table 1 – cont.

European Union	Poland	
	solution	sample application
1	2	3
Sector: industry		
application of advanced resource and energy efficient processes and machines in industry recycling materials	limiting emission in the cement sector energy efficiency in chemical and steel industries development of auto-generations in energy-intensive enterprises	legal obligation for energy audits in companies criteria for using best available technologies (BAT)
Sector: buildings		
Increasing energy performance standards for buildings 'intelligent' buildings with near zero-energy balance using RES technologies integrated with buildings implementing energy saving equipment and installations local district heating	systematically increasing energy performance for buildings new materials and construction technologies new zero-energy buildings Implementing RES	Promotion of Building Energy Management systems, optimizing energy utilization Support for modernization the New Energy Efficient Act and its role for buildings
Sector: agriculture		
improvement of fertilising management biogasification improvement of feed promotion of extensive agronomy and agriculture sustainable improvement of productivity carbon sequestration in soil and forest areas production of liquid biofuels	low carbon agronomy methods waste management including the development of biogas	dedicated support for agricultural biogas plants in the novelization of the RES act, including the implementation of a dedicated support scheme and preferences in the auction system

Source: own elaboration based on: European Commission (2011b); Mazurkiewicz and Pająk (2014); Ministerstwo Gospodarki (2015); Bednarski et al. (2017), IEA (2017c); Ministerstwo Energii (2017).

CONCLUSIONS

National planning documents and legal regulations of a low-emission economy are convergent and closely related to EU policy. The programmes incorporated by public administration authorities in Poland refer to general regulations in the field of environmental protection, spatial planning, sharing information and domain areas. The basic planning documents for municipalities are Low-Emission Economy Plans, which complement other documents in the field of environmental protection (Air Protection Plans, Low Emission Reduction Plans).

Photovoltaic technologies, onshore wind energy and electric vehicles are considered to be the most developmental in the field of renewable energy sources. Organizational, financial and fiscal solutions, which limit emissions, include energy efficiency and financing mechanisms for low-emission investments. The significance of the maturity of RES technologies in terms of grid parity, economic competitiveness with conventional sources, achieved without subsidies and other forms of support, are also growing.

Regional Operational Programmes of voivodeships provide investment support in the field of a low-emission economy in the financial perspective of 2014–2020 in the scope of: generation and distribution of energy from renewable sources, including high-efficiency cogeneration, energy efficiency in public buildings, the housing sector and enterprises. Local activities are recommended, which are decided on by local governments, especially in urban areas focused on mobility and adaptation activities.

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IDENTIFICATION OF FUNCTIONAL TYPES OF RURAL COMMUNES IN POLAND

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ABSTRACT

The aim of the research was to identify the functional structure of rural communes in Poland. The functional types were further characterized and spatially delimited. The research drew on 2015 data from the Central Statistical Office database, Local Data Bank and statistical yearbooks: 'Voivodship, subregions, poviats and communes'. Identification of functional types of rural communes in Poland employed a structural approach that classifies an administrative unit according to its prevalent social and economic functions. The optimal number of typological classes was first determined from the dendrogram produced by the Ward's method. Then, the *k*-means method was employed to perform the actual classification.

Keywords: rural communes, functional types of rural communes, Ward's method, *k*-means method
JEL codes: R1, C38

INTRODUCTION

Rural development issues received much attention after Poland's entry into EU (Bański, 2014a; Hadyński, 2015; Heffner and Klemens, 2016; Kozera 2017). Of particular importance in this respect was the research conducted by the Institute of Rural and Agricultural Development (Monitoring Rural Development 2016), and by the Foundation for the Development of Polish Agriculture (Wilkin and Nurzyńska, eds., 2016). This interest is dictated by the simple fact that rural areas cover over 90% of the country's total area and are home to over 30% of the total population[3].

Communes, as the lower tier of local administrative units, can be divided into three administrative types: urban, rural or mixed urban-rural. In 2015 there were 2,478 communes in Poland, of which roughly 63% were rural and 13% urban[4]. The basic functions of rural communes were still related to agriculture, though driven by social and economic changes many rural communes were in the process of transformation from typically agricultural to multifunctional, mainly residential and service oriented (Kozera and Wysocki, 2015). This functional mix is the fundamental benchmark for rural communes typology viewed as a prediction tool for their growth potential. Identification of their functional structure is then not only of a cognitive merit, but also has applicative values. As Śleszyński points out (2012), it allows for more effective management through the use of rural areas

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[3] Local Data Bank webpage https://bdl.stat.gov.pl/BDL/dane/podgrup/temat [Accessed 05.05.2017].
[4] Ibidem.

specific resources and assets, which in turn determine the character of its social and economic development. It is the reason why modern principles of regional development policy-making, that inform both EU and national policy documents, place such emphasis on research of territorial units in terms of their natural and socio-economic specificity. A synthetic classification of their individual characteristics may be of paramount importance for programming appropriate policy measures (Bański, 2014b). The classification of rural areas in Poland in terms of the level and dynamics of their socio-economic development is covered by many studies, including Rosner (2007), Stanny (2013), Rosner and Stanny (2016).

The aim of the research was to identify the functional structure of rural communes in Poland. The functional types were further characterized and spatially delimited.

MATERIALS AND METHODS

The research drew on 2015 data from the Central Statistical Office database, Local Data Bank and statistical yearbooks: 'Voivodship, subregions, poviats and communes' (GUS, 2015). Identification of functional types of rural communes in Poland employed a structural approach that classifies an administrative unit according to its prevalent social and economic functions (Dijkstra and Poelman, 2008; Bański 2014b). The research was carried out in four stages:

Step 1. Selection of simple features describing functions performed by communes (functional types). The selection was motivated by the perceived merit of the features in describing residential, industrial, commercial, agricultural and tourism functions (Table 1). An initial set of draft features was subjected to statistical scrutiny for their information gain (through VIF threshold approach to collinearity) and discriminatory ability (by removing features with little variability). As a result features x_3, x_5, x_7 and x_8 were omitted from further analysis.

Step 2. Normalization of simple features – by classical standardization (Wysocki, 2010).

Step 3. Rural communes' classification by Ward's and *k*-means methods. The functional classification of rural communes was carried out using two cluster analysis methods: Ward's and *k*-means. Cluster analysis attempts to group objects into classes (clusters) in such a way that objects in the same cluster are more similar to each other than to those in other clusters. This creates a set of fairly homogeneous classes that are dissimilar between each other (Migut, 2009). In this step, the optimal number of typological classes was first determined from the dendrogram produced by the Ward's method. Then, the *k*-means method was employed to perform the actual classification.

Step 4. Identification of functional types, their characterization and spatial distribution. Interpretation of the classes created in the previous step required that relevant features for each class were properly identified. First, class means and standard deviations were calculated for each feature. As all were measured on ratio scales, pseudo-test of mean differences could be used (Wysocki, 2010):

$$t_{ck} = \frac{\overline{x}_{ck} - \overline{x}_k}{s_{ck}}$$

Like in the classical t-test, the pseudo-test t-statistics measures the distance from the *c*-th class mean $\overline{x}_{ck}$ to the overall mean $\overline{x}_k$ and expresses the distance in the class mean's standard error units s_{ck}. The variance of the class mean is given by the formula:

$$s_{ck}^2 = \frac{N - N_c}{N - 1} \cdot \frac{s_k^2}{N_c}$$

where:
s_k^2 – (total) empirical variance of the *k*-th feature;
N_c – size of the *c*-th class;
N – number of objects.

The larger the absolute value of the t-statistics the more relevant is the feature to a given class. The degree of this relevance can be categorized by the following benchmarks (Wysocki, 2010): if the absolute value exceeds 3, the feature is considered highly relevant, if it falls between 2 and 3 – moderately relevant, and if smaller than 2 – the feature is regarded as irrelevant. The highly relevant features to a given class were taken to identify main functions performed by the class communes, and gave that class its functional name.

Table 1. Simple features describing functions performed by communes

Designation	Feature name
Residential functions	
x_1	Population density per km^2
x_2	Population change per 1,000 inhabitants (for 2013–2015)
x_3	Non-working age to 100 of working age population ratio
x_4	Post-working age to 100 of pre-working age population ratio
x_5	Post-working age to 100 of working age population ratio
x_6	Residential in urbanized area (%)
x_7	Dwellings per 1,000 inhabitants
Industrial/Commercial functions	
x_8	Urbanized area (%)
x_9	Industrial and mining in urbanized area (%)
x_{10}	Registered business enterprises per 10,000 inhabitants
x_{11}	Newly registered business enterprises per 10,000 inhabitants
x_{12}	Enterprises employing over 50 persons per 10,000 working age inhabitants
x_{13}	Industry workers per 100 working age inhabitants
Agricultural functions	
x_{14}	Individual farmstead workers per 100 working age inhabitants*
x_{15}	Agricultural holdings with area of over 15 ha (%)
x_{16}	NPK fertilizer consumption in kg per UAA ha
x_{17}	Large livestock per 100 UAA ha
x_{18}	Agricultural area (%)
Tourism functions	
x_{19}	Accommodations per 1,000 inhabitants
x_{20}	Land under the waters area (%)
x_{21}	Forest area (%)

* Own estimates taking into account persons working on individual farmsteads (on average two persons per farmstead).

Source: own elaboration.

RESULTS

Functional classification of rural communes in Poland produced five typological classes, whose spatial distribution is presented in Figure 1. Table 2 shows class means of simple features together with designations of feature-to-class relevance levels (highly positive or highly negative) computed from the criteria of the pseudo-test of mean differences.

Rural communes perform primarily the basic function of rural areas, that is agriculture. In 2015 nearly half of all rural communes were of two purely

Table 2. Class mean values of simple features and relevance of features across typological classes of rural communes in Poland

Specification	Typological class					Overall
	I	II	III	IV	V	
	agricultural intensive	multifunctional	agricultural extensive with growing residential	agricultural extensive	residential/ /industrial	
Percentage of communes (%)	26.0	18.0	27.3	23.5	5.2	100
Residential functions						
Population density per km^2	43.0^N	63.5	69.1^P	42.7^N	242.0^P	51.6
Population change per 1,000 inhabitants (for 2013–2015)	–8.4^N	15.5^P	1.7^P	–18.5^N	28.5^P	–3.6
Post-working age to 100 of pre-working age population ratio	86.6^N	75.3^N	87.3^N	118.7^P	79.6^N	90.1
Residential in urbanized area (%)	8.1^N	17.5^P	9.4	1.7^N	37.9^P	8.7
Industrial/Commercial functions						
Registered business enterprises per 10,000 inhabitants	599.8^N	871.1^P	641.6^N	512.8^N	1 078.2^P	638.2
Newly registered business enterprises per 10,000 inhabitants	56.7^N	84.9^P	62.8	44.2^N	87.0^P	60.0
Enterprises employing over 50 persons per 10,000 working age inhabitants	3.2^N	7.0^P	2.9^N	2.7^N	8.5^P	3.8
Industry workers per 100 working age inhabitants	1.5^N	6.9^P	2.8^N	0.0^N	8.6^P	2.5
Industrial and mining in urbanized area (%)	2.0^N	4.2^P	2.0^N	0.7^N	3.7^P	2.0
Agricultural functions						
Individual farmstead workers per 100 working age inhabitants	45.9^P	24.5^N	50.6^P	65.2^P	14.8^N	44.3
Agricultural holdings with area of over 15 ha (%)	23.5^P	11.7	2.0^N	7.5^N	1.7^N	9.1
NPK fertilizer consumption in kg per UAA ha	152.3^P	105.8^P	46.7^N	104.3	75.3^N	101.0
Large livestock per 100 UAA ha	67.8^P	46.3	30.5^N	34.3^N	23.6^N	42.9
Agricultural area (%)	75.6^P	56.7^N	60.6^N	77.2^P	64.7^N	69.3
Tourism functions						
Land under the waters area (%)	0.5	1.4^P	0.7^N	0.3^N	0.6	0.6
Forest area (%)	17.7^N	32.7^P	33.2^P	18.9^N	17.8^N	23.2
Accommodations per 1,000 inhabitants	0.0^N	6.5^P	2.9^N	0.0^N	3.4	0.0

Designation of feature-to-class relevance: *P* – highly relevant and positive, *N* – highly relevant and negative

Source: own elaboration based on Central Statistical Office data.

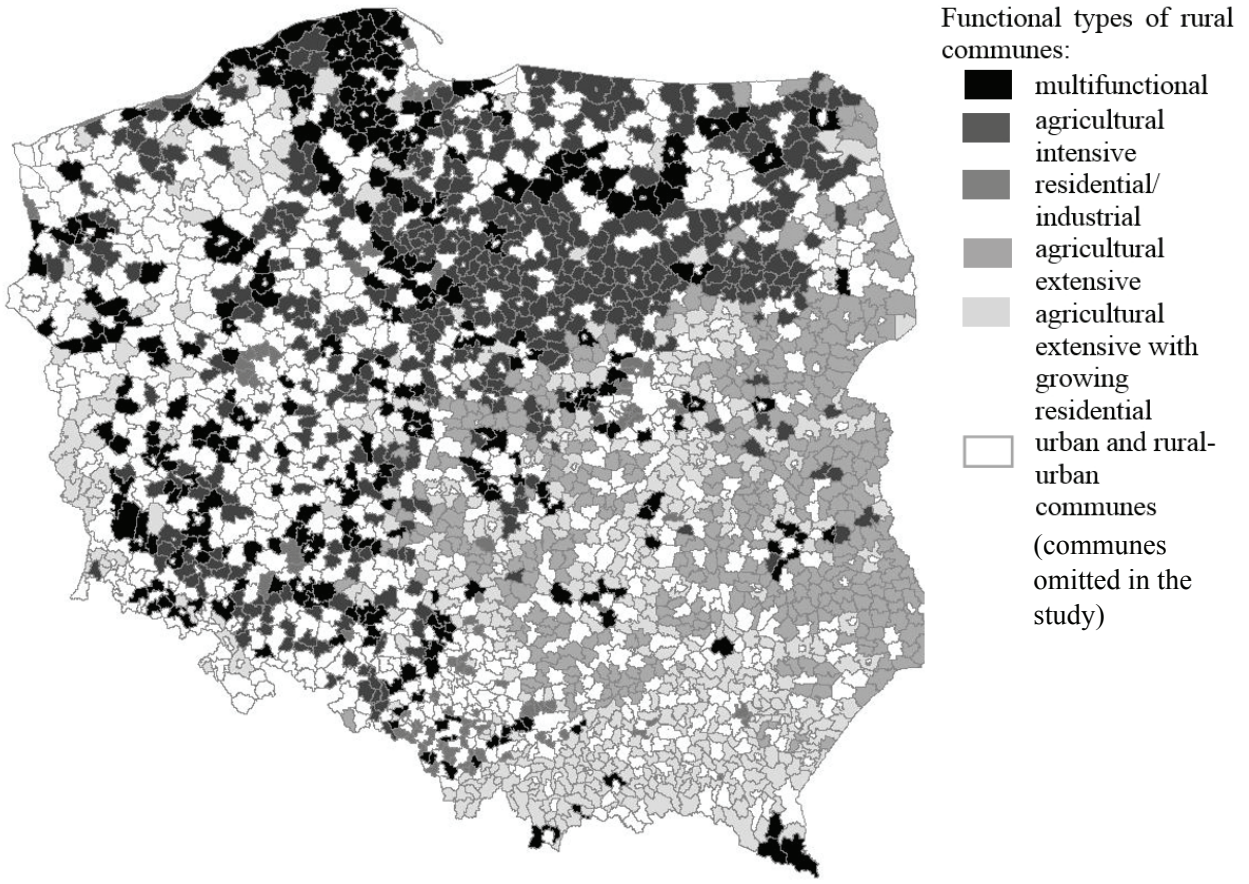

Figure 1. Spatial delimitation of functional types of rural communes in Poland in 2015

Source: own elaboration based on Central Statistical Office data.

agricultural types: intensive (Class I) – 26%, and extensive (Class IV) – 23.5% (Table 1). These communes were located mainly in the north-eastern part of the country (intensive agricultural type) and in the mid-eastern (extensive agricultural type) (Fig. 1). Their most relevant features were related to agricultural activity (Table 2), and for class IV characterized by high number of individual farmstead workers (65.2), high share of agricultural area (72.2%), low percentage of over 15 ha agricultural holdings (7.5%), and small number of large livestock (34.3). In this class processes of depopulation and aging could be observed. Relevant features of this class were high negative population change (–18.5) and high post-working age/pre-working age population ration (118.7) – Table 2.

On the other hand, the communes forming Class I (intensive agricultural) were characterized by the large percentage of over 15 ha agricultural holdings (23.5%), high NPK consumption (152.3) and high number of large livestock (67.8). Rural communes of this class were also affected by depopulation, but to a much lesser extent than those of Class IV. Class III communes (agricultural with growing residential functions) constituted over one fourth of all rural communes (27.3%) and were located mainly in the south-eastern part of the country (Fig. 1). Relevant and positive features of this class were high population density (69.1) and population growth (+1.7), but more than half of the working age population still worked on individual farms. Interestingly, these communes had also high share of forest area (33.2%) (Table 2).

Nearly every fifth rural commune (18.0%) belonged to the second class of multifunctional type. These communes were located mainly in the northern and western part of the country (Fig. 1). Relevant features of this class were low number of individual farmstead workers (24.5), positive and large population change (15.5) and development of industrial and commercial functions: high number of registered enterprises (871.1), of large enterprises (7.0), and industrial workers (6.9). In these communes, in particular in the northern part of the country, the tourist function was also developing, as evidenced by high number of accommodations (6.5) – Table 2.

The residential /industrial communes (Class V) represented only 5.2% of all rural communes. They had lost their typically rural, agricultural character. Residential, industrial and service-oriented functions were performed by rural communes located in the vicinity of large urban centers such as Warszawa, Poznań, Katowice and Kraków. They were characterized by relevant features related to suburbanization processes: very large population change (28.5) and density (242), high number of registered enterprises (1,078), and high number industry workers (8.6) (Fig. 1, Table 2).

CONCLUSIONS

The idea of multifunctional rural growth model assumes a gradual shift from exclusive agriculture-based development towards diversification with non-agricultural functions, such as residential, commercial, transportation, service and tourism. Such model is to promote entrepreneurship and put the local economy on a more robust and sustainable development path and, as a result, improve the quality of life of the inhabitants.

Empirical research showed that agriculture remains the basic function of rural communes in Poland. Half of the communes still perform mainly agricultural functions, characteristic of either extensive or intensive agriculture. In 27%, alongside extensive agriculture residential functions have been developing. Only 5% of rural communes have lost completely its agricultural character and perform typically residential or industrial functions, while 18% are distinguished by multifunctional development.

One of the most important results of the research is the confirmation of regional diversification in the scope of performed functions, especially between rural communes located in the eastern and western part of Poland. In eastern rural communes dominates the mono-functional character of local economy, with intensive agricultural functions in the north-east and extensive ones in the mid-eastern part of the country. Extensive agricultural model with developing residential functions predominates in the south-eastern regions, and multifunctional development is observed mainly in the western part of Poland.

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LABOUR PRODUCTIVITY IN THE LIQUID BIOFUELS SECTOR IN SELECTED EUROPEAN UNION COUNTRIES

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ABSTRACT

The development of the liquid biofuels sector has been dynamic for more than 10 years, but from the very beginning of this process has been accompanied by a number of controversies as the production and use of liquid biofuels have both positive and negative effects. These consequences primary concern socio-economic and environmental areas. The most important economic benefits are connected with production, turnover and employment in the biofuels industry and the development of agriculture through higher demand on agricultural commodities. The aim of the paper was to quantify labour productivity in the liquid biofuels sector in European Union countries. It is hypothesized that highly developed countries (measured by GDP per capita) have higher labour productivity in the liquid biofuels industry than poorer European Union countries. The second hypothesis states that countries with high liquid biofuel production have higher labour productivity than other countries. The period under research covered the years 2009–2015. The data are mainly from Eurostat, EurObserv'ER consortium and World Bank. This research provides the general conclusion that a high level of economic development is not accompanied by high labour productivity (two types) in the liquid biofuels sector (there is no significant positive correlation). The same applies to the relation between biofuel production volume and labour productivity. The research proves that a high level of GDP per capita or the big scale of biofuel production (and use) is not a determinant of high labour productivity in this sector.

Keywords: liquid biofuels, production, turnover, job creation, labour productivity in the liquid biofuel sector
JEL codes: Q16, J24

INTRODUCTION AND THEORETICAL BACKGROUND

The production and use of liquid biofuels play a significant role in the current European Union's energy policy, as demonstrated by the existence of the 2020 climate & energy package, to some extent dedicated to liquid biofuels (10% share of biofuels in the overall consumption of transport fuels) (Directive 2009/28/WE). At the same time, the biofuels sector may be a relevant determinant of the development of the agricultural sector, the bioeconomy and the whole economy primarily through job creation, investment and a higher demand of agricultural commodities, which contributes to the development of agriculture and rural areas and an increase in agricultural income. The development of the liquid biofuel sector has been dynamic for more than 10 years, but from the very beginning of this process has been accompanied by a number of controversies

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as the production and use of liquid biofuels have both positive and negative effects.

These negative consequences primarily concern environmental (a small actual reduction of CO_2 emissions, more agricultural area, water and other resources allocated for biofuel production) and socio-economic areas: (1) a multifarious impact of biofuel production on prices of agricultural raw materials and food (growth) both in a local and global context; (2) an increase in price volatility; (3) an impact on land prices (growth); (4) a negative impact on food security; (5) high production costs of liquid biofuels and possible unprofitability of this production (Abbott, Hurt and Tyner, 2008; Krugman, 2008; Mitchell, 2008; Rosegrant, 2008; Baffes and Haniotis, 2010; Hochman et al., 2011; Rifkin, 2011; Trostle et al., 2011; Abbott, 2013; de Gorter et al., 2013; Gilbert and Mugera, 2014). On the other hand, the crucial positive effects regarding the development of this sector are the following: the most important being its environmental effect – natural environmental protection through lower greenhouse gas emissions in comparison to fossil fuels – however, this depends on which raw materials are used for biofuel production (Directive 2009/28/WE) and socio-economic benefits: (1) agricultural and rural area development through an increasing demand of agricultural raw materials in the liquid biofuel industry; (2) job creation in rural areas and other sectors of the national economy; (3) reduction of fossil fuel dependence and the strengthening of energy safety; (4) possibility of using agricultural raw materials, which were in surplus every year; (5) production of a significant amount of animal feeds and their components and a reduction of their import as a consequence (Gao, Zhao and Wang, 2010; Alexandratos and Bruinsma, 2012; de Gorter and Drabik, 2012; Kretschmer, Bowyer and Buckwell, 2012; World Bank, 2012; Baffes, 2013; Biokraftstoffe, 2014).

Productivity is a measure of the production effect at a given input of a factor (or factors) of production. It is expressed as a ratio. Efficiency (the criterion of efficiency) is of key importance to modern economics. It concerns the management of scarce resources (production factors) and the optimisation of their use for the production of goods and services. The overall productivity index takes into account three factors (total factor productivity), but productivity can be measured separately for each factor (land, labour and capital productivity). Thanks to the productivity ratio, the phenomena can be presented at different levels: macro, meso and micro (Staniszewski, 2018). In this article, labour productivity in the biofuel sector, i.e. at the meso level, is examined. Investigating labour productivity in the whole economy and sectors or branches is currently a very important research area. For some countries, increasing labour productivity is the only way to achieve economic growth in the long term. Dorward (2013) argues that agricultural labour productivity plays a foundational role within wider economic development processes.

MATERIALS AND METHODS

Issues concerning the development of the biofuel market are analysed by many authors, especially in a global context. Researchers concentrate on benefits and losses or threats regarding this market and the relationships between the biofuel market and agriculture, economic policy as well as the macroeconomic environment. However, there is a lack of work and research on labour productivity in the liquid biofuels sector. This article is an innovative approach to the economic aspects of the functioning and development of the biofuels market in the European Union, covering certain countries. The article may be an inspiration for further research on biofuel market efficiency in the European Union, selected countries and worldwide. In addition, it may also provide recommendations for energy policy regarding the directions of development of the liquid biofuel sector. For example, it would seem justified to promote the development of this sector in those countries where labour productivity is highest, and thus has development potential. The aim of the paper was to quantify labour productivity (to some extent it can be identified with work efficiency) in the liquid biofuel sector in European Union countries in order to recognize its level and differences and indicate tendencies. The general formula for the labour productivity indicator is:

$$Labour\ productivity = \frac{output\ value\ (volume)}{labour\ input\ use}$$

The labour productivity ratio for the liquid biofuel sector was developed in the paper in two ways: (1) as a relation between turnover and employment (measured in thousand euro per one employed person in the biofuel industry); (2) as a relation between liquid biofuel production and employment (measured in ktoe per one employed person in the biofuel industry):

$$Labour\ productivity\ 1 = \frac{Turnover}{Employment} \quad (1)$$

$$Labour\ productivity\ 2 = \frac{Biofuels\ production}{Employment} \quad (2)$$

It is hypothesized that highly developed countries (measured by GDP per capita) have higher labour productivity in the liquid biofuel industry than poorer European Union countries. High GDP often is a result of high productivity of production factors, including land, labour and capital (and technology), thus, in the paper, it was assumed that countries with a high GDP should be more productive/effective in such an area as the biofuel industry, which is technologically quite advanced. The second hypothesis states that the countries with high liquid biofuel production have higher labour productivity than other countries. Countries develop an industry – for example – the biofuel industry because they are effective in this area. Thus, they produce more and more biofuels because of high productivity and – as a result – the economy of this country benefits from that. The period under research covered the years 2009–2015, which results from the availability of detailed data for the liquid biofuel sector in the European Union. Some countries were excluded from the research – these are countries in which the liquid biofuel sector does not play an important role and the share of liquid biofuels in fuels used in transport is low. These countries are: Croatia, Cyprus, Estonia, Ireland, Latvia, Luxembourg, Malta and Slovenia. All other countries were analysed in the paper, as well as the European Union as a whole. The additional groups considered in the article are the EU-13 (old member states excluding Ireland and Luxembourg) and the EU-7 (selected new member states: Bulgaria, the Czech Republic, Hungary, Lithuania, Poland, Romania and Slovakia. The data are mainly from Eurostat, the European Commission (production of liquid biofuels, share of biofuels in transport fuels), the EurObserv'ER consortium[2] (employment, turnover) and World Bank (GDP per capita). Some methodological remarks (concerning data) are as follows: (1) job figures are rounded to 50 jobs and turnover indicators to EUR 5 million; (2) employment data refers to gross employment, i.e. not taking into account job losses in other industrial sectors or due to reduced investment in other sectors; (3) employment and turnover refer to the main economic investment activities in the renewable energy technology supply chains, namely manufacturing, distribution and installation of equipment, plant operation and maintenance.

RESULTS AND DISCUSSION

In 2009, the production of liquid biofuels in the European Union reached 10.5 Mtoe (millions of tonnes of oil equivalent), with the largest share of the following countries: Germany 28.5% (3 Mtoe), France 22% (2.3 Mtoe) and further on: Spain 8.4% (0.89 Mtoe) and Italy 7.7% (0.81 Mtoe) – Table 1. The two largest countries therefore produced more than half of the liquid biofuel production in the European Union as a whole. In 2015, the structure changed somewhat as a result of the dynamic growth of production in some EU countries. Despite this, Germany and France remained leaders in the sector, producing respectively: Germany – share of 24.3% (3.3 Mtoe) and France – 18.4% (2.5 Mtoe), though their total share fell to 42.7%, which indicates an interest in

[2] The EurObserv'ER consortium groups together Observ'ER (France), the Energy Research Centre of the Netherlands, Renewables Academy AG (Germany), Frankfurt School of Finance and Management (Germany), Fraunhofer Institute for Systems and Innovation Research (Germany) and Statistics Netherlands, see: The state of renewable energies in Europe.

biofuels in other member states and their recognition of benefits associated with the development of the industry. Further large producers are the Netherlands 10.5% (1.4 Mtoe), Spain 9% (1.24 Mtoe) and Poland 6.9% (0.94 Mtoe). Within 6 years (between 2009 and 2015), the Netherlands has achieved the highest production growth rate: almost 400% and Bulgaria: over 430%, however the nominal production level in Bulgaria is still relatively low. On the other hand, in some countries, production decreased in 2015–2009, e.g. in Denmark (from 116 to 13 ktoe, almost 90%) and Sweden (from 557 to 276 ktoe, by about half).

Table 1 also shows the share of liquid biofuel use in total transport fuel consumption of each country. In this situation, the highest production of biofuels does not necessarily correspond with the highest share. Thus, in 2015, the highest share was held in Sweden (13.8%) with consumption of biofuels at a level of over 1,000 ktoe and production of 276 ktoe, which meant that the country was a significant net importer of biofuels. Also, Austria remained a net importer, with a share of 8.3% and consumption of biofuels of 645 ktoe in the production of 445 ktoe. In Finland, the share of 11.8% was achieved with the consumption of 497 ktoe (and similar production, i.e. 472 ktoe) and in Slovakia a share of 7.5% with consumption and production less than 150 ktoe. The lowest shares were recorded in Great Britain, i.e. 1.8% with consumption close to 930 ktoe and production 300 ktoe, which meant that demand had to be covered by imports, and in Greece, where the share exceeded 2.2% with consumption and production at a level of 140 ktoe. The largest producers of liquid biofuels in the European Union recorded mostly low (or average) shares: Poland: 4.9%, Germany: 4.3%, Spain: 3%, the Netherlands: 2.2%, however, all these countries produced much more biofuel than they used to, and it is the level of share that depends on consumption. In France, the share was 6.4%, with consumption of 2.9 Mtoe and production of 2.5 Mtoe.

In 2015, the highest turnover and employment are, of course, in the countries with the highest biofuel production or use – France: over EUR 3 billion and 22 thousand people; Germany: EUR 2.5 billion and almost 23 thousand employed; Italy: EUR 1.1 billion and 6,000 people, Sweden: EUR 1 billion and 4.5 thousand employed. Relatively high employment was observed in Belgium, in 2015 (7,500 people), at a relatively low turnover – only EUR 250 million and in Poland (6,000 employed) at a relatively high turnover – EUR 710 million. On the other hand, the smallest liquid biofuel markets in the European Union considering turnover and employment were: Bulgaria: EUR 50 million and 500 employed, Lithuania: EUR 65 million and 300 people. In the European Union, in 2015, treated as a whole economy, the production of liquid biofuels exceeded 13.6 Mtoe, consumption was close to 14 Mtoe and this sector employed 96 thousand people and generated a turnover EUR exceeding 13 billion. The study also presents EU-13 and EU-7 aggregates. The selected old member states (EU-13) produced a total of 11.5 Mtoe of liquid biofuels in 2015, achieving a turnover of EUR 11 billion and providing over 83 thousand jobs. In turn, selected new member states (EU-7) produced 2 Mtoe biofuels, and the sector reached a turnover of EUR 1.7 billion and employment at a level of over 10 thousand people.

Table 1 also contains data on labour productivity in two presented variants in selected years: 2009, 2012, 2015. The first type was labour productivity in EUR thousands of per one employee in the liquid biofuel sector. In 2009, highly developed countries (these are EU-13 countries to a large extent) achieved both very high productivity values – Sweden (300), Denmark (176), Italy (152.3) and France (126.6) – and low (or very low) productivity values – Belgium (9.6), the Netherlands (43.5) and Austria (48.8). Meanwhile, the new member states reached values ranging from 37.2 (Slovakia) to 120 (Bulgaria). Although this productivity was characterised by high volatility in the period 2009–2015, most countries achieved an improvement. Exceptions were Bulgaria and Sweden (productivity decline in 2015 versus 2009). On the other hand, only a low improvement was noted in a few wealthy countries – Denmark, Finland, France and Italy. The biggest improvements were observed in Hungary, Austria, Slovakia and the Czech Republic. As a result, in 2015 Austria (333.3), Hungary (307.7), Slovakia (236.4) and the Czech Republic (235.7) had the highest productivity, as well as Romania (307.7) and Lithuania (216.7). An interesting

Table 1. GDP per capita PPP, liquid biofuel production, share of biofuels in transport fuels, turnover, employment (number of jobs) and labour productivity in the liquid biofuel sector in selected countries of the European Union in 2009, 2012, 2015

Specification	GDP per capita PPP	Production of liquid biofuels (ktoe)			Share of biofuels in transport fuels (%)			Turnover (EUR million)			Employment (direct and indirect jobs)			Labour productivity 1 (EUR thousand per one employee)			Labour productivity 2 (ktoe per one employee)		
	2015	2009	2012	2015	2009	2012	2015	2009	2012	2015	2009	2012	2015	2009	2012	2015	2009	2012	2015
Austria	49 938	327	263	445	6.8	6.5	8.3	400	500	400	8 200	1 000	1 200	48.8	500.0	333.3	39.8	263.0	370.8
Belgium	45 431	224	472	392	1.4	3.8	2.6	80	310	250	8 350	2 000	7 500	9.6	155.0	33.3	26.8	236.0	52.3
Bulgaria	18 115	11	7	60	0.1	3.2	4.9	30	10	50	250	750	500	120.0	13.3	100.0	44.4	9.5	119.0
Czech Republic	33 469	195	219	216	3.2	4.9	5.0	220	270	330	4 800	2 950	1 400	45.8	91.5	235.7	40.6	74.1	154.1
Denmark	48 675	116	22	13	0.2	4.9	5.0	220	220	200	1 250	800	1 100	176.0	275.0	181.8	93.0	27.8	12.2
Finland	42 071	249	279	472	3.0	4.3	11.8	210	250	200	2 450	1 500	1 800	85.7	166.7	111.1	101.7	186.2	262.3
France	40 469	2 313	2 364	2 519	5.3	5.8	6.4	1 772	3 180	3 030	14 000	30 000	22 000	126.6	106.0	137.7	165.2	78.8	114.5
Germany	47 811	2 992	2 976	3 319	4.7	5.1	4.3	2 950	3 680	2 500	26 100	22 700	22 800	113.0	162.1	109.6	114.6	131.1	145.6
Greece	26 697	71	124	134	0.8	1.7	2.2	70	120	140	800	500	750	87.5	240.0	186.7	88.5	248.6	178.3
Hungary	26 148	154	282	377	3.8	4.3	4.3	200	75	200	5 500	800	650	36.4	93.8	307.7	27.9	352.0	580.3
Italy	36 640	810	371	682	2.9	3.8	3.2	1 500	1 300	1 100	9 850	5 250	6 000	152.3	247.6	183.3	82.3	70.6	113.7
Lithuania	28 784	108	108	114	3.	4.1	3.9	110	60	65	1 800	850	300	61.1	70.6	216.7	59.9	126.6	381.3
Netherlands	49 528	290	1 040	1 440	2.6	2.2	2.2	150	660	300	3 450	700	2 800	43.5	942.9	107.1	84.0	1 485.9	514.1
Poland	26 595	416	665	936	4.1	5.1	4.9	400	580	710	8 000	5 500	6 000	50.0	105.5	118.3	52.0	121.0	155.9
Portugal	29 532	226	273	321	3.0	4.5	5.2	230	270	330	2 700	1 850	1 600	85.2	145.9	206.3	83.6	147.6	200.4
Romania	21 566	75	131	157	3.2	3.6	3.8	30	180	200	300	950	650	100.0	189.5	307.7	250.3	138.1	241.7
Slovakia	29 522	150	151	149	4.7	4.6	7.5	160	100	130	4 300	700	550	37.2	142.9	236.4	34.9	216.0	271.3
Spain	34 818	887	638	1 235	2.9	6.8	3.0	750	1 830	920	21 800	9 450	7 500	34.4	193.7	122.7	40.7	67.5	164.7
Sweden	47 891	557	649	276	4.5	7.2	13.8	1 800	560	1 000	6 000	4 150	4 500	300.0	134.9	222.2	92.9	156.4	61.4
United Kingdom	41 580	215	300	301	1.9	1.8	1.8	170	550	740	3 400	3 000	3 900	50.0	183.3	189.7	63.2	99.8	77.3
Total EU	–	10 510	11 482	13 660	3.3	4.3	4.2	11 522	14 950	13 100	134 750	97 050	95 900	85.5	154.0	136.6	78.0	118.3	142.4
EU-13	–	9 277	9 772	11 550	–	–	–	10 302	13 430	11 110	108 350	82 900	83 450	95.1	162.0	133.1	85.6	117.9	138.4
EU-7	–	1 109	1 563	2 009	–	–	–	1 150	1 275	1 685	24 950	12 500	10 050	46.1	102.0	167.7	44.4	125.0	199.9

GDP per capita PPP (current international USD).

ktoe – thousand tonnes of oil equivalent. Tonne(s) of oil equivalent is a normalized unit of energy. By convention it is equivalent to the approximate amount of energy that can be extracted from one tonne of crude oil. It is a standardized unit, assigned a net calorific value of 41,868 kJ/kg and may be used to compare the energy from different sources (Eurostat, 2018).

Production of liquid biofuels – production of bioethanol, biodiesel and other liquid biofuels (together). Share of biofuels in transport fuels – share of biofuels together (bioethanol + biodiesel)

Labour productivity 1 (= Turnover / Employment) in EUR thousand per one employee. Labour productivity 2 (= Production / Employment) in ktoe per one employee.

UE-13 countries are old member states without Ireland and Luxembourg. EU-7 countries are Bulgaria, the Czech Republic, Hungary, Lithuania, Poland, Romania and Slovakia.

Source: own calculation and study based on the data: European Commission, Energy; The state of renewable energies in Europe; World Bank (2018).

phenomenon can also be observed – in 2015, the EU-7 countries achieved higher productivity (EUR 167.7 thousand per one employee) than in the EU-13 countries (133.1), although in the first analysed year it was the opposite. The new member states (EU-7) had a much higher productivity growth rate – by an average of 45% per year taking into account the geometric mean compared to 10% in the old countries. Productivity in thousands of euros per person employed in the biofuel sector in the European Union increased fairly evenly – by around 14% per year, from 85.5 in 2009 to 136.6 in 2015. In 2015, the already mentioned largest producers of liquid biofuels in the European Union had productivity in the range of EUR 107–137 thousand per one employee in the liquid biofuel sector. In terms of this type of productivity, Austria was as much as 10 times better than Belgium.

The second type of labour productivity was expressed in ktoe (thousand tonnes of oil equivalent) per one employee in the liquid biofuel sector. In 2009, highly developed countries (EU-13) achieved both high productivity values – France (165.2), Germany (114.6) and Finland (101.7) – and low productivity values – Belgium (26.8), Austria (39.8) and Spain (40.7). Meanwhile, the new member states reached values ranging from 27.9 (Hungary) to 59.9 (Lithuania). Romania is an exception with productivity over 250 ktoe per one employed person in the liquid biofuel sector. Although this productivity was characterised by high volatility in the period 2009–2015, most countries achieved an improvement. Exceptions were Denmark, Sweden and France (productivity decrease in 2015 versus 2009). On the other hand, only a low improvement was noted in a few wealthy countries – Germany, Italy and the United Kingdom. The biggest improvements were observed in Hungary, Austria, Slovakia and Lithuania. As a result, in 2015 Hungary (580.3), Lithuania (381.3), Austria (370.8) and Slovakia (271.3) had the highest productivity, as well as the Netherlands (514.1) and Finland (262.3). An interesting phenomenon can also be observed also concerning this type of productivity – in 2015, EU-7 countries achieved higher productivity (200 ktoe per one employee) than EU-13 countries (138.4), although in the first analysed year it was the opposite. The new member states (EU-7) had a much higher productivity growth rate – by an average of 54% per year taking into account the geometric mean in comparison to 15% in the old member states. Productivity in ktoe per person employed in the biofuel sector in the European Union increased gradually – by around 19% per year, from 78 in 2009 to 142.4 in 2015. In 2015, the largest producers of liquid biofuels in the European Union had productivity in the range of 114.5–164.7 (France, Germany, Poland, Spain) and the Netherlands: 514.1 ktoe per one employee in the liquid biofuel sector. In terms of such productivity, Hungary (580.3) was almost 50 times better than Denmark (12.2 ktoe per one employee).

Research carried out in this article provides the general conclusion that a high level of economic development (measured by GDP per capita PPP) is not accompanied by high labour productivity (two variants) in the liquid biofuel sector (no significant correlation). The same applies to the relation between biofuel production volume and labour productivity (Table 2). Both hypotheses were rejected. There are only a few highly developed and rich countries with a high labour productivity type 1 (EUR thousand per 1 employed) – Austria and Sweden and with high labour productivity type 2 (in ktoe per 1 employed) – Austria, the Netherlands and Finland, but at the same time there are many highly developed countries with low or very low productivity in the liquid biofuel sector – Denmark, Germany, Belgium and Finland (labour productivity type 1) and Denmark, Sweden, Belgium, the United Kingdom, France and Italy (labour productivity type 2). On the other hand, there are poorer European Union countries (with lower GDP per capita) – mostly new member states (EU-7), which achieved high labour productivity values in the liquid biofuel sector. Romania, Hungary and Slovakia (labour productivity type 1) and Hungary, Lithuania and Slovakia (labour productivity type 2) deserve a special mention. Concerning the second hypothesis – most EU biofuel production leaders have low labour productivity type 1 (Germany, France, the Netherlands, Spain, Poland, Italy and Finland) and low productivity type 2 (Germany, France and Italy). On the other hand, countries

with lower biofuel production achieve higher labour productivity type 1 – Romania, Slovakia, the Czech Republic, Sweden, Lithuania and labour productivity type 2 – Lithuania, Slovakia and Romania. The study proves that a high GDP per capita level or a big scale of biofuel production (and use) is not a determinant of high labour productivity in this sector. According to Dorward (2013) there are some important determinants of higher labour productivity in agricultural, industrial and service sectors. These are: energy, materials, capital, technology, knowledge and institutions. We can conclude that these factors and elements are better and stronger mainly in highly developed countries and these countries should have

Table 2. Rankings in GDP per capita, liquid biofuel production and labour productivity in the liquid biofuel sector in selected countries of the European Union in 2015

Specification	GDP per capita PPP	Production of liquid biofuels	Labour productivity 1	Labour productivity 2
Austria	1	8	1	4
Belgium	6	9	20	19
Bulgaria	20	19	19	14
Czech Republic	12	14	5	12
Denmark	3	20	12	20
Finland	7	7	16	6
France	9	2	13	15
Germany	5	1	17	13
Greece	16	17	10	9
Hungary	18	10	3	1
Italy	10	6	11	16
Lithuania	15	18	7	3
Netherlands	2	3	18	2
Poland	17	5	15	11
Portugal	13	11	8	8
Romania	19	15	2	7
Slovakia	14	16	4	5
Spain	11	4	14	10
Sweden	4	13	6	18
United Kingdom	8	12	9	17

1 – the best country, 20 – the worst.

The following data was used to make rankings: GDP per capita – Gross Domestic Product per capita, based on purchasing power parity (PPP), current prices (USD); Production of liquid biofuels – production of bioethanol, biodiesel and other liquid biofuels (together); Labour productivity 1 (= Turnover / Employment) in EUR thousand euro per one employee; Labour productivity 2 (= Production / Employment) in ktoe per one employee.

Source: own study based on data from Table 1.

higher productivity in the biofuel industry as well. The conducted research denies the existence of such a relationship.

Furthermore, this research may also provide recommendations for energy policy regarding the directions of development of the liquid biofuel sector. Based on the results from the paper, it seems justified to promote and support the development of this sector in countries where the highest labour productivity exists, and thus, the highest development potential. As Montalbano and Nenci (2018) point out, energy saving policy priorities need to take into account changes (increases) in productivity. What is more, the search for higher energy efficiency (which is one of the goals under the climate and energy policy of the European Union) leads to an improvement in productivity. Such a conclusion could be supported by the theory of comparative advantages (David Ricardo). Taking into account specialisation – the countries with the highest labour productivity could focus on biofuel production, however there are more important conditions to be fulfilled (the supply of agricultural raw materials, no competition for commodities between biofuels and food and feed production as well as positive environmental effects). This specialisation could be even more important in the context of common goals in the climate and energy policy. Some purposes are overnational and formulated for the European Union as a whole.

CONCLUSIONS

This article is an innovative approach to the economic aspects of the development of the biofuel market in the European Union and may serve as inspiration for further research on biofuel market efficiency in the European Union, selected countries and worldwide. This research provides the general conclusion that a high level of economic development is not accompanied by high labour productivity (two types) in the liquid biofuel sector (no significant positive correlation). The same applies to the relation between biofuel production volume and labour productivity. The research proves that a high level of GDP per capita or the big scale of biofuel production (and use) is not a determinant of high labour productivity in this sector. Some policy recommendations can be formulated: to support liquid biofuel production in countries where labour productivity is high, to adopt the climate and energy policy to broader circumstances and to treat its goals (concerning the share of use of biofuels in the transport fuels) overnationally.

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SOCIAL REPORTING AS A TOOL FOR ACHIEVING THE SUSTAINABLE DEVELOPMENT GOALS

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ABSTRACT

The concept of sustainable development is not only the subject of theoretical consideration but also an important field of actions taken by international institutions. The adoption of the Sustainable Development Goals (SDGs) is one of the results of these activities A special role in this area is attributed to companies which are expected to incorporate the sustainable development principles into long-term business strategy. Social reporting is a tool for support this process. It provides an information on activities and results in social and environmental fields. The aim of the article is to identify trends associated with the publishing information related to Sustainable Development Goals. The realization of the article's purpose was based on descriptive method consists of analysis of the subject-related literature concerning social reporting and sustainable development. In addition, the method of desk research was applied. Results of the research lead to the conclusion that implementation of challenges related to Agenda 2030 had an impact on increase the number of companies published social reports which contain information concerning sustainable development. However, in order to further develop this type of reporting, it is essential to improve the involvement of governments and other regulatory institutions in the areas of educational activities as well as take the promotional initiatives such as encouraging the use of the GRI Reporting Framework which allows to increase the transparency and ensure comparability and credibility of social reports. The article constitutes a contribution to research on the practice of social reporting.

Keywords: sustainable development, social reporting, GRI
JEL codes: M14, Q01, Q56

INTRODUCTION

The challenges of the contemporary world connected with climate changes, depletion of natural resources, ongoing environmental degradation as well as growing expectations of different stakeholders has become a reason for change in approach regarding the economic process. In the face of this changes, the concept of sustainable development has been born. It is based on the assumption that main goal of this process should not be maximizing the benefits, but also create and maintain socio-economic durability.

A special role in this area is attributed to companies and, above all, their activity based on transparency. It is determined by the fact that stakeholders are interested not only in undertaken or declared actions for the implementation of the Sustainable Development Goals but also in results of these activities (Kaputa, 2013; GRI, 2017).

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Social reporting is a tool, which support this process. It provides information relating to company's activities and their performance in the field of sustainable development. It leads not only to reducing information asymmetry in the market. From the company's point of view, it also offers opportunities for evaluation of these activities and manage them appropriately.

The aim of the article is to identify trends associated with the publishing information related to Sustainable Development Goals.

THEORETICAL BACKGROUND

Strategy in modern companies should be based on incorporation of the concept of sustainable development (Grabara, Bajdor and Mihaescu, 2015; Lorenc and Sorokina, 2015). This is confirmed by initiatives taken by various international institutions. Undoubtedly, one of them is the Agenda 2030, adopted by the Members of the United Nations in 2015. It includes 17 Sustainable Development Goals (SDGs) subdivided into 169 targets (United Nations, 2015). In addition to priorities such as health, education and food safety, the Sustainable Development Goals include a wider range of economic, social and environmental issues, seeking to transform economies that will create a basis for long-term sustainable growth favouring job creation (Global Compact Poland, 2016).

In this perspective, initiatives undertaken by companies for sustainable development cannot be treated exclusively as the secondary area of their activity. They should be an important element of business strategy implementation, constituting coordinated and logical sequence of actions contributing to the long term implementation the common vision for development (Jastrzębska, 2016).

In accordance with the assumptions of Agenda 2030, the monitoring based on quality, accessible, and reliable information should be an inherent element of achieving sustainable development goals (United Nations, 2015). Sustainability reporting is one of the tools, which supports companies in this process. In general, two types of reporting related to sustainable development can be identified. The first one is based on the indicative measurements (Atkinson, 2000; Veleva et al., 2001), while the other only on description and narrative (Agger, 2010). Some companies publish this type of information within their mandatory annual reports (Dagiliene, 2010). The other companies prepare optional social reports.

Social reports are undoubtedly more informative. Social reporting consists on measuring, disclosing and taking responsibility towards internal and external stakeholders for results and efficiency in terms of presentation of an organization's contributions towards the sustainable development (GRI, 2016). It contributes to increase transparency as well as reduce information asymmetry in the market by improve information policy towards stakeholders. Additionally, social reporting forces companies, having significant social and environmental impact to take a look at their activities and manage them appropriately, which in effect means a step towards sustainable development (Adams and Frost, 2008; Du, Bhattacharya and Sen, 2010). Therefore, the need of disclosure information relating to sustainable development becomes a global standard (Berglof and Pajuste, 2005; Cho and Pucik, 2005; Ciegis and Grunda, 2006; Gao, 2011; Laidroo and Ööbik, 2013).

MATERIALS AND METHODS

The aim of the article is to identify trends associated with the publishing information related to Sustainable Development Goals. Considering the complexity of issues taken in the article, attention has been focused on social reports as well as the role of GRI Standards in this process.

The realization of the article's purpose was based on descriptive method consists of analysis of the subject-related literature concerning social reporting and sustainable development. In addition, the method of desk research was applied. The reports submitted to databases connected with the practice of reporting information concerning sustainable development were analysed. The article is also based on selected studies showing social reporting practices in the world. The selection of this studies had been dictated by fact they provide a detailed look at both global trends in publishing social reports and at disclosing information related to Sustainable Development Goals adopted in

2015. Also because they are focused on practices of the largest companies, whose activities very often becomes a model conduct for other economic actors.

The proposed methodology allowed to of the realization article's purpose and formulation of recommendations concerning the social reporting in the field of Sustainable Development Goals.

RESULTS AND DISCUSSION

Social reporting plays an increasingly important role in the business activity. This is reflected in research included in the report 'The road ahead. The KPMG Survey of Corporate Social Responsibility Reporting 2017', which related to practice of social reporting in selected countries in the world[3]. The results show that 72% of 4.900 analysed companies (N100) disclosed information concerning sustainable development in 2017. The situation of 250 largest, according to income, companies in the world ranked by Fortune Global 500 is even more preferably. The results indicate that 93% of them prepare sustainability reports. This reflects the significant changes that have occurred in this area in recent years (Fig. 1). The number of reports submitted to GRI Sustainability Disclosure Database launched in 1999 also confirms the increasing interest in reports concerning the concept of sustainable development. More than 47,000 reports were registered since its inception (as of May 2018). It should be emphasized that over the years there have been a gradual increasing number of submitted reports. In 2007, less than 1,000 reports were published. However, since 2013 annual number of registration exceeds 5,000 (GRI, 2018). The analysis of reporting rates by geographical segments allow to indicate countries which are the leaders in this field. Among the global business leaders, companies from Germany (83%), France (63%) and Great Britain (60%) are the most active in disclosing data relating to Sustainable Development Goals (KPMG, 2018). When analysing this aspect by sectors it turns out that the most active are companies from sectors such as utilities, automotive, retail as well as technology, media, and telecommunications (Fig. 2).

The companies preparing their social reports differ significantly in the scope of disclosing data concerning sustainable development. They indicate their priority goals such as: climate action, decent work and economic growth, good health and well-being, responsible consumption and production, gender equality and quality education. By contrast, companies are paying the least attention to the following SDGs: life on land, zero hunger and life below water (Fig. 3).

When analyses sustainability reporting by Polish companies, it can be noted that their practice deviates

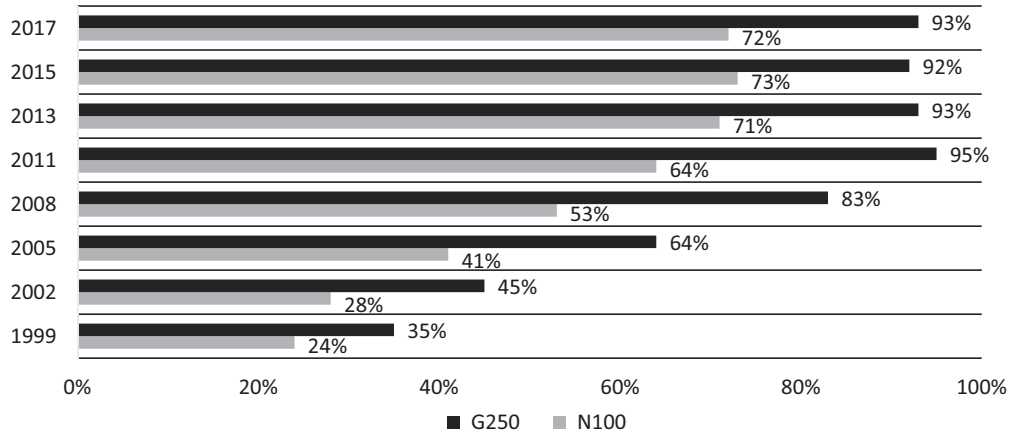


Figure 1. Global trends in social reporting

Source: author's own work based on KPMG (2015, 2017).

[3] KPMG has published results of research since 1993. Currently 49 countries are in its scope.

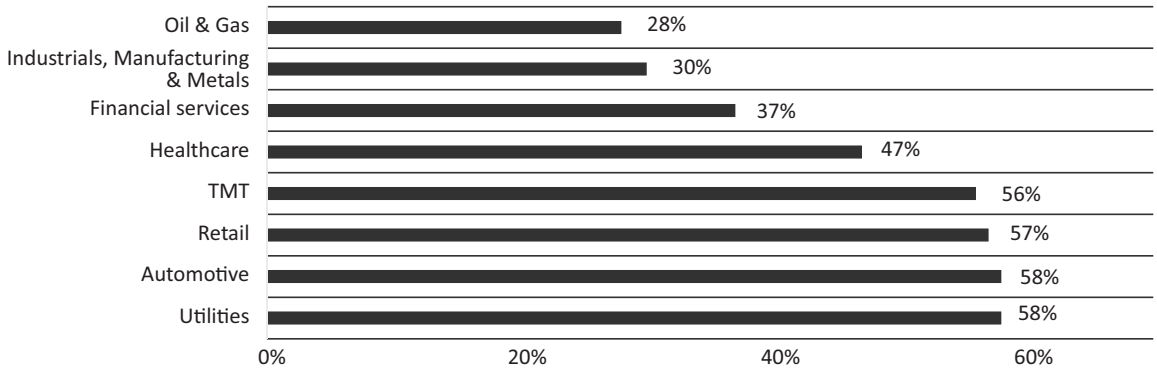


Figure 2. Reporting on SDGs across sectors by the world's largest companies

Source: author's own work based on KPMG (2018).

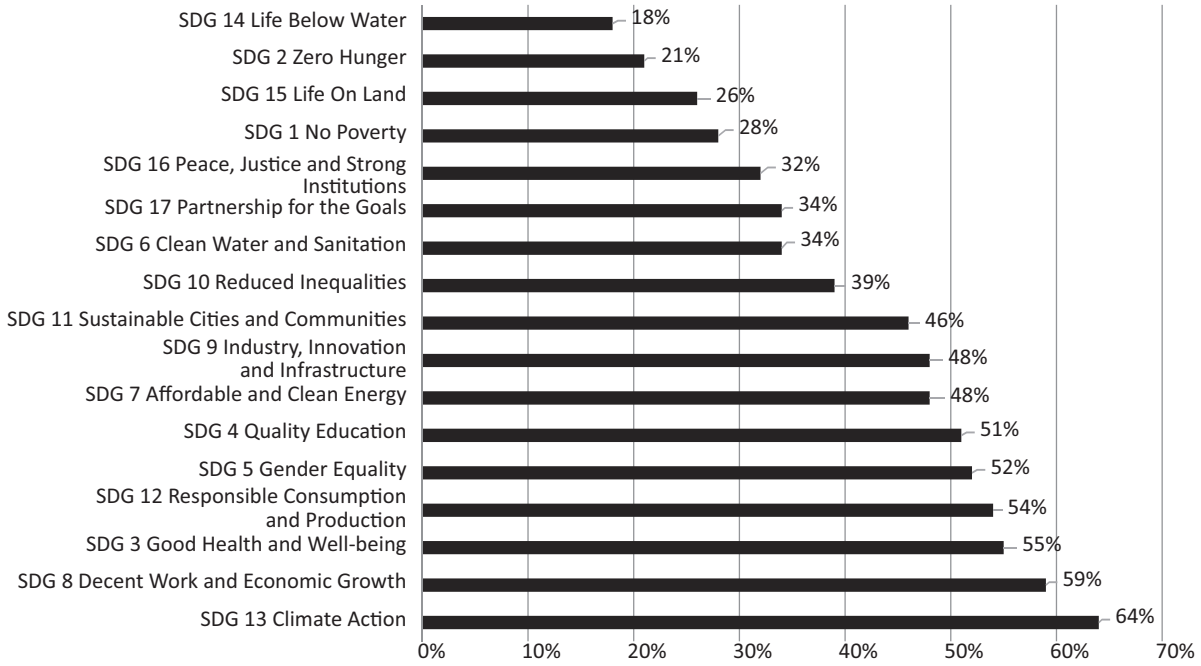


Figure 3. Level of prioritizing the Sustainable Development Goals by the world's largest companies

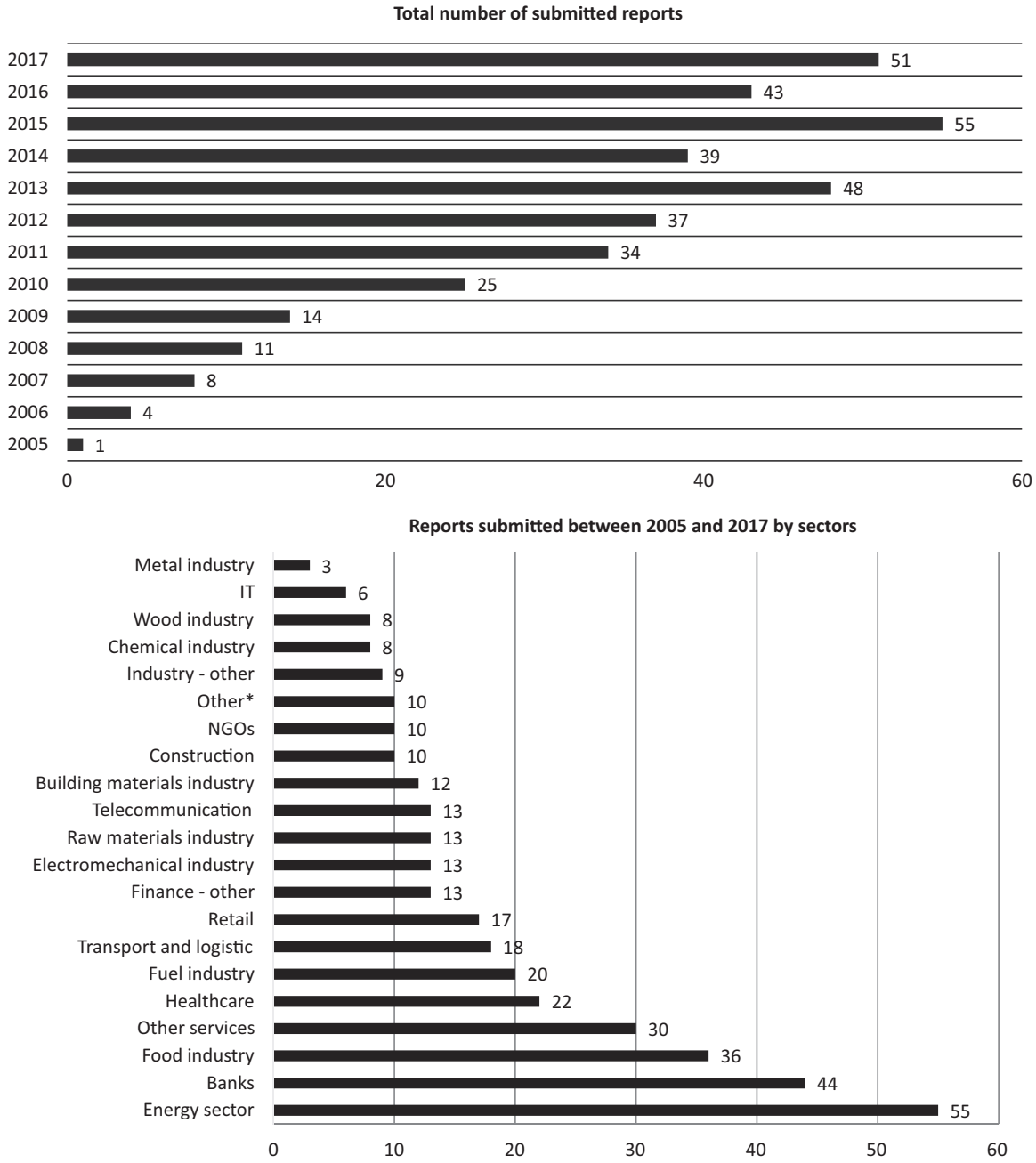
Source: author's own work based on KPMG (2018).

from the world's best practices. The data contained within the KPMG's survey shows that only 59% of the largest polish companies had prepared a reports containing this type of information in 2017. However, it should be emphasized that this result increased by five percentage points between 2015 and 2017, and by three percentage points between 2013 and 2017 (KPMG, 2013, 2015, 2017).

The growing interest in publishing reports concerning sustainable development also confirms the number of report submitted to GRI Sustainability Disclosure Database. Until now, 298 reports were registered by Polish companies, of which 209 were prepared between 2013 and 2018 (GRI, 2018).

The same trends can be observed on the basis of number of submitted reports to a registry maintained by CSRinfo, an educational and consulting company in the field of corporate social responsibility and sustainable development, which is an official partner of the Global Reporting Initiative organization in Po-

land. CSRinfo database is a key source of information relating to social reports publishing on Polish market. It also allows to observe general trends related thereto as well as to identify the leading sectors in the area of social reporting in Poland. These includes: Energy sector, Banks and Food industry (Fig. 4).



* Media (2), Cities (2), Waste and recycling (1), Automotive (1), Plastic industry (1), Universities (1), Water utilities (1), Gambling industry (1).

Figure 4. Number of social reports registered in the CSRinfo between 2005 and 2017

Source: author's own work based on CSRinfo.

Despite the fact that companies are increasingly referring to the Sustainable Development Goals in their social reports, it is still not a standard procedure, even among the largest companies in the world. This may result from the problems with identify, measurement and disclosure of key aspects relating thereto. The regulations preparing by Global Reporting Initiative (GRI) may become a tool which support this process. GRI is an independent international organization, founded in 1997, whose mission 'is to make sustainability reporting standard practice by providing guidance and support to organizations (GRI, 2011)'. Tools preparing by GRI are a kind of guide, which helps reporting companies to understand not only the requirements and principles contained therein but also the whole process of social reporting (Anam, 2013).

Global Reporting Initiative focuses not only on preparing the most common guidelines concerning the area of sustainable development. It also takes active steps to support companies in achieving sustainable development goals and reporting them. The development, in cooperation with UN Global Compact and World Business Council for Sustainable Development, of a set of applicable indicators defining the business contribution to implementation of the Sustainable Development Goals is one the results of these activities. The newest GRI Standards may play an important role in this process. They shall place particular emphasis on reporting on issues that are relevant from the point of view of company's activity and its key stakeholders. The GRI Standards, in their assumption are to be more understandable, better structured and easier to use than the GRI G4 guidelines, which are still in force today[4] (Sikacz, 2017). As a result, this should increase the reliability and usefulness of information and improve the way of communication. This is particularly important from the point of view of those companies, for which implementation of sustainable development goals and reporting of information related thereto is a new field of activity.

CONCLUSIONS

The implementation of the concept of sustainable development by companies requires a new and innovative approach to making choices and ways of thinking based not only on economic, but also on social and environmental issues. That implies the transparency, which should be basis for building relationships with stakeholders and other market interaction.

Social reporting based on GRI's framework for sustainability reporting is a helpful tool in this respect. The aim of the GRI regulations is to create a generally accepted framework for reporting on an economic, environmental, and social aspects of organization's functioning. The preparation on social reports helps companies set goals, measure their performance and management of changes, striving to sustainable development.

The analysis included in the article, which related to disclosure of information concerning activities undertaken in the field of sustainable development leads to the following statements and recommendations:

- despite the unequal pace of development of the concept of social reporting in individual countries, the implementation of challenges related to Agenda 2030 had an impact on increase the number of companies published their social reports;
- in addition to general information concerning economic, social and environmental aspects of company's activity, social reporting also creates an opportunity to access to information on actions undertaken for the implementation of the Sustainable Development Goals;
- to increase the number of reporting companies, it is important to improve the involvement of governments and other regulatory institutions in the areas such as development of educational activities resulting in increased knowledge and public awareness as well as take the promotional initiatives (for example encouraging the use of the *GRI* Standards)*;*

[4] GRI Standards will definitively replace the G4 Guidelines on July of 2018.

– use of the GRI's framework in social reporting increases its transparency and ensures comparability and credibility of publishing information.

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OPPORTUNITIES AND BARRIERS REGARDING THE DEVELOPMENT OF REGIONAL BEAN PRODUCTION WITH GEOGRAPHICAL CERTIFICATION IN POLAND

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ABSTRACT

The objective of the study is to present opportunities and barriers concerning the development of regional bean production with geographical indication and designation of origin, in Poland, in 2012-2017. The specificity, scale and conditions of production of three Polish regional bean species are described including the background of changes in the area cultivated with bean, its yield, production and development of buying-in prices. Attention is drawn to objective and subjective factors slowing down the certification process of leguminous crop production in accordance with producer specification. Information from the following databases has been used in the study: FAOSTAT, Eurostat, GUS (Central Statistical Office), JIHARS (Agricultural and Food Quality Inspection), as well as the following associations of regional bean producers (Association of Climbing Bean 'Piękny Jaś' Producers in Wrzawy, Association of Bean Producers in Nowy Korczyn, Cooperative 'Dolina Dunajca' and LAG (Local Action Group) 'Biała-Dunajec'). The niche character and small previous production volume mean that regional beans PDO and PGI are only available in season for a small group of consumers. Little interest from producers of production certification makes it difficult to recognize that this pro-development activity is rather amateur at the current stage of building the regional food market in Poland.

Key words: regional beans, production, price
JEL code: Q11

INTRODUCTION

The multiflora bean is grown exclusively for dry seeds in Poland (Deska, 2016). As regards production and consumption, the most widespread are white beans, i.e. the climbing bean 'Piękny Jaś tyczny', the dwarf bean 'Piękny Jaś karłowy', white beans with a uniform white colour and multi-coloured ones. There are three species of multiflora beans among forty Polish products protected in the EU, found within the framework of the food quality policy of the European quality scheme for agricultural products and foodstuffs, such as Protected Designation of Origin (PDO), Protected Geographical Indication (PGI) or Traditional Speciality Guaranteed (TSG). Their seeds are those of large beans. One thousand beans of 'fasola Pięknego Jasia z Doliny Dunajca Fasola z Doliny Dunajca', registered on 25 October 2011 as PDO, weighed up to 2–2.8 kg, 'fasola wrzawska', registered on 13 January 2012 as PDO weighed around

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2 kg and 'fasola korczyńska', registered on 13 July 2010 as PGI with a weight of 1–1.6 kg (European Commission, 2018).

MATERIALS AND METHODS

The objective of this article is to present the situation of regional bean on the Polish market, with particular regard to bean holding a recognized EU geographical certification – with protected designation of origin and geographical indication. Primary and secondary sources of information were used in the study. The first came from research conducted in 2012, 2014 and February–April 2016 by all three associations of the certified and non-certificated agricultural producer of: 'fasola Piękny Jaś z Doliny Dunajca' (PDO), 'fasola wrzawska' (PDO) and 'fasola korczyńska' (PGI) – in the form of a survey questionnaire. Statistical reports used in this study included data from the Ministry of Agriculture and Rural Development, Agricultural and Food Quality Inspection – Main Inspectorate and Central Statistical Office, FAOSTAT, Eurostat, GUS and the European Commission. In the analysis of research, comparative and descriptive methods were used.

RESULTS AND DISCUSSION

Private farms in Poland regard the bean as a crop that diversifies production, however, some growers specialize in its cultivation. Most decide to sell beans early in the season to entities specializing in buying in (most often for export), distributing or processing the crop, in order to generate additional income in the household budget as soon as possible. It is the scale of production, the organization level of agricultural holdings (operating individually or in the framework of associations, etc.) that determines the use of contractual advantage gained by the buyer vis-à-vis the supplier or vice versa, which is less frequent. Farmers did not have any problems selling beans, especially in 2008–2014. Buying-in entities were able to purchase total production (meeting domestic processing industry demand; while approximately 37,500 t were exported) (INTRASTAT, 2016), though the intermediation of logistic companies or the direct collection by processing enterprises (offering for instance advisory services and supply of agricultural inputs) was also observed. In 2017, the area covered by beans was 18,000 ha. The acreage made up 25.2% of the area cultivated with pulses for grains.

Table 1. Production, yield, area grown to bean in Poland in 2004–2017

Years	Bean			Production of pulses for human consumption (thous. t)	Share of bean acreage in area grown to pulses for human consumption (%)	Share of bean production in pulses for human consumption production (%)	Share of bean purchase in total bean production (%)
	production (thous. t)	yield (dt/ha)	area (thous. ha)				
2004	37.9	18.6	20.4	76.6	57.1	49.5	12.3
2007	38.8	19.4	20.1	75.2	57.1	51.6	14.9
2010	33.4	18.7	17.8	87.5	40.7	38.2	20.2
2012	29.3	21.7	13.5	85.2	39.1	34.4	17.0
2014	38.4	22.0	17.5	115.4	32.9	33.3	21.1
2015	40.7	15.7	25.8	171.5	28.4	23.7	26.0
2017	49.9	27.7	18.0	173.2	26.8	28.8	27.1

Source: own calculations based on GUS (2004–2018).

Table 2. Average prices of bean for human consumption and purchasing power of average monthly remuneration in Poland in 2005–2015

Specification	2010	2011	2012	2013	2014	2015	Changes 2005–2014
Average buying-in prices of beans for human consumption (PLN/kg)	3.44	3.83	4.18	5.63	4.83	3.64	164.2
Average prices of bean obtained by farmers at market places (PLN/kg)	6.1	7.0	7.3	8.2	9.3	9.4	206.9
Average retail prices of small white bean (PLN/kg)	7.37	8.12	8.46	9.30	10.76	n.d.	180.5
Purchasing power of average monthly remuneration relative to beans available at market places (kg)	529	486	482	445	407	415	59.82
Purchasing power of average monthly remuneration relative to small white bean in retail sale (kg)	438	419	416	392	352	346	74.16

Source: calculations based on GUS (2015).

The yield was 27.7 dt/ha and was by 0.9 dt/ha (3.4%) higher than in the previous year (2016). Bean production totalled 49,900 t – the largest in the period under examination, 2004–2017, accounting for 28.8% of total pulse production (Table 1). Since Poland's accession to the EU, the retail price of bean was from around 50 to 120% higher than the wholesale price. From 2005 to 2014, the average price of small white bean in retail trade rose by 80.5% and that of bean sold directly by farmers at market places – by 107%, whereas bean paid for by buying-in entities – by 64% (Table 2). Households in Poland in general can afford to buy bean (grains). Unfortunately, in 2016 average consumption of pulses was as low as approximately 0.5 kg per person in a household, whereas in the 1980s it was 5 kg (Podleśny and Magnuszewski, 2004) per person per annum, and by the end of 1990s – 1.2 kg per person per annum. The biggest quantities were consumed by inhabitants of regions where cultivation of bean was most widespread, i.e. Małopolskie and Świętokrzyskie (0.72 kg/person/year) as well as Podkarpackie (0.84 kg/person/year).

VOLUME AND VALUE OF PRODUCTION OF CERTIFIED REGIONAL BEANS

Out of three Polish beans certified as PDO or PGI, 'fasola wrzawska PDO' has been the only one available on the market from its registration date. The remaining two multiflora beans (stringed and climbing), i.e. 'fasola korczyńska PGI' and 'Piękny Jaś z Doliny Dunajca PGI' were not available on the market to consumers since the former was not cultivated by a certified producer and the latter was, in fact, occasionally available, mainly for promotion purposes as tasting panels. The certified bean was placed on the market mainly by producers of 'fasola wrzawska PDO', who belonged to the Association of Climbing Bean 'Piękny Jaś' Producers in Wrzawy. The Association was composed of 301 members in 2006, however, their number fell to a mere 26 in subsequent years. By 2011, right before bean certification as PDO, more than 50% of members were interested in certified production, at least this is what was declared, however only every third applied for the control of the production process, whereas in 2017 there were only six farmers (Table 3). Climbing Bean 'Piękny Jaś' is cultivated on small farms. In 2015, around 250 farmers in the village of Wrzawy alone, from which the name of the protected product originates, were involved in the production of non-certified beans, allotting on average approximately 0.5–0.7 ha of the crop, and total production of approximately 25 t. However, as regards certified 'fasola wrzawska PDO', in 2012–2016, it was produced in agricultural holdings of an area of 4.5–4.6 ha, mainly

Table 3. Characteristics of producers and production of bean 'fasola wrzawska PDO' in 2012–2016

Specification	2012	2013	2014	2015	2016
Number of certified producers of 'fasola wrzawska PDO'	11	10	10	10	10
Area grown to 'fasola wrzawska PDO' by certified producers (ha)	7.9	8.7	9.9	10.5	11.0
Estimated production volume of 'fasola wrzawska PDO' – sold according to the Association of Climbing Bean "Piękny Jaś' Producers in Wrzawy (kg)	950	1 750	1 600	1 550	–
Estimated value of 'fasola wrzawska PDO' sales (PLN thous.)	17.1	31.5	32.0	31.0	–

Source: Stowarzyszenie Producentów Fasoli Tycznej 'Piękny Jaś' we Wrzawach/Association of Tyczna Bean 'Piękny Jaś' in Wrzawy.

in the Gorzyce municipality (10), and on plots of an area of 0.72–1.1 ha located in Radomyśl municipality on the San River.

In the period under examination, when 'fasola wrzawska' with a PDO label was produced, its acreage increased by 14% (to 11 ha). In the course of 2012–2014, its average yield obtained by farmers ranged from 12 to15 dt/ha, whereas 2015 turned out to be worse as yields were at a level of 8.7 dt/ha. Producers consider a good harvest to be from 150 kg to 200 kg beans obtained from 600 plants (i.e. 0.25–0.33 kg/item). The sold production of 'fasola wrzawska PDO' totalled 5.85 t. In 2012, it became available under protected designation for the first time and then its volume sold was equal to 9.5 t, whereas in the following three years its sales amounted to 15.5–17.5 t. By the end of this period, the sales of bean with a PDO logo amounted to around PLN 111,600, of which PLN 17,100 was paid to farmers in the first year of production certification and PLN 31,000–32,000 in subsequent years (Borowska, 2010, 2017). The scale of total production was small; only eight producers placed up to 500 kg of the PDO bean on the market, while five sold from 510 kg to 1.2 t. None of the farm holdings specialized in this leguminous crop production and simply acted as a supplement to diversify basic production, generating additional, regular and real income from several to a dozen or so PLN thousand per 1 ha, annually. The two categories of multiflora beans cultivated in the Nadwiślańska Lowland and the Lower San Basin, i.e. the same variety – with or without the PDO label – were characterized by the same average price rise experienced by farmers in direct sales, in buying-in entities and at market places. Due to physical properties (e.g. the size of beans), the price of dwarf varieties ('piękny Jaś karłowy') on the local market was relatively lower in comparison with climbing beans ('piękny Jaś'), particularly those with large-size beans. In 2012–2015, the producers of 'fasola wrzawska PDO' distributed, in total, 20% more seeds via the direct sales channel, i.e. over 3.1 t, than via the indirect channel – 2.65 t. One third of farmers declared that the sale was carried out on the farm by themselves or by family members, and 23% – at nearby market places. It is worth noting that local retail store demand, on a one-off basis, was about 20–30 kg of the certified product, but it was more difficult to find a buyer of larger quantities (Tajs, 2013). At the beginning, it was assumed that through the promotion of bean with the EU PDO label, farmers would reduce the supply chain thanks to the Association (by eliminating intermediaries and tradesmen) and reach consumers directly with their product, thereby obtaining not only a price premium but also minimizing trade margin (Borowska, 2010; Tajs, 2013; Borowska, 2017). However, the presence of this link in the chain improved and accelerated the flow of goods, and therefore its complete elimination at this stage was not in the interest of the producers; moreover, it caused 'fasola wrzawska PDO' to become more recognizable and bought not only at the local market. The second Polish regional bean with the EU PDO logo available on the market is 'Piękny Jaś z Doliny Dunajca'. It is cultivated in eleven

municipalities located within the administrative borders of the Małopolskie Voivodeship (province). In 2008 alone, the area grown to beans in the Dunajec Valley, in municipalities associated in the Union of Bean Producing Municipalities, was approximately 600 ha. The average farm size in the Tarnowskie district located in this Voivodeship is slightly more than 3 ha, whereas the acreage grown to beans by members of the 'Dolina Dunajca' cooperative, composed of 31 members, was in total 15 ha, i.e. on average 0.48 ha per person. A characteristic feature of the region was the allotment of plots from 20 acres to approximately 0.5 ha for bean cultivation. In favourable soil and meteorological conditions, during the growing season, the yield obtained in the plantations in the Dunajec Valley, depending on production technology, varied from 2 to 4 t/ha. In 2008–2014 the production of non-certified bean in the 'Dolina Dunajca' cooperative amounted to nearly 20 t and its estimated value ranged, depending on the year, from PLN 120,000 to 220,000. In 2011 wholesale prices of non-certified beans paid to farmers were on average from 10 to 11 PLN/kg, however the final level depended on the date of sale, the customer, product volume and calibration. In subsequent years, i.e. 2013–2014, producers were able to obtain 8–9 PLN/kg for fresh produce and 10–11 PLN/kg for dried beans. It turned out that the sale of bean 'Piękny Jaś', without the EU PDO label, was ensured every year due to activity on the local market of specialist buying-in entities, such as 'Florpak' Sp. z.o.o. (Wojnicz), 'TAR – GROCH-FIL', Vitapol, Baśpol and others. Until the product name was reserved, this bean variety had been sold on the market under the common name 'Piękny Jaś z Doliny Dunajca'. Producers were identified with it and had hopes for future economic benefits deriving from it. From 2011, the vegetable under the certified name 'fasola Piękny Jaś z Doliny Dunajca' was not sold or was sold in negligible, niche quantities. Although this variety of bean was still commonly cultivated in the Dunajec Valley following the same production methodology as before, the common, generic name, not the protected one, was used for grains of this leguminous crop, because the producers did not want to go through the certification procedure and control of the production process.

Just like 'fasola wrzawska PDO', 'fasola Piękny Jaś z Doliny Dunajca PDO' provided an additional source of income; it was considered to be of economic importance – it enabled the maintainence of jobs in agriculture and helped create new ones for family firms connected with the product (collection, transport, export, processing, etc.). Furthermore, it constituted an important element of the concept of the development strategy under implementation of, for instance, the Tarnowski district. A precious local entrepreneurship initiative was undertaken, i.e. thanks to the Association GRUPA ODROLNIKA, sales were organized via a website http://www.odrolnika.pl/ (the so-called parcel from a farmer in the online store www.paczkaodrolnika.pl). In addition, the Local Product Centre (CPL) in Rzuchowa was established to carry out the direct sale of, for example, traditional foodstuff (included in the List of Traditional Products (LPT) of the Ministry of Agriculture and Rural Development), and in 2015–2016 the bean 'Piękny Jaś z Doliny Dunajca PDO' was on offer there, too.

The third regional bean in Poland protected by geographical indication is 'fasola korczyńska'. However, it was not available on the market under this name. There were several reasons for this situation. Firstly, the Association of Bean Producers in Nowy Korczyn pointed out to the fact that the price fixed by the entities buying in beans only due to product geographical indication – 'fasola korczyńska PGI' was not higher, given the lack of full traceability in trade of the origin of the regional bean as a high quality product (e.g. by indicating on the package the name of the bean, its commercial standard; in the case of a mixture, the share of varieties together with their origin and structure; the name of the producer, site of production and packing). However, the price should be higher resulting from additional requirements imposed on producers upon certification (confirming production quality) and the value-added for the consumer – full product traceability at each stage 'from farm to fork'. Additional workload of the producers upon production, keeping registers identifying volume and sale would not constitute a barrier to obtaining a certificate. However, producers believed it was debatable whether the market was mature and developed enough for all entities involved in buying in and

packaging bean bearing, in this case, the PGI logo to feel the necessity of putting in an additional effort to prove to authorities – potentially another, additional, new (e.g. marketable quality) control body in the company – all raw material suppliers, the quantity and origin of the bean, buyers and quantities of seeds sold as well as the bill for the amount of bean bought in and sold. The potential for this leguminous crop production under the name 'fasola korczyńska PGI' was considerable. In 2014 alone, there were over 7,330 farm holdings in the designated geographical area of its production, and about 1,200 persons from these holdings were members of the Association of Bean Producers in Nowy Korczyn. They allotted nearly 3,000 ha to vegetable cultivation and, depending on the year, approximately 80% of it, i.e. 2,400 ha, for the cultivation of stringed dwarf bean 'Piękny Jaś'. In 2007, in the Nowy Korczyn municipality alone, this bean was grown on around 700 ha of arable land. The requirement imposed on the 'fasola korczyńska PGI' producers to grow it on plots not less than 0.20 ha, whereas yield should not be higher than 20 dt/ha. It is worth adding that, in 2009 alone, the area grown to beans was 2,500 ha, while production amounted to almost 800 t. The acreage of bean cultivated by members of the Association was about 650 ha, while production – nearly 1,600 t.

DISCUSSION AND COMMENTS

In the areas where regional bean with protected geographical certification could be cultivated, including Małopolskie Voivodeship ('fasola Piękny Jaś z Doliny Dunajca PDO'), Świętokrzyskie Voivodeship ('fasola korczyńska PGI'), Podkarpackie Voivodeship ('fasola wrzawska PDO'), there are thousands of agricultural holdings that have varieties of this leguminous crop within the structure of the area sown to crops. However, taking into account the dozen or so producers in total who submitted the application for certification and control of bean production according to specification, the scale is regarded as very modest. Moreover, in 2017, there were, in total, only seven certified producers in Poland, including one of the bean 'fasola z Doliny Dunajca' and six of 'fasola wrzawska' with the possibility of selling the product with the EU PDO label and making use of the protected name. There were many objective and subjective reasons for this situation. The former were as follows: formally complex documentation, a time-consuming process of recording information necessary for comprehensive production control, making free samples available for laboratory tests of the product – the producer must bear additional costs of a control (about PLN 650–700, i.e. as much as the farmer obtained from the sale of 50 kg of beans, while production was low several hundred kilogrammes). This was a significant, additional burden to the budget, as farmers had to wait for months for cost reimbursement provided they applied for such reimbursement under the measure 'Farmers' participation in food quality schemes' in the subsequent Rural development programmes: RDP 2007–2013, RDP 2014–2020. It is worth noting that the maximum reimbursement of eligible costs borne due to farmer participation in EU food quality schemes was 3,200 PLN annually per holding throughout the period of five years since entering the food quality scheme. Moreover, a lack of price premium satisfactory to producers for a high quality regional product (bearing the EU logo on a label) relative to non-certified bean offered on the market, etc., was observed. Subjective factors are another matter – additional obligations from the certification declaration, the attitude of an observer of the certification and control system functioning, the willingness to take a decision based on other farmer experience, no time to deal with additional administrative tasks and formalities connected with keeping product records and statistics, small production scale due to a lack of farm specialization, annual sale on a contract basis of beans not requiring certification, etc. One of the major reasons for relatively little interest in the crop were not very high and variable in year harvests, though high yield potential was great, but sensitivity to unfavourable weather and susceptibility to disease very often caused the yield to be low. Furthermore, bean production was an additional source of income for small agricultural holdings for which the production certification process became the goal of the formal sale of small quantities of the product bearing a protected EU symbol and it was an image-related benefit only, not an economic success. Little interest

in growing PDO or PGI beans was the consequence of relatively favourable bean prices in 2011–2014 in both wholesale purchases and direct sale, while annual demand on the part of the wholesale purchase of goods (including large beans) intended for processing in Poland and for export remained unflagging.

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SUSTAINABILITY IN URBAN VS. RURAL AREAS: A COMPARISON OF SUBJECTIVE AND OBJECTIVE INDICATORS ACROSS EUROPEAN COUNTRIES

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ABSTRACT

In this paper, starting from the approach described in Chiarini et al. (2017), who have provided a subjective measure of the environmental impact of cities (subjective EIC) at the country level, we extend the analysis comparing their indicator with the objective measure of the environmental impact of cities (objective EIC) suggested by Agenda 2030, namely mean levels of fine particulate matter (PM2.5 and PM10). The comparison between subjective and objective indicators of the EIC is a novelty in the panorama of the available studies, and provides useful results for policy analysis. In fact, the relative ranking of countries changes according to the metric adopted, and the analysis of association with macroeconomic indicators of development and growth reveal that subjective and objective EIC indicators might influence/be influenced by different macrofactors.

Keywords: perception of pollution, concentration of particulate matter, cross-country comparison
JEL codes: Q5, O57, C25

INTRODUCTION

Several studies in the framework of quality of life, but also in the domains of poverty and deprivation, have found that subjective and objective indicators may tell a rather different story. Usually, objective indicators were found to be weak predictors of satisfaction in related life domains (Cummins, 2000). With reference to urban sustainability, we can expect that measures based on subjective perception of pollution and measures based on the actual level of pollutant concentration may give a different picture.

This paper investigates both types of information. Specifically, country rankings according to both measures are provided. The question we ask is twofold: (1) what explains the differences in the rankings; (2) is there a criterion to guide the researcher/policy maker to trust more one measure or the other one according to specific circumstances? The two questions are deeply linked to each other and raise the issue of

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combining both indicators in order to increase their usefulness for policy makers.

THEORETICAL BACKGROUND

Urbanisation has been a fundamental feature of economic development, as documented in several papers (see, for instance, Galor, 2005; Chiarini and Marzano, 2014), albeit its role in fastening the improvement of economic conditions has been debated by recent literature (Jedwab and Vollrath, 2015). Moreover, the development of cities, and, especially in the less developed countries, megacities, is a serious concern for scholars investigating the issue of urban sustainability (Button, 2002). This is witnessed by the fact that in the 2030 Agenda for Sustainable Development (United Nations, 2015), the issue of sustainable cities is listed among the 17 sustainable development goals adopted in 2015. With regard to goal 11, promoting sustainable cities, one of the targets to pursue by 2030 is listed as reducing 'the adverse per capita environmental impact of cities, by paying special attention to air quality and municipal and other waste management'. To this scope, one of the recommended indicators is the annual mean levels of fine particulate matter (e.g. PM2.5 and PM10) in cities.

The main idea of this paper is to compare objective indicators (such as environmental quantitative measures) and subjective indicators (such as individual perceptions). Subjective indicators of environmental discomfort deserve to be considered since individuals may differ not only in their exposure to environmental risk but also in their sensitivity to exposure (Schmit and Lorant, 2009). The analogies and discrepancies of both kinds of indicators could support decision making and policy analysis as regards to sustainability in urban areas vs. rural areas.

Studies that address the impact of pollution frequently resort to the use of both objective and subjective measures of environmental quality: the application fields range from epidemiology where the interest is in estimating the impact on health (Orru et al., 2018) to quality of life for the influence on life satisfaction (Liao, Shaw and Lin, 2015) to housing economics for the effect on housing prices (Berezansky, Portnov and Barzilai, 2010; Mínguez, Montero and Fernández-Avilés, 2013).

MATERIALS AND METHODS

Subjective indicator: data and variables

The subjective measure of the environmental impact of cities (Estimated Environmental Impact of Cities, EEIC) has been estimated on microdata from the 2013 wave of the European Union Statistics on Income and Living Conditions (EU-SILC; Eurostat, 2013).

The total final sample size consists of 184,876 households living in 26 European countries (23 EU countries plus Norway, Switzerland and Serbia): the within country sample size ranges from 3,630 households in Luxembourg to 15,703 in Italy.

The two main variables of interest are the indicator of environmental risk and the degree of urbanization, which represent the response variable and the key predictor in the estimated models, respectively. Differently from Chiarini et al. (2017), who measured environmental risk in terms of noise and air pollution, given the scope of our analysis, here we focus the attention only on self-reported problems of pollution where the household lives. This is coded as a dummy variable that equals 1 if the household perceived to be exposed to the risk of pollution. The degree of urbanization is a categorical regressor with three categories: large urban area, small urban area, rural area.

To derive the subjective indicator at the country level, for every country first we estimated a probit regression for the probability of perceiving pollution and then we computed the average marginal effect of the degree of urbanization on that probability. The average marginal effect has been computed by contrasting large urban area with rural area. Therefore, the indicator shows the difference in the predicted probability to report environmental risk when living in a large urban area and when living in a rural area. This difference is averaged across all households living in a country. More methodological details, which include also the selection of the control explanatory variables, can be found in Chiarini et al. (2017).

Objective indicator

The objective indicator is based on the concentration of particulate matter (PM). It is well known that anthropogenic sources (such as traffic emissions or combustion activities) tend to produce more fine particulate (PM2.5, i.e. particles whose diameter is 2.5 micrometers at most) whereas natural sources are responsible for producing more PM10 particles (i.e. particles with a diameter of 10 micrometers at most).

The information about the population weighted annual means of PM2.5 and PM10 has been retrieved from the European Environmental Agency (EEA), with reference to year 2013. For every country, the objective indicator is derived as the PM2.5/PM10 ratio. Therefore, high values of this ratio signal that PM10 mainly consists of fine particles, that are likely to be found in urban areas, where usually a high density of human activities is found. This ratio is frequently used in spatial and/or temporal analyses (Munir, 2017; Talbi et al., 2018).

RESULTS AND DISCUSSION

The two indicators have been compared across countries by looking at the relative ranking of countries and by investigating the relationship between every indicator and country-level macroeconomic factors accounting for per capita GDP and growth rate.

By plotting the countries in a plane, with the x axis representing the PM ratio and the y axis representing the subjective indicator, and taking the medians of both indicators as reference lines (the red lines, Fig. 1), we see that the countries are scattered randomly in all four quadrants. The most industrialized European countries (Germany, Italy and France) combine above the median values of both indicators. The cleanest European countries (the Nordic countries) combine below the median values for both indicators. For other countries, high scores on one indicator are paired with relatively low scores on the other, and vice versa. Greece deserves to be mentioned as the country that ranks first in the subjective indicator and

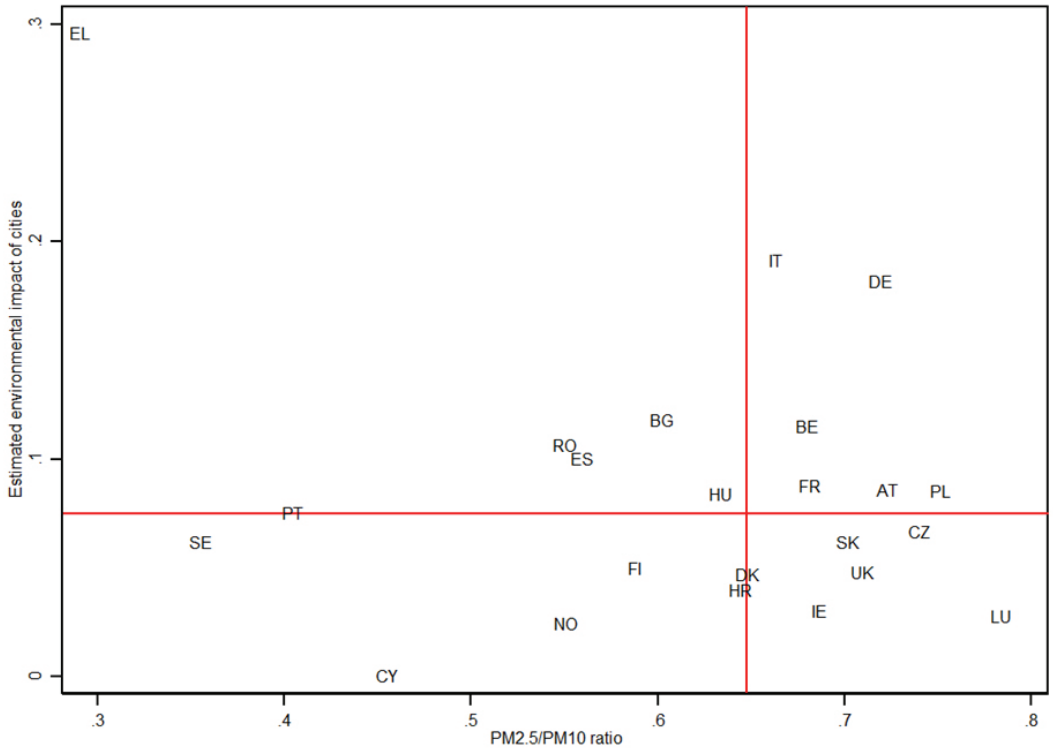

Figure 1. Subjective indicator (EEIC, y axis) vs. objective indicator (PM2.5/PM10 ratio, x axis)

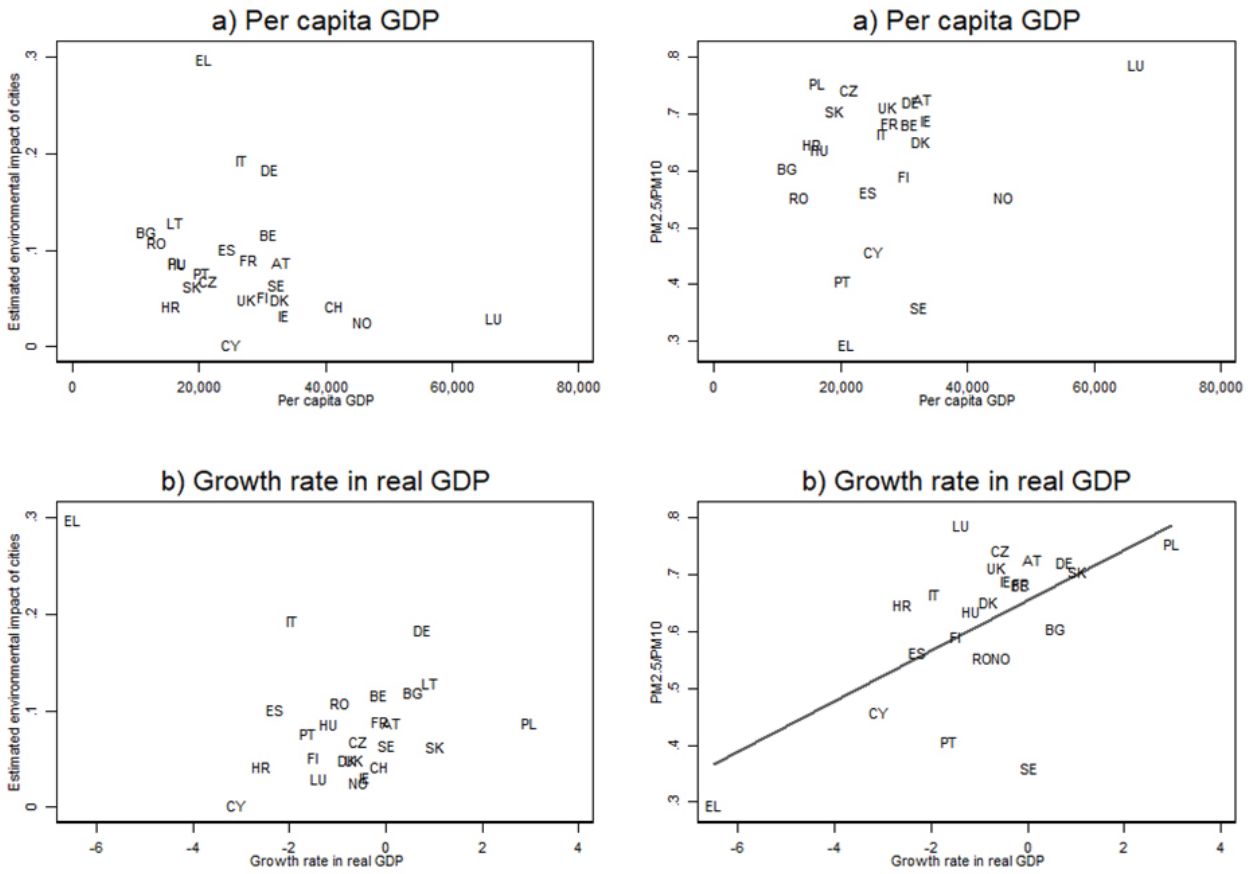

Figure 2. Subjective indicator (EEIC, left panel) and objective indicator (PM2.5/PM10 ratio, right panel) vs. per capita GDP and growth rate

last in the objective indicator. This unusual combination of values of both indicators qualifies Greece as an outlier, which should be investigated further.

In the whole, as a general result, the two rankings do not show any association (Spearman coefficient –0.06).

The next issue we want to investigate is whether the two measures reflect different correlations with country level factors reflecting economic conditions and business cycle. To this end we plotted every indicator on per capita GDP and growth rate in real GDP. This information was extracted from the Eurostat database[5] and it is expressed as average during 2009–2012.

From Figure 2, no significant association seems to emerge between per capita GDP and growth rate with the subjective indicator (on the left) whereas there appears to be some evidence of a positive linear correlation between growth rate and the objective indicator (bottom right panel).

CONCLUSIONS

The subjective and objective measures of urban sustainability emerge as two different domains of the environmental impact of living in cities. Plausible explanations of the absence of correlation between the two indicators may concern: (i) issues of popula-

[5] http://ec.europa.eu/eurostat/data/database.

tion density and/or concentration of polluting activities in urban areas; (ii) individual sensitivity to environmental issues, that is the threshold of subjective acceptance of pollution, that in turn can be affected by institutional features, environment-related legislation, cultural and psychological aspects.

For example, for countries where polluting industries are located away from residential areas, we can expect low levels of subjective indicator associated with even high values of objective indicator. This source of discrepancy may be mitigated in our case by the use of the PM2.5/PM10 ratio, which accounts for the share of emissions due to anthropogenic activities run in urban environments.

Furthermore, in countries where environment-related legislation is not very strict (where, for instance, citizens can circulate by using old cars), we expect larger objective EIC, and a sort of acquaintance with high levels of pollution, that could explain low perception. This observation has much to do with the explanation that reminds to cultural aspects. In countries where attention to environmental issues is widely present in the public opinion, it is expected that the threshold of acceptance of environmental pollution might be particularly low. Therefore, where the environmental culture is more lively, the presence of high levels of the subjective EIC might be contrasted with low measures of the objective measurement of the pollution.

These evidences suggest two orders of considerations. First, in the analysis of sustainability, a multidimensional approach which combines both subjective and objective information could prove to add useful insights to enrich the understanding. Second, while targeting policies aiming to pursue the goal of sustainable cities, it can be of help to expand the analysis beyond the realm of urban-mobility management practises. Specifically, policies targeted to limit the emissions should not disregard the business cycle dimension of air pollution, that is its positive association with the growth rate of GDP. Nevertheless, due to the uncorrelation between objective and subjective indicators, an improvement in the concentration of emissions does not automatically entail an improvement in the perception of urban sustainability.

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PART 2

POLICY TOWARDS AGRICULTURE AND RURAL AREAS

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SIGNS AND TRENDS IN SOCIOECONOMIC CHANGES IN RURAL AREAS

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ABSTRACT

This paper analyses the scope and the main directions of economic and social changes occurring in rural areas including, among others, the declining role of agriculture and the growth of non-agricultural activity. Although employment in agriculture is decreasing, the population of people in rural areas is on the rise, while the general population continues to decline. In general, these phenomena have been caused by nationwide de-urbanisation and re-ruralisation (the influx of residents to rural areas). The cumulative effect of these changes is the transformation of rural areas, especially those which are suburban or attractive due to their natural environment, which are losing their agrarian character.

Keywords: rural areas, functions of rural areas, economic and social changes
JEL code: R11

INTRODUCTION

Traditional thinking identifies the countryside with agriculture and, in terms of production, this association is likely to remain valid forever. However, modern times are characteristic for their overarching volatility, which also affects the functions of rural areas, the scope, signs, conditions and consequences of the occurring changes. After the change in the political system in 1989, rural areas have undergone considerable production-related, economic, social and cultural shifts, deemed comparable to, or greater than, the changes that have transpired in other socio-economic spheres. At the same time, the countryside had a far worse starting point than the city (the industry). At the beginning of the transformation, the countryside and agriculture were not areas of particular interest for the state or the socioeconomic policy. Both the opening of the markets and the dwindling state support have decreased the profitability of food production and reduced the income of the rural population. The living conditions worsened with the shutdown of some of the social infrastructure facilities, the so-called supply and sale cooperatives, and cuts in the transport network. This transformation was particularly painful for the former state farms and rural areas, where a high percentage of property was state-owned. This stagnation, or rather recession, in the growth of rural areas was put to a halt after Poland's accession to the European Union. Even before, the countryside had received support from pre-accession programmes, but it was only after the introduction of the common European agricultural policy that farmers gained access to direct subsidies and, under a range of dedicated programmes, the rural population could receive funds for restoring the infrastructure and developing

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the non-agricultural economic activity. This paper aims to outline the economic and social processes and phenomena observed in the countryside, as well as the signs which forecast its future.

ECONOMIC ACTIVITY

Identifying the countryside solely with agriculture is an increasingly inaccurate reflection of reality. The number of so-called agricultural homesteads, which engage in solely agricultural activity, amounts to approximately 300 thousand. In other words, only one homestead in seven has sufficient commercial production to generate a decent income to ensure development. According to the report drafted by the Country Support Foundation (FWW), the number of people living on agriculture barely exceeds 10% of the rural population, 38% of people engage in hired labour, while 25% live on pensions and benefits, and the remainder have diversified sources of income (Sadura, 2017). Approximately 40% of rural homesteads are unrelated to agriculture.

The survival of many homesteads, not only those engaging in commercial production, is ensured by direct subsidies from the European Union, which are used by more than 1.3 million homesteads. Those subsidies are provided in the form of social pensions which complement the income generated by a limited agricultural production. Although in Poland the share of subsidies in agricultural income is lower than in other countries of western Europe, it has reached 50%. The total amount of the subsidies in the years 2004–2015 amounted to EUR 21 billion. Differing capability to use the subsidies, develop agricultural production and compete in the market has significantly polarised the acreage of homesteads. There is a clear increase in the number of small, so-called 'social' homesteads (up to 2 ha) and large commercial homesteads covering an area of more than 50 ha.

While the gap in the spatial distribution of agricultural production continues to grow, reaching the level of regional specialisation, the scale of poverty and disparities in the level of income among the rural population are decreasing (Wilkin and Nurzyńska, 2016). Large-scale homesteads, most of which are situated in regions where a high percentage of property used to be state-owned, specialise in field crop production, sometimes combined with factory farming, while smaller homesteads engage in a multi-faceted activity or specialise in gardening, ecological production or traditional husbandry. The liberalisation of international trade in agricultural produce will foster the concentration of production and an increase in acreage as a prerequisite for competitiveness. In other cases, it may encourage the development of market niches which exploit unique natural assets or technological conditions for production. The concentration of agricultural production, involving factory animal farming or large-scale monocultures, complicates the fulfilment of requirements related to sustainable development, especially in the field of natural sustainability. In the social dimension, sustainable development involves using available labour resources and providing the rural residents with access to products and services which determine the standard of their living conditions. The growth of such activity has encountered multiple barriers, such as scarcity of demand, its dispersion across a large territory, low level of education, lack of experience in business activity and legal limitations, especially for small food service facilities, food production and direct sales. Studies have found that rural residents engaging in non-agricultural activity have a lower level of education than farmers, especially the owners of larger homesteads (Zawalińska et al., 2015). Such residents have more difficulty finding employment as hired workers or initiating their own economic activity. Yet, some of the educated youth return to rural areas. Those people show potential to start their own economic activity, either in the form of self-employment or a microenterprise. People engaging in such businesses are often families of the farmers. Sometimes, non-agricultural and agricultural activity is combined, as exemplified by agritourism. Non-agricultural economic activity comprises different areas (industries) of manufacturing and services, usually involving trading (oftentimes street trading), construction and repairs, food processing, small-scale manufacturing (handicrafts), tourism, vehicle servicing and transport (Sadura, 2017). The growth of non-agricultural entrepreneurship may be fuelled by the increasing influx of urban residents to the countryside. However,

this process is more likely to generate demand for all kinds of services (housework, gardening, cultural services, beauty services, etc.); migrants should not be expected to launch their own businesses. In general, the countryside is progressively losing is agrarian character (though the speed of changes varies) while its non-agricultural functions keep growing (Rosner and Stanny, 2016). Those processes are in line with the principle of multi-functional rural development. Changes in the economic structure are coupled with social development because of the growing social and technical infrastructure, public services, use of labour resources, upkeep of homesteads and agriculture. The development of non-agricultural economic activity in the countryside:

– prevents marginalisation and depopulation of rural areas, especially those located on the peripheries;
– ensures better allocation and use of capital and human resources on a regional and local scale;
– increases the standard and quality of living by generating income and allowing rural residents to satisfy their needs in terms of livelihood, culture, recreation, production, transport, etc.;
– improves the accessibility of public services thanks to the growing social and technical infrastructure, financed with municipal income generated by business;
– spreads knowledge of the economy and fosters entrepreneurship.

In general, even though agriculture is losing its significance due to the dwindling employment and share in GDP, it remains vital for using land resources and ensuring food security. At the same time, non-agricultural activity in rural areas continues to grow in importance. The relationships between those two spheres of economic activity show considerable spatial disparity: for instance, they are different in rural areas bordering agglomerations and on the peripheries.

SOCIAL CHANGES

Since the change to a market system, and later the accession to the European Union, rural areas have witnessed significant demographic and social changes. Those changes have translated into, among other things, a growth in the rural population, even as the general population continues to decrease. The growing number of rural residents is the upshot of migration from the cities. The scale of this migration is more than sufficient to balance out the migration to the cities and abroad, as well as the dwindling birth rate of the rural population (Zawalińska et al., 2015). Currently, approximately 40% of the general population lives in the countryside and this percentage is on the rise. Living in the countryside seems more and more attractive. It is usually the wealthier and the educated who move to rural areas, while the opposite direction is taken by people who have lesser economic and professional potential (Sadura, 2017). Thus, the gap in the intellectual potential between the country and the city is closing. Migrants from the cities settle in places located in vicinity of urban areas. Villages bordering a city often become commuter towns. In addition, urban dwellers migrate to places appealing due to their scenic landscapes or allowing them to pursue their dreams of an idyllic life in the bosom of nature. More and more people combine living in the country and the city by means of second-home ownership (Stanny and Drygas, 2010). Discovering rural areas as a good place for settling down often leads to re-ruralisation, or a return to living in the country. It is a symptom of tendencies opposite to those observed on a global scale. In most Polish cities, the number of inhabitants is declining. In other words, de-urbanisation is underway. The changing employment structure of rural residents, involving a decreasing share of people involved in agricultural production, is a symptom showing that rural areas are losing their agrarian character. Judging by the manner and scope of integration of urban dwellers with the rural environment, two groups may be discerned: animators and colonists (Bendyk, 2017). Members of the former group socialise with the local community and initiate activities which lead to mobilisation of the people and development of the area. Such activities may be related to history, tradition, rural customs, economic activity (e.g. traditional food, ecological farming, agritourism) or social activity (associations, cooperatives, etc.). Conversely, colonists refrain from integrating with the local population. They often only exploit local resources, including cheap labour, to achieve their own goals (Bendyk, 2017).

Rural areas are losing their agrarian character and the process of re-ruralisation continues. As a result, almost 46% of rural homesteads are owned by workers (engaging in hired labour), 34% by pensioners, 6% by businessmen and less than 12% by farmers (Nurzyńska and Poczta, 2014). Shifts in the social and employment structure of rural population, increased incomes (due to direct subsidies, among others) and the development of social and technical infrastructure financed with European funds have narrowed the gap between the country and the city. It is apparent from the amenities of rural homesteads, accessibility of services, transport possibilities and the level of education. The scope of changes also shows high spatial disparity (Stanny and Drygas, 2010). In peripheral areas, where the distance to the closest city is significant, the geographic location is unfavourable (e.g. near the Russian border) or the transport possibilities are limited, agriculture remains the main function in terms of production, depopulation continues and villages virtually disappear. In turn, in the vicinity of large agglomerations, the borders and differences between the country and the city become blurred, resulting in the emergence of a country-city unit. In peripheral areas, the share of the elderly is increasing due to migration, poverty is relatively common and the number of so-called NEETs (not in employment, education or training) remains relatively high. The growing diversity and multi-culturality of the rural population have a positive potential, as the co-operation of multicultural subjects and their mutual influence generate a synergistic effect. On the other hand, diversity and multi-culturality pose a risk for rural traditions and the integration of local communities. Those circumstances necessitate support for traditional rural organisations, initiatives to ensure educational chances, especially in disadvantaged areas, the development of economic co-operation (cooperatives, producer groups, etc.) and the development of non-governmental organisations.

TOWARDS SUSTAINABLE DEVELOPMENT

The economic and social changes discussed have various causes and consequences. The identification of all the causes is difficult, if not impossible. Even though they are always rooted in the past, and – as time cannot be stopped – the present has also already changed into the past where we seemingly have full (or at least broad) knowledge, identification of the sources of changes and their relationships to the current situation presents a range of considerable challenges. This is because not only causal relationships need to be considered, but also feedback loops, the multiplier effect, the synergistic effect, and others. Furthermore, rural areas are not isolated from their closer and more distant surroundings – including the entire globe – in various spheres (economic, political, civilisational, etc.). Predicting the consequences, or the future, is an even more difficult task. This cumulative uncertainty results from the growing volatility which stymies any predictions of the future. The problem concerns the favourability assessment of different aspects of changes, including the assessment of conformity with the principles of sustainable development. The economy should satisfy social needs and its principles, as well as the manner of satisfying those needs, should be in harmony with the natural environment. The awareness of risks for the ecosystem posed by economic growth is becoming increasingly universal. It is the consequence of, among others, environmental threats resulting from industrialisation of plant and animal production, concentration of production and reduction of biodiversity (Niedzielski, 2015). Preserving harmony with the natural environment is becoming an even more arduous task due to the abovementioned spatial disparity of homesteads. Growing population density and the development of rural areas further aggravates the problem. Sustainable development requires interventionism at the level of the state and local governments since the pursuit of economic gain may clash with social and environmental interests, the development of technical infrastructure and settling may damage the landscape and nature, etc. Ecological awareness, as well as concern for biodiversity, scenic landscapes, quality of natural environment (soil, water, air) are also required and, fortunately, are increasing in society. Economic and social changes in rural areas are increasing the diversity of functions served by those territories, thus developing the network of relationships between those functions.

CONCLUSIONS

In recent decades, particularly since the Polish accession to the European Union and the implementation of the common agricultural policy, rural areas have witnessed far-reaching economic and social changes. Three processes are the cause and the effect of those changes: de-urbanisation, re-ruralisation and the loss of agrarian character by rural areas. The fading role of agriculture in rural areas has translated into decreasing employment in agriculture, dwindling acreage of land used for farming, as well as a rapid growth in non-agricultural economic activity. Social and cultural changes result from the altered number and structure of rural residents, which include more and more actual inhabitants (second homes) or former urban dwellers (migrants). The scope and direction of changes, both in the economic and the social dimension, show high spatial disparity – ranging from areas with a very limited agricultural function, located in the vicinity of large agglomerations, to peripheral areas, where depopulation is widespread and agricultural prevails along with forestry.

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DISCOVERING ECONOMICS IN THE EU'S COMMON AGRICULTURAL POLICY. RECOMMENDATIONS FOR THE NEW PERIOD 2021–2026

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ABSTRACT

The aim of the publication is to assess the functioning of common agricultural policy (CAP) in the context of its relationship with the paradigm of industrial and sustained development of the food economy. The idea is to find a relationship between specific instruments of the EU's agricultural policy and the assumptions of the adopted paradigms, and thus formulate certain general application premises and solutions in three areas: justification for the support of the agricultural sector, the problem of income deprivation of agricultural producers, and the change of the industrial-technological development model, predominant in agriculture, into sustained development. In light of the presented discussion, the occurrence of the following three economic CAP premises was confirmed: the need for financial support for the agricultural sector, the drainage of agricultural producers in the food supply chain, and the superiority of sustainably developed agriculture over industrial agriculture. As a result, recommendations concerning common agricultural policy after 2020 were given. The most important ones include: maintaining as high a level of support for agriculture as possible at an EU level, maintaining the system of direct subsidies as the most important instrument of equalising agricultural income, limiting unequal distribution of payments among small and large farms, enhancing the position of the farmer in the food chain, implementating a mandatory risk management instrument, and establishing an 'environmental budget' financing public goods.

Keywords: common agricultural policy, economics, paradigm, recommendations
JEL codes: E60, E61, Q01, Q18

INTRODUCTION

The basic definition of economics treats it as a social science concerned with economic life. Its beginnings date back to the deliberations of ancient philosophers (Hesiod's and Xenophon's works on running a household, Plato's theory of the ideal state or Aristotle's chrematistics), and the period of geographical discoveries which enhanced the willingness to explore the regularities of the market mechanism. The real heyday of theory occurred in the 17th–18th centuries, and representatives of classical economics, such as William Petty, Adam Smith, David Ricardo, and Jean-Baptiste Say, have become an inherent part of the canon of humanities (Hull, 1899; Vaggi, 1987). Since that time, successive economic currents have

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made attempts at explaining economic development, both in macro- (Smith, 1776; Keynes, 1936) and microeconomic terms (Marshall, 1920; Robbins, 1932), differing as to the causes, course, and consequences of this phenomenon. The views of the followers of the neoclassical or neoliberal schools and those of Keynes and institutional schools on the role of the state also differed.

Nowadays, diversification of opinions and views is particularly high, among others on account of the nature of the global economy and the processes that accompany it and due to the development of science as such (Bartkowiak, 2010). More and more frequently, they go beyond national borders and involve decisions made by supranational entities of the political sphere (e.g. EU institutions). Consumer and producer economics (with the consumer and producer as entities active in the market) was replaced with the public choice theory (Wilkin, 2009). It is a useful tool for examining phenomena of political, economic, and social nature and may be successfully used to analyse specific activity of institutions of national and supranational reach. From the point of view of common agricultural policy, the public choice theory may serve as a search tool for selected paradigms of economics within its framework.

The aim of the publication is to assess the functioning of common agricultural policy (CAP) in the context of its relationship with the model of industrial and sustained development of the food economy. The idea is to find a relationship between specific instruments of the EU's agricultural policy and the assumptions of adopted models, and thus formulate certain general application premises and solutions in three areas: justification for the support of the agricultural sector; the problem of income deprivation of agricultural producers, i.e. the continuing disparity between agricultural and non-agricultural income in the conditions of average pay level growth in the economy; and the change of the industrial-technological development model, predominant in agriculture, into sustained development, considering that the second and third areas pertain to the need for support of agriculture (the first area), from different perspectives.

The significance of the problem adopted in the study arises from the fact that we are now on the eve of negotiations on the EU budget in a new financial perspective. It would be desirable for certain arguments to become a basis for formulating demands as to the shape of common agricultural policy. Searching for new solutions for agriculture no longer remains in the sphere of economists' aspirations, but is a necessity in a situation where industrial agriculture keeps bringing more and more socially and environmentally destructive side effects (Zegar, 2010; Czyżewski and Matuszczak, 2015). The article is not only a review and apart from the presentation of the theoretical bases of agricultural economics and the mechanisms of CAP f unctioning, this research procedure contains elements of critical analysis of source literature, meta-analysis, and valuation, and is complemented with recommendations as to the shape of the EU's common agricultural policy after 2020. At the same time, the publication is a response to the November 2017 announcement of the European Commission concerning the future of CAP (European Commission, 2017).

PARADIGMS OF ECONOMICS IN COMMON AGRICULTURAL POLICY

On the need to support the agricultural sector

The framework of common agricultural policy dates back to the late 1950s (in practice CAP was launched in 1962). It was then that the six countries making up the European Economic Community decided to define the objectives of intervention policy in the food sector in order to rebuild the production potential after the damage caused by World War II (Jambor and Harvey, 2010). In subsequent periods, its principles and directions of funding changed, yet in spite of the occurrence of critical remarks as to the essence of support for agriculture, the continuity of budgeting of this sector of the economy remained a distinctive characteristic. To date, attempts at limiting or even doing away with agricultural policy have met with opposition from most EU countries, even in the period in which the neoliberal economic doctrine prevailed in the mainstream (the 1980s and 1990s and the early 21st century (Mączyńska and Pysz, 2014). So what premises determine the need to maintain the support of the agricultural sector? If a liberal point of view with its study of micro-

economic rationality was adopted, it would have to be assumed that state interventionism (or, in our case, EU interventionism) is an unjustified privilege of the food sector and it burdens the entire society with costs. However, this kind of reasoning fails to take into consideration the specific determinants of the agricultural market and the land factor, such as the compulsion to consume food and the lack of its substitutes, low price and income flexibility in the demand for agricultural products, a high share of the random parameter shaping the size of supply (dependence on natural and climatic factors), limited mobility and non-portability (massiveness) of the property invested in farms or a long capital payback period (Czyżewski, 2007). The characteristics of the agricultural sector also include its non-uniformity, resulting from the properties of the production factor – the quality of soil, the surroundings, location, and agrarian structure, and the fact that it does not meet the free market criteria, including a large number of buyers and sellers (or actually a balance in terms of the impact of these two parties to the transaction), the freedom to enter and leave the market, and finally, perfect information. Moreover, weather changeability and natural (biological) adaptation processes determine the higher degree of the seasonal and cyclical nature of supply and prices than in other sectors, contributing to the lack of income stability and difficulties in management (Stępień, 2015).

This way, production conditions unfavourable to agriculture entail ineffective allocation of production factors. In market conditions, farmers come under huge pressure to increase productivity, production scale, and specialisation, which hinders the fulfilment of non-commercial functions. At the same time, the market – guided by the principle of equalising marginal costs – favours concentration of agricultural production in the regions adapted to it and the disappearance of production in areas with less favourable natural and economic conditions. A liberal approach to the agricultural sector passes over the external effects accompanying agricultural production, both the negative ones, such as the deprivation of the weaker farms (which is discussed further on in the article) and the degradation of the natural environment, and the positive ones, related to the supply of public goods. The scale of the problem grows in conditions of globalisation and the increasingly stronger position of transnational corporations. Economic effectiveness is becoming a priority and this means locating capital where profits are highest, often in places with lower environmental requirements or lower requirements concerning the well-being of animals or technologies used. Extending the journey made by food 'from the field to the table' creates an opportunity – due to anonymity – to introduce products of worse quality to the market, to the detriment of people's health (Czyżewski and Stępień, 2017).

Taking the above into consideration, one may conclude that the implementation of CAP mechanisms corrects the failures of the market mechanism and is justified from the point of view of economic, social, and environmental criteria. Thanks to financial support, the Community supports the so-called European agriculture model, which emphasises the duality of its function – apart from producing food, it contributes to the broadly defined development of rural areas and provides public goods (Committee of Agricultural Organisations in the European Union/General Committee for Agricultural Cooperation in the European Union, 1999; Fischler, 1999; Kowalczyk and Sobiecki, 2001). What is more, the observation of the consecutive periods encourages the conclusion that the response to incorrectly designed policy was the reform of CAP objectives and the adaptation of new solutions to these objectives. And so, after over more than 50 years of functioning, it has changed from a market-price policy, through an income and structural policy, to an environmental policy. Hence a reorientation of budget expenses occurred – from those oriented at constant growth of the productivity of production factors through high prices of food to those which directly make up the source of the farmer's income, while at the same time caring about the development of rural areas and natural conditions.

Limiting income deprivation

The above discussion justifies the conclusion that one of the paradigms of common agricultural policy is the need to maintain support for the sector. A lack of such a mechanism gives rise to the problem of

relative, i.e. in relation to the non-agricultural surroundings[3], income deprivation of farms occurring in free market conditions (cf. Czyżewski and Poczta-Wajda, 2016; Czyżewski, 2017). It turns out that without financial help, agricultural income in many highly developed countries is not only much lower than non-agricultural income, but also insufficient to cover the current operating costs and provide fair remuneration for work (Goraj, 2009; Czyżewski and Kułyk, 2010). So what are the underlying reasons for this disproportion in income? One should look for answers in the essence of land itself as a specific production factor. In the process of shaping indirect and final demand, rents (remuneration) from land participate in the distribution of surplus due to the lack of internalisation, i.e. taking into consideration numerous costs (e.g. maintaining the well-being of the natural environment) and the lack of fees for the public goods provided, to an inadequate extent. It is therefore true that the added value produced by agricultural producers does not meet the criterion of optimal allocation in the Pareto sense in intersectoral flows. In the supply chain, it is partly 'seized' by purchasers, processors, sellers, and finally consumers. This is caused, as Zegar points out, mainly by the operation of the market mechanism (Zegar, 2010). By means of prices, the market – based on property rights and supply and demand regulations – creates demand for money. In the real sphere, this leads to the concentration of production in order to lower its unit costs (in narrow microeconomic terms). Combined with technical progress, we obtain an increase in the production of agricultural raw materials in conditions of decreasing real prices of food[4]. The beneficiaries of this process include highly industrialised agricultural enterprises, which – through economies of scale – are becoming effective in the microeconomic sense, but with minimum requirements as to the quality of food, the well-being of animals, and the protection of the natural environment. For traditional, family farms (and these prevail e.g. in the Polish agrarian structure), income is significantly lower than the average for non-agricultural activity. The scale of disproportion is increased by the progressing globalisation process, which – through mergers and acquisitions – creates more and more processing and commercial corporations (such as Nestlé, Unilever, Craft Foods) which compete with one another for consumers using lower prices (Czyżewski and Czyżewski, 2015). A similar phenomenon occurs at the level of suppliers of goods and services for agriculture, where huge conglomerates use their monopolistic position and drain agricultural producers (not to mention giants such as Monsanto, Bayer, BASF, and Syngenta).

A consequence of the relationships described above is the need to return this part of the produced economic surplus which outflowed from the producers of raw material through a mechanism of income redistribution to the taxpayers (consumers), formerly through the market (minimum prices, intervention buying-in), and now primarily through the budget (subsidies and subventions of various types). A support mechanism of this kind constitutes a compensation of market discrimination of agriculture and is an important premise of the EU's common agricultural policy. At the same time, the CAP experience teaches us that the return of this surplus by supporting market prices significantly destabilises the market. Hence, as a result of an evolution of rules and instruments of the EU's agricultural policy, the lost value is returned through the budget, mainly in the form of direct subsidies (today mainly unrelated to production). They correct the failures of the market mechanism and decrease the scale of income inequality between agricultural producers and remaining market participants. This is proven, for instance, in research by Stępień,

[3] The term 'relative deprivation' was used intentionally, in order to ensure a proper standard of living for the rural population. It is necessary not only to absolutely increase income, but also decrease the differences between income in the agricultural sector and remaining sectors of the economy.

[4] Considering the last several decades, it can be observed that the current food prices, in real terms, are lower than the prices from the mid-1970s, even given the much higher prices of means of production (fertilisers, plant protection products, fuels, energy, etc.). Reaching back further, it should be emphasised that the long-term trend of agricultural price scissors getting worse has been ongoing since the 1880s.

Guth and Smędzik-Ambroży, concerning the diversification of the income of farms in the European Union and their non-agricultural surroundings (Stępień, Guth and Smędzik-Ambroży, 2017). The results clearly indicate that thanks to CAP support, the average income of farms came close to the average values of income in non-agricultural sectors. For example, taking into consideration the value of subsidies received by farms in Poland has increased the relation of their income to non-agricultural income from 30 to 70% (on average for the years 2004–2013). Similar conclusions were previously formulated e.g. by Sobczyński (2008) and Drygas (2010).

Striving for sustainable development

In search of the desirable path of development of the agricultural sector, it may initially be assumed that the industrial-technological model, predominant in the contemporary world, stimulating the technical effectiveness of production, has reached its limits of further growth. It is impossible to permanently increase labour and capital productivity in conditions of relatively low real buying-in prices. Industrial agriculture failed to meet two primary objectives of farming (Thirtle et al., 2004). Firstly – it failed to ensure proper income parity for the majority of farms, secondly – along with an increase in the scale and concentration of agricultural production, it degraded the standard of living in rural areas more and more, without internalising external costs in any way (Czyżewski and Czyżewski, 2015). These include both social costs – for instance, the previously mentioned income deprivation of agricultural producers, maintaining the disparity relative to non-agricultural holdings when it comes to the standard of living, sometimes leading to the depopulation of rural areas, and environmental costs – soil degradation, excessive emissions of carbon dioxide, eutrophication of watercourses and water reservoirs, steppe formation, etc. (Smędzik-Ambroży and Czyżewski, 2015). Considering the above, the model of sustainable agriculture is a kind of alternative to industrial agriculture.

The argument mentioned here became a basis for the construction of a CAP intervention system which would take into consideration economic, social, and environmental criteria. This was reflected in the change of the support structure from export-oriented market support into income-oriented support first, and later rural development and increasingly, environmental issues. The establishment of the so-called second pillar of the common policy in 1999, within the framework of the Agenda 2000 reform (Duer, 2000), responsible for sustainable and multifunctional development of agriculture, was particularly significant. The money that it provides plays an important modernisation and development-oriented role, increasing the competitiveness of the agricultural and food sector, thus serving an economic function. It also contributes to the improvement of the standard of living in rural areas, among others through the development of infrastructure, creating non-agricultural jobs, funding projects related to education, culture, tradition, etc., thus serving a social function. Finally, it creates tasks related to the protection of nature, maintaining biodiversity, the greening of food production, thus serving an environmental function. Moreover, as part of direct subsidies, certain rules were established which in their essence serve the creation of public goods. They make the granting of aid conditional on meeting a number of requirements related to the protection of the natural environment, people's health, the health of plants, and the well-being of animals (the so-called cross compliance, and currently also the so-called 'green' area payments).

CONCLUSIONS AND RECOMMENDATIONS

The discussion presented in the article leads to the final conclusion that in the practice of the EU's common agricultural policy, certain universal economic premises referring to the system of values resulting from the specificity of the land factor may be observed. The first one concerns the need for financial support for the agricultural sector, because the argument that the market mechanism is effective for lasting development of the agricultural sector is an idealisation of reality. In fact, agriculture's market orientation, along with attempts to increase productivity and technical progress, leads to structural changes in rural areas, which is manifested in the concentration of production and land consolidation. A negative consequence of these trends is the formation of mono- and oli-

gopolistic structures, and later, income depreciation of small and medium-sized family farms. The latter do not participate in the process of creating the final product in an equivalent way. A large part of the economic surplus they produce is regularly 'seized' by purchasers, processors, sellers, and finally consumers themselves. This peculiar drainage of agricultural producers constitutes the second important premise of the pursued agricultural policy. Finally, the third economic premise concerns the new paradigm of development of the agricultural sector, the so-called sustainably developed agriculture, emphasising the equality of economic, social, and environmental objectives.

In this context, there is a need to determine the priorities of common agricultural policy after 2020 on the eve of negotiations on the new shape of the EU budget. Firstly, it is necessary to strive to maintain as high a level of agriculture funding as possible at an EU level. Renationalisation of support would be unfavourable for less wealthy countries, such as Poland. It would be a good idea to keep the two pillars of support. Above all, it is important to maintain the system of direct subsidies in the 1st pillar, as in practice, this is the most important instrument of equalising agricultural income relative to non-agricultural income. Secondly, we need to limit the problem of unequal distribution of support among small and large farms (Bournaris and Manos, 2012; Swinnen, 2015; European Commission, 2016; Matthews, 2016; Stępień, Guth and Smędzik-Ambroży, 2017), suggesting proper corrective action, e.g. degressive payments or setting the upper limit of annual funding or the agricultural area for which the producer would receive support. Solving the problem of income deprivation also requires the enhancement of the farmer's position in the food chain, which means the need to continue programmes aimed at the creation of agricultural producer groups and cooperatives and to support tasks increasing the added value of the farmer/producer, marketing activities, etc. At the same time, the implementation of a mandatory – not voluntary as it is now – risk management instrument (e.g. in the form of mutual insurance funds) is called for. For this purpose, each country would create a special reserve, within the framework of the second pillar of CAP. Other important tasks of rural development programmes should include tasks concerning the creation of new sectors of the economy, such as clean energy, bio-economy, circular economy, eco-tourism, and others. It is reasonable to maintain flexibility in the choice of directions of support for member states. Thirdly, when it comes to the orientation of CAP towards environmental objectives, it may be concluded that more requirements for farms will make food production more expensive and more complex. The thing is not to put pressure on further limits, but to manage the environment more effectively within a limited budget. So the idea is to develop a package of precise solutions for the natural environment, for which the farmer would receive remuneration (treated as remuneration for public goods), as additional income apart from area payments. In order to avoid double funding ('greening' in the first pillar, agri-environmental payments in the second), it would be appropriate to create a single budget (an 'environmental budget', as a potential separate pillar), funded from part of the area subsidy envelope and from savings made by limiting support for the largest farms. In this context, the instrument would be addressed mainly to smaller farms, functioning as suppliers of public goods and 'landscape guards', and by moving some direct support to the environmental budget could be treated as providing equal opportunities to small and medium-sized farms.

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EUROPEAN ADDED VALUE OF THE COMMON AGRICULTURAL POLICY, A NEW EFFECT OF THE REGIONAL INTEGRATION

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ABSTRACT

Integration links in the European Union are particularly strong in agriculture and in this sector joint actions have brought the most visible effect – the implementation of the common agricultural policy. The concept of European Added Value (EAV) can contribute to understanding and assessing the relevance of the CAP to the European Union. The CAP is one of the few EU policies which is chiefly implemented at the EU level and closely linked to the subsidiarity principle, according to which the EU takes on tasks which it can implement more effectively than the Member State governments and regions. EAV derived from the CAP has its own specificity. It creates new values in rural areas and agriculture, but also provides economic, social and environmental effects beyond agriculture. A couple of new values and effects are exemplified in the present paper. It shows the CAP's contribution to other areas as well as to the UN's sustainable development objectives. Further research studies on Added Value can contribute to the theory of regional economic integration.

Keywords: European Union, Common Agricultural Policy, Added Value
JEL codes: A10, E00, F10, F15, F53, Q18

INTRODUCTION

The question what the common agricultural policy owes its success to, is an interesting research issue. Undoubtedly, the constant adaptation of the Common Agricultural Policy to the changing world is one of the reasons. Its evolution and policy achievements to date are illustrated well by the EC Communication of November 2017 entitled 'The Future of Food and Farming', announcing further reforms of the CAP after 2020 (European Commission, 2017a).

The EC Communication highlights the key role of the CAP in the development of an integrated single market for EU agricultural products, which is reflected in providing consumers with food of proven quality. Direct payments introduced under the CAP (the principal aid instrument for farmers) provide income support to farms, affecting their viability and competitiveness. These effects are also reinforced by the CAP market measures. Rural development support measures (Pillar II under the CAP), in turn, contribute – through targeted operations – to rural economic development, i.a. through support for investments, organisation of farmers and strengthening the food chain, development of farmers' skills and knowledge transfer, as well as through environmental/climate change combatting measures and new non-agricultural jobs.

Thanks to the efforts of the EU's agricultural and food processing sector as well as adequate trade policies and promotion strategies under the CAP, the EU is the world's largest exporter of agri-food products. At the same time, products which do not meet certain

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food safety standards and animal welfare criteria are not allowed to enter the EU. According to the Communication, the CAP is also planned to contribute to tackling migration issues. It will stand for agriculture-related trainings and projects in migrants' origin and transit areas as well as assistance provided to legal refugees to enable their settlement in EU countries and integration into rural communities. As it can be perceived, the CAP supports present day challenges, not necessarily directly related to agriculture. Out of the 17 sustainable development objectives by 2030 promoted by the UN, 12 are directly or indirectly implemented through the Common Agricultural Policy (Fig. 1). Thus, this is undoubtedly a policy of the future, which for 60 years has fostered the development of agriculture and rural areas and – through care for the environment and provision of food – the entire societies in the European Union.

However, how come the CAP manages to operate on so many levels with its effects not only in the agricultural sphere? And here, the concept of European Added Value (EAV) can be applied.

The objective of this paper is presentation of the European Added Value category and its manifestations in the economic life of the Community. Especially pronounced effects of EAV are being seen in the broadly defined agricultural and rural development sphere of the EU countries. The European value shows its external effect through collective actions within the Common Agricultural Policy. Recognition of the EAV category and its different forms and areas (agricultural included) serves as an introduction to further, broader and deeper research, concerning driving forces behind the world integration processes.

THEORETICAL BACKGROUND

Generally, European Added Value means an added value (benefits) derived from actions (policies) implemented at the European level compared to the effects which would be achieved by separate policies of individual Member States within a given area (RAND Corporation, 2013).

Figure 1. Sustainable development goals
Source: European Commission (2017a).

The concept of European Added Value (EAV) can contribute to understanding (and assessing) the relevance of the CAP to the European Union. The CAP is one of the few EU policies which is chiefly implemented at the EU level and closely linked to the subsidiarity principle, according to which the EU takes on tasks which it can implement more effectively than the Member State governments and regions (Ministerstwo Rolnictwa i Rozwoju Wsi, 2017).

Looking for the origins of European Added Value (EAV), it is necessary to go back to 1992/1993 and the Maastricht Treaty establishing the European Union. The concept of EAV derives from three principles: subsidiarity, proportionality and additionality, the first two are enshrined in Article 5 of the Treaty (RAND Corporation, 2013) and then further construed in a specific protocol (Protocol No 30).

According to the principle of subsidiarity, in areas which do not fall within its exclusive competence, the EU starts operating only if and in so far as the objectives of any intended action cannot be sufficiently achieved by the Member States, either at the central level or at the regional and local level, and can therefore, by reason of the scale or effects of this action, be better achieved by the EU. In accordance with the principle of proportionality, the scope and form of action undertaken by the EU do not go beyond what is required in order to achieve the objectives of the Treaties.

The Protocol No 30 to the Treaty states that, for the Community action to be justified, the principles of subsidiarity and proportionality must be attained: the objectives of any intended action cannot be sufficiently achieved by the Member States within the framework of their national constitutional systems, and can therefore be better attained by action at the Community level.

The potentiality of EAV derives from respecting the above principles. However, the concept of Added Value is broader than both. Subsidiarity and proportionality are intended to give legitimacy to action undertaken by the EU in the legal sense. One aspect of how EAV is manifested comes to its economic relevance. The condition of its formation and the type of value created are important here. The creation of EAV is also not limited by the EU's borders. New value can be created, for example, in the form of development aid.

The concept of European Added Value was strongly emphasised during the discussion on the EU budget for 2014–2020. According to the European Commission, EAV can be best defined to be a value 'additional to the value created by actions of individual Member States' (European Commission, 2014).

At the same time, European Added Value was highlighted in the theory of regional economic integration (Robson, 1998), while analysing externalities. European Added Value is a value which comes from the fact that an individual action is not undertaken at the Member State level but at the EU level. The mere establishment of a common approach for dealing with a given issue can be considered an added value, since it creates a single framework for action and ensures the operation of the EU single market, which is considered as an example of EAV. The specific structure of trade in the EU Member States, where the trade in goods with other EU countries is higher than the one with third countries (Gorzelak et al., 2017) is also considered a manifestation of added value.

However, it can be concluded that EAV is not a mere added value. In fact, EAV is an manifestation of the synergy effect, i.e. cooperation at the regional level[2]. Currently, EAV has been increasingly identified with the synergy effect (European Commission, 2017b) .

Community-level actions form EAV because:

- Many elements are of a cross-border nature, i.e. they concern other sectors. For example, the CAP is linked to the Single Market, which in turn depends on global markets. Climate, water and air quality issues are clearly of a cross-border nature.
- Actions on common issues are more effective when undertaken at a higher level of centralisation.

[2] Synergy (synergy effect, gr. *συνεργία* 'cooperation') – interaction/cooperation of various factors, the effect of which is higher than the sum of individual separate operations. As a result of synergy, for example, merged companies generate a higher profit than the sum of profits of individual companies before their merger. The main reasons for synergies are: reduction of costs and increase in the sales of each company (Corning, 2003).

- The shared budget builds solidarity. Thus, projects can be implemented in the Member States or regions, even where there is a lack of local funding there.

Just in the case of the budget it can be assumed that these funds bring more benefits than if they were spent by individual Member States. Here the theory of 'fiscal equivalence' can be applied (Olson, 1969). According to it, state-level structures should be organised in such a way that, when the state provides a public good, there should be convergent interests of beneficiaries, decision-makers and taxpayers. If this is the case, there are no cross-border (negative) external effects and public goods are provided efficiently.

Thus, it can be argued that European public goods should be provided at the EU level (ECORYS, CPB, IFO 2008; Collignon, 2011). It refers to, among others:
- border control,
- defence policy,
- internal security,
- regulations on the common market,
- trade and competition policy,
- environment, combatting climate changes, energy policy;
- R&D and education policy.

It can even be argued that the European integration creates new European public goods which can only be provided effectively at the European level. They include, for example: lowering trade barriers, migration policy, flows of production factors. It can also be proved that managing the implementation of tasks from the EU level lets the Member States to achieve better results than their all actions at the national level and above all to reduce (save) resources. This is when EAV is created (Heinemann, 2011).

MATERIALS AND METHODS

The paper is based on the analysis of the literature in the field and the European Union documentation. The analysis starts with a clarification of the concept of European Added Value followed by tracking the process of interest into this phenomenon. Subsequently, EAV and its creation under the EU Common Agricultural Policy actions and measures was discussed. On these grounds, some general conclusions have been drawn.

RESULTS AND DISCUSSION

European Added Value implemented under the CAP has its specificity:
- It creates new values in rural areas and agriculture
- It generates economic, social and environmental effects also beyond agriculture.

Point 1. The CAP pursues the objectives specified in the Treaty of Rome, among which food security for Europe is crucial. The CAP provides affordable food to consumers, bringing household expenditure on food (and non-alcoholic beverages) in the EU down gradually to 12.3% of total expenditure in 2014 (compared to over 30% in the 1960s) (Eurostat, 2017). This is undoubtedly an added value. Similarly, the EU saves €23 billion a year compared to the case without the CAP (RAND Corporation, 2013)[3]. The common agricultural policy plays the role of a guarantor of the European agricultural model, which is a relevant social asset. Without the CAP, many European countries could quickly concentrate and intensify their agricultural production (such as the USA) and set up industrial-scale agricultural businesses with all its social and environmental effects. Apart from food security, the Common Agricultural Policy now provides EU citizens with access to a wide range of agricultural public goods (Cooper, Hart and Baldock, 2009; Institute for European Environmental Policy, 2011), such as: appropriate state of the natural environment (including water and air quality, soil functionality), vitality of rural areas, animal welfare, landscape elements and structure or biodiversity. Many of these goods are 'non-marketable' and of cross-border character (e.g.

[3] In the case study conducted for 21 Member States covered by the CAP, the authors of 'The European Added Value of EU Spending: Can the EU Help its Member States to Save Money?' stated that from 2007 onwards, the likely national agricultural policies (in case of no CAP) would exceed the CAP expenditure. Expenditure by the national agricultural policies could be EUR 23 billion higher than that of the CAP alone in 2010. Vide The European Added Value of EU Spending: Can the EU Help its Member States to Save Money? RAND Corporation (2013).

air quality, climate, water). They make an integral part of the high standard of EU citizens' living and one of the key elements of the integrated approach to public health. The CAP facilitates effective prevention and reduction of negative effects of natural and climatic phenomena and crises related to plant and animal diseases, which occur more and more often in recent years and affect more than one EU Member State.

Point 2. The CAP is not just a sectoral policy any more. Further reforms of this policy, taking advantage of the multi-functionality of agricultural activities, have included – within the CAP – various EU-relevant areas, among others the ones related to environmental protection (e.g. combating biodiversity loss) or preventing climate changes.

In the forthcoming financial perspectives, under the Treaty objectives, the CAP will pursue the priorities set for the whole EU, as set out in the political process. For 2014–2020 they are:

- cost-effective food production;
- sustainable management of natural resources and climate-driven actions;
- ensured sustainable territorial development.

The CAP has been playing an increasing role in the introduction of a new economic model in the EU i.e. the closed-loop economy, as an alternative to the linear economic model ('we produce, use and dispose of'). The CAP also sets up a common framework for the operation of the agricultural sector in the EU (Marinello, Sapir and Terzi, 2015). The absence of the CAP would prevent the emergence of an efficient common agri-food market in the EU because the Member States would compete with one another with the level of their support for agriculture, which could also lead to increased expenditures in their national budgets for agriculture (RAND Corporation, 2013). Competition disturbances would result from differences in the level of aggregated budget support and the measures applied.

The operation of the single market is also facilitated by the quality standards of agri-food products introduced by the CAP. The absence of common food safety and quality standards would significantly impede trade within the European Union. The CAP provides (in fact irreplaceable) cross-border public goods at the EU level. The CAP also effectively counteracts the external effects of agricultural activity and protects European citizens against global threats. The creation of added value in various areas is shown in Figure 2.

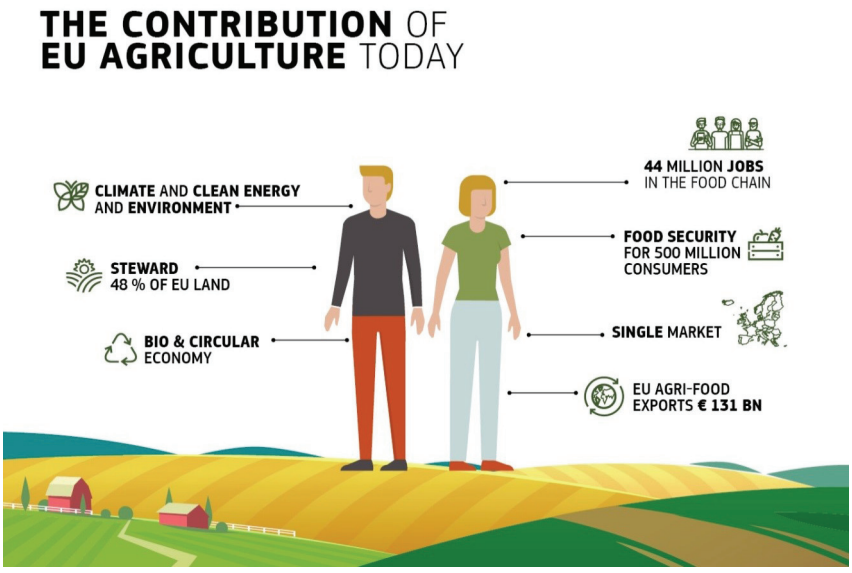

Figure 2. Contribution of the CAP funds to various spheres of activity

Source: European Commission (2017a).

CONCLUSIONS

The CAP is active on many economic and social levels also beyond agriculture. It can be said that its effective operation is made possible by the creation of European Added Value (EAV). According to many researchers, EAV is created through actions undertaken in the field of regional integration. It is also an effect of synergy. EAV is an interesting concept in cognitive terms. It is created not only in agriculture, but also wherever there is any joint action at the Community level. Taking the European Union as a model, it can be analysed whether such added value is created in other emerging economic groups being at various stages of their integration development. If the answer was positive, it would confirm the hypothesis that the creation of added value is a universal process, directly resulting from integrative operations. Going further, it could be argued that the effect of added value is the third effect (next to the two known from the theory of economic integration: trade creation and trade diversion effects), resulting from the creation of integration links.

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COMMON AGRICULTURAL POLICY AS A DETERMINANT OF TRANSFORMATION IN POLISH AGRICULTURE

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ABSTRACT

The impact assessment of the Common Agricultural Policy on transformation process of Polish agriculture following Poland's accession to European Union has been carried out. The analysis took into account the changes of the Common Agricultural Policy in terms of goals and the directions of its evolution. In the paper the alterations in land, labour and capital resources of Polish agriculture were also analysed. It has been established that funds coming from the Community budget allowed Polish agriculture to adjust to the requirement of new environment. Integration into the European Union has created good conditions to dynamic development of the agri-food sector as a whole. Acceleration of the modernization and restructuring processes of Polish farms has taken place. These developments have resulted in a reduction in the total number of farms (by 52%) at the simultaneous rise in their average area (by 78%). Union financial measures have also influenced on generational renewal amongst farms managers. The funds considerably enhanced farmers' incomes, which increased by 156%, thus promoting expenditure on investments. As a result the improvement of technical utilities of farms has been achieved. Consequently, labour productivity growth in Polish agriculture has also been recorded. A wide range of measures within the framework of the Common Agricultural Policy enables to overcome many obstacles of the rural areas in Poland. It also creates possibilities to take advantage of naturally occurring assets in order to effectively compete on the external market.

Keywords: rural areas, Common Agricultural Policy, direct payments

INTRODUCTION

Agriculture is an important branch the national economy of Poland. In comparison to other EU Member States the share of this sector in output, employment and gross value added has been considerable for many years. The changes in the world's agri-food economy as well as the constant advance in globalization and trade liberalization have changed circumstances in Polish agriculture. According to Adamowicz (2008) 'natural, production and economic risk is a new challenge of contemporary times'. Thus, it has become necessary to enhance the pace of ongoing transformation of agriculture, and also adjust it to the rules

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prevailing on the European market (Mrówczyńska-Kamińska, 2013). Poland's accession to the European Union and involving its agri-food sector in the Common Agricultural Policy schemes have provided an unique opportunity for beneficial transformations in Polish agriculture and rural areas.

MATERIALS AND METHODS

The paper comprised the scale and the direction of changes in the Polish farming sector as a consequence of implementation of the Common Agricultural Policy. The rundown was based on data provided by the Ministry of Agriculture and Rural Development, the Central Statistical Office and complemented by own observations. Other sources have been used, including information and data from the literature concerning this subject. In the study, the significance of the European Agricultural Policy in the periods prior to and after Poland's accession to the European Union was taken into consideration. The impact of the Common Agricultural Policy on the direction and pace of transformation of Polish agriculture, with regard to farm size changes as well as equipping with the basic means of production, were evaluated. The analysis also accounts for alterations in the age structure of farm managers. Moreover, other changes of countryside within the concept of multifunctional sustainable development were characterized. The evolution of priorities of the Common Agricultural Policy, expressed in pre-and post-accession support schemes, was considered as a factor for the nature and intensity of transformation of rural areas in Poland.

RESULTS AND DISCUSSION

Evolution of agricultural policy in Europe

Common agricultural policy is the first and most extensive of the Community's integrated policies. Since the 1950s the main principle of Member States' policy was to prevent the crisis in the war-ravaged Europe. The farmer's income support in the form of subsidies and guaranteed prices was supposed to become an effective means of meeting food requirements of the European citizens. Additionally, the aim was to accelerate agrarian transformations (Consolidated versions of the Treaty…, 2008). These goals were swiftly achieved in the early 1970s.

However, a surplus of agricultural products turned out to be an adverse effect of the implementation of intervention mechanisms. The high cost of storage and maintaining minimum prices not only excessively burdened the Community budget, but also sometimes they led to destabilization of some global food markets. In response to severe criticism of conducting practices from the consumers as well as tax-payers, the liberalisation of support for agriculture and protectionism curtailment has occurred. Reductions in price support and attempts to extensify agricultural production did not counterbalance the drawbacks of ongoing actions. Impediments to diversification of economic activities, and the high fixed costs with continuously favourable financial conditions for sustaining production resulted in persistent generating of surpluses by farmers.

Finally, the turning point was the year 1991, when the so-called MacSharry reform was accepted. As a consequence, a completely new role in economy was assigned for agriculture. The adopted model of multifunctional agriculture assumed that alongside ensuring food security, pro-environmental activities will be its essential aims (Caldwell, 2004). Thus, agricultural policy of the European Union was divided into two parts. Pillar I (agriculture) concerns market policy and Pillar II (countryside) promotes rural development policy. Notably, the environmental targets are carried out for the implementation of programmes of both ones (Zegar, 2012). Following subsequent Common Agricultural Reforms led to departure from subsidising the volume and directions of agricultural production in favour of income support for farms (decoupling). The proposed regulations aimed to contribute to greater market orientation, and to focus on the realisation of the objectives of the rural development policy (OECD, 2010). The direct income support for farmers, as the single area payment was introduced. However, the granting of the aid was depended on fulfilment of standards as regards, in particular, environment, hygiene, animal welfare, food safety and product quality (cross compliance). The legal instrument, which permitted the transfer of financial resources from the first to the Pillar II of the

agricultural policy, was also launched. The concept of sustainable development, preserving the integrity of economic, social and environmental objectives, has been strongly emphasised. (European Commission, 1999). All these activities allowed to shift the focus in conducted policy from market support towards rural areas development.

The current goals of the Common Agricultural Policy are not limited only to ensure productivity of the European agriculture, to stabilise agricultural markets and the income of agricultural producers or to supply of agricultural and food products at reasonable prices. Its multidimensional character also contains sustainable management of natural resources and the delivery of environmental public goods such as landscape, biodiversity, air, soil and water quality. The priority is the economic viability of the rural areas in any region of the European Union. It is possible to achieve through enhancing their effectiveness and economic diversity (Czyżewski and Stępień, 2013).I

Influence of Common Agricultural Policy on Polish agriculture

On 1 May 2004, Poland became a member of the European Union. Therefore, Polish agriculture began to subject to its common legal regulations. European integration has created new conditions for the development of Polish food economy. Mobilisation of Community aid schemes became a non-market tool, stimulating the desired amendments in the agricultural sectors and rural areas, The process was launched by the pre-accesion programme SAPARD (Special Accession Programme for Agriculture and Rural Development). It supported the adjustment of the Polish agri-food sector to European health and hygiene as well as environmental standards. For this purpose the beneficiaries received some PLN 4.5 billion (MRiRW, 2007). During the period 2004–2013 the total value of the aid under Common Agricultural Policy exceeded PLN 210 billion, nearly 50% of which accounted for direct payments (Pillar I) (Wigier, 2014). These measures made a significant contribution to increasing the incomes of farms. The major part of the funds was used for covering of their current production costs such as the purchase of forage, fertilizers and plant protection products. On the contrary, pro-investment and pro-ecological activities, were financed under the Rural Development Programme (formerly the Plan) (Pillar II). They included the payments supporting socio-economic changes in rural areas in Poland, among other things, payments to areas facing natural constraints (LFAs), agri-environmental programmes or additional financial resources encouraging the development of non-agricultural activity. By the end of 2013, PLN 65 billion was paid out from the programme accounts, representing 30% of the total funding under the Common Agricultural Policy (Wigier, 2014). In the financial perspective 2014–2020 of Common Agricultural Policy EUR 28.5 billion have been earmarked, in constant prices. It is an increase of EUR 1.6 billion over the 2007–2013 budget. This follows from the greater share of expenditure on direct payments (by 37%). The increase was achieved by means of launching the full direct payments from the budget (phasing-in). On the other hand, the significant decrease (up to 25%) in appropriations for rural areas development took place. Consequently, it can lead to a substantial limitation of important investments related to competitiveness of farms, modernisation and entrepreneurship on rural areas in Poland (Czyżewski and Stępień, 2014).

During the several years of the Polish membership of the European Union rural areas have undergone dynamic structural and organisational changes. The necessity of competition with Western European countries, alignment to their standards and the opportunity of participating in European funds have become a strong impetus transformations in the agricultural sector. The essential reflection of the concentration of production process is an evident decrease in the overall farm numbers, while the corresponding increase in the average area has occurred. Available data show, that in the years 2002–2016 the number of farms decreased by 52% (from 2,933 to 1,410 thousand). Simultaneously, the average area of farms increased by 78% (from 5.8 to 10.3 ha) (GUS, 2011, 2017). These amendments were mainly caused by the decrease in the number of the smallest ones (less than 5 ha), which stood at around 20% at that time. The lack of properly prepared successors to the retiring owners of such farms is claimed to be the main reason for this situation. However, the amount of farms with the area exceeding 50 ha has almost doubled (Table 1).

Table 1. The changes in the area structure of farms in Poland in the years 2002, 2010 and 2016

Area group (ha)	Number of farms						
	2002		2010		2016		2002/2016 2002 = 100
	thou.	%	thou.	%	thou.	%	
< 5	2 124.0	72.4	815.3	54	759.9	53.9	35.8
5–20	693.5	23.6	569.8	37.8	514.1	36.4	74.1
20.01–50	96	3.3	97	6.4	102	7.2	106.3
> 50	19.8	0.7	27	1,8	34.7	2.5	175.3
Total	2 933.2	100	1 509.1	100	1 410.7	100.0	48.1

Source: own elaboration based on CSO data.

This positive trend, but there is necessary to its continuation and intensification, as compared with other Member States (especially UE-15) Poland is characterized by unfavourable polarization. The slowdown of desirable changes, in this regard, is to some extent attributed to the impact of certain instruments of Common Agricultural Policy. Among these direct payments could be mentioned. The primacy of environmental goals obliging farmers to greening and diversification have the effect of reducing the scale of production (Cantore, 2013). Additionally, modulation and the degressive nature of aid are factors that restrict the land concentration process and strengthen the position of small, family farms (Czyżewski and Stępień, 2013).

In its current state the instrument perpetuates existing disparities thus reducing the benefits that follow from the improve farm business performance in Poland. The transfer of 25% of the financial envelope from the Pillar II of the Common Agricultural Policy for the years 2015–2020 to the first one, has increased the initial financial allocation for direct payments up to EUR 23.49 billion. The redistribution of a part of the additional aid for small and medium-sized farms, as a payment for the first hectares (from 3.01 to 30 ha), seems to only maintain the income level without motivation for improvement of management effectiveness. Certainly, EUR 41 per 1 ha this is insufficient to invest in the development of the activities of the new farms. Moreover, diminution of funds allocated for rural development reduces the possibility to create new non-farm jobs within rural areas. It also limits providing adequate infrastructure, favourable for stopping outmigration of young people to urban areas.

However, the increase of budget support within the Common Agricultural Policy has contributed to improved economic performance of the Polish farms. Their average annual output of the period 2004 to 2014 was PLN 72 billion (at constant 2005 prices). It was greater by 27% than in the period 1999–2003, before the accession of Poland to the European Union (Czyżewski and Stępień, 2017). At the same time, the average income of farms increased by 156% in comparison with the pre-accession period. This was notably due to the aid of European subsidies. Direct payments, on average, in the years 2004–2009 comprised 48.52% of farmers' income, whereas in the 2010–2014 period – 62.6% (IERiGŻ-PIB, 2014). Even though a certain part of this appropriation is used for consumption, it nevertheless has a positive indirect impact on the willingness to invest and the value of investment (Wigier, 2014). However, the financial support systems under the Pillar II primarily allows to increase in the pace investments in farms. The amount of support and funding received within the framework of the Pillar II of the Common Agricultural Policy has more than doubled during 2002–2014 (from PLN 2.2 to 5.2 billion). It is mainly due to the implementation of programmes such as: 'Modernisation of farms' and 'Setting-up of young farmers'. The visible result of these actions was a significant growth in investment

outlay in the agricultural sector. This is proved by the increasing number of tractors, machinery, agricultural equipment and farm buildings put into service (Table 2). Both new and modernised buildings and fully up-to-date machinery reinforce the concept of the sustainable development, based on environmentally friendly forms of farm management.

Technological advances and progress and favourable changes in technical equipment of farms enabled Polish agriculture to increase an effectiveness of labour. This has been achieved by means of the reduction in the total labour input. The workload indicator amounted to 2,280 thousand AWU[4] in 2004, while 1,937 thousand AWU in 2014 (Bear-Nawrocka and Poczta, 2016). This phenomenon appears to be closely related to labour outflows from the agricultural sector to other economic sectors and demographic alterations in rural population. The capability to adapt to changing surrounding conditions and to assimilate the effects of the latest technical development is negatively correlated with the age of Polish farmers.

The Common Agricultural Policy provides for funding mechanisms to implement measures supporting beneficial transformation of the age structure of farmers. They are aimed to enhance the generational renewal of the agricultural holders. Additional funding for setting up a farm or its modernization is available to farmers who are under years of age. On the other hand, there was a system of agricultural structural pensions which encouraged people at post-productive age to abandon production and transfer the farm to the younger one. The tangible consequence of these measures is that, in comparison with other Member States, Poland is characterised by highest the percentage of farms headed by people under 35, namely 14.7%. The average value, in this respect, throughout the European Union is 6.4%. Significant decrease in the number of farms run by individuals over 65 years of age has also been recorded. In 2010 these farms represent 8.4% of the total of agricultural holdings in Poland as compared to 19.3% in 2002. They occupy 4.3% of the overall agricultural area in Poland, whereas on average in UE-15 it was three times higher (Sadowski, Baer-Nawrocka and Poczta, 2013). Thus, the impact of the Common Agricultural Policy on activation of the young and qualified persons to run a farm is clearly visible. It creates an opportunity to apply innovative solutions in the production to a greater extent, thereby contributing to improving the competitiveness of the Polish agricultural sector. Nevertheless, the measures that have been allocated to this purpose so far are not sufficient and inefficiently used. The aid has often social character impeding the process of substantial changes and solely perpetuates the status quo (Kondracki and Rogoźnicki, 2017).

The evolution of the Common Agricultural Policy is heading for further restriction of production – profitable targets. By contrast, the objectives of biodiversity, preservation and sustainability of the landscape

Table 2. Farming equipment in Polish farms in 2002, 2010 and 2016

Name of machinery	2002	2012	2016	2002/2012 2002 = 100	2002/2016 2002 = 100
Agricultural tractor	1 339	1 471	1 492	10.9	111.4
Combine harvesters	123	152	160	12.6	130.1
	per 1 farm				
Agricultural tractor	0.46	0.65	1	141.3	217.4
Combine harvesters	0.04	0.07	0.09	175.0	22

Source: own elaboration based on CSO data.

[4] AWU – Annual Work Unit. In Polish agriculture 1 AWU means 2,120 hours worked per year as full time equivalent, i.e. 265 days of 8 hours per day.

and unique natural resources gain in importance. This strategy is entirely consistent not only with the concept of multi-functional, but also sustainable development of rural areas. Thus, the implementation of new non-agricultural activities (i.e. production, commercial or services), which utilize country production capacity is possible. The diversification of agriculture, the development of infrastructure and local entrepreneurship may lead to economic recovery in rural areas. Thereby, the issue of employment of labour force surpluses is dealt with, as well as the adverse trend of rural depopulation is inhibited. In line with the tenets of sustainable development obtaining greater economic performances may not cause any negative repercussions on the natural living environment. It should be noted that a pro-environmental character of the Common Agricultural Policy is supported both under Pillars I and II. In its current state 30% of the financial envelope for direct payments (Pillar I) constitutes 'greening'. In order to receive it, the farms over 15 ha of arable land have to exclude at least 5% of it for 'ecological focus areas' (EFA). Moreover, in the case of the farms over 10 ha of arable land the crop diversification is compulsory. The payments degressivity concerns farms with the greatest area.

Beneficiaries of the Pillar II of the Common Agricultural Policy, who expenditure carry out the obligations under agri-environmental-climatic programmes, decide on abandonment of intensive agricultural production. It implies a decrease in economic efficiency of their farms. However, additional financial resources are a strong incentive for altering management practices in agriculture towards reducing its adverse impact on environment. Besides, the foregone income may be compensated. As a result, the tendency of significant increase in the total agricultural area subjected to agri-environment payments in Poland has been noticed. In 2013 it amounted to 2,614,808 ha, accounting for 13% of the overall the agricultural area in Poland. In comparison with 2006 (889,842 ha) this figure has almost tripled. According to the categorisation of support under the Common Agricultural Policy for the years 2007–2013 organic farming is treated as a separate measure. So far, it has been a component of agri-environment package. It emphasizes of its gaining importance. In 2004–2014 the number of certified organic farms in Poland has increased almost seven-fold (3,760 and 25,427, respectively). During the same period the areas under organic farming have expanded eight-fold (IJHARS, 2015). Favourable environmental conditions ensure that Polish organic farming creates a greater opportunity to compete on the international market than the conventional one. Relatively large manual labour input is an important factor affecting the growth in employment and the increase of income levels of local inhabitants. As a result, organic farming may become a key stimulus for the local labour market, preventing the migration process. This might lead to boost the local and regional development in the longer term.

CONCLUSIONS

Following Poland's accession the European Union, numerous structural changes have been carried out in Polish agriculture. Although, it is still undergoing significant transformations. The progressing process of adaptation aims at strengthening the competitiveness of Polish agriculture, has also revealed its serious weaknesses. The fragmented agrarian structure, technical and technological delays as well as the extensive nature of production are barriers that impede the effective competition of Polish farms with the European ones. The measures under the Common Agricultural Policy constitute a tangible support of the Polish agricultural changes. The financial support of the European budget for the current financing period (i.e. 2014–2020) is smaller than previous ones. Nevertheless, without such wherewithal the development of Polish agriculture and rural areas would be much more difficult. The determination of new priorities and purposes of the Common Agricultural Policy in the next financial perspective after 2020 require a continuous assessment of the achievements made so far.

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OVERVIEW OF ECONOMICAL THEORETICAL CONCEPTS ASSOCIATED WITH THE ECONOMIC EFFICIENCY RESEARCH OF STATE FORESTS NATIONAL FOREST HOLDING

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ABSTRACT

The State Forests National Forest Holding is responsible for the management of forests owned by the State Treasury. The assessment of the economic effectiveness is difficult due to characteristic of Stare Forests, which is surrounded through legal restrictions. Economic efficiency in relation to National Forest Holding is understood as an activity aimed at achieving the goal by available resources. Evaluation of economic efficiency is based on technical, production and allocation efficiency. Economic theories, most suitable for the specification of National Forest Holding, focus around the New Institutional Economy. Economic concepts which solve sub-problems related to the research, refer to the monopolistic character of the entity and its basic function, that is self-financing.

Keywords: State Forest National Forest Holding, economic efficiency, monopoly, transaction costs
JEL codes: D23, D42, D61, L73, Q23

INTRODUCTION

The basic activity of the State Forest Economy State Forests is, first of all, forest management, under which they can sell wood raw material. Wood raw material is the basic production material for many important areas of the Polish economy, e.g. construction, furniture industry, paper and cellulose industry. Thus, the supply and price of the raw material on the market is particularly important for these branches.

The Act of 28 September 1991 on forests specifies that the State Forests are an entity that operates on the principle of financial independence. This means that the State Forests must function in a way that ensures a source of income, that will be able to cover the total costs of operations and will ensure the possibility of further functioning and development.

The main source of revenues of the State Forests is the sale of wood, which is over 90% of total revenues (Lasy Państwowe, 2017). In 2016, the State Forests generated a net profit of PLN 404 million (Lasy Państwowe, 2017). The profit generated was allocated entirely for purposes related to the operation of State Forests. A relatively high net profit may indicate that the State Forests are a effective entity, however, the net profit to sales revenues amounted to 5% in 2016.

On a national scale, there is no enterprise with a similar business profile and similar cash flows. The specificity of the State Forests' business constitutes

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challenges for researchers in the form of identification all areas of activity. This is an interesting task that allows for multi-territorial monopolist analysis that works on behalf of the Treasury. The areas to be studied include the method of financing basic and investment activities, the organizational structure and the influence of external factors on the functioning of basic State Forest t districts and the entity as a whole.

Economic efficiency is an action devoid of waste and aimed at achieving the best result within available resources and technologies (Lockwood, 2008). This term, however, should be interpreted as simultaneously achieving technological (technical and production) efficiency and allocation efficiency. All of mentioned types of efficiency also refer to the definition of financial efficiency of enterprises, which is a set degree of achieving the company's monetary goals, with particular privilege however maximizing its value, usually reflected by maximizing the benefits from equity involvement in assets, expressed in numbers absolute (profit, income, etc.), as well as relative values, or indicators (Kulawik, 2008).

The aim of this study is introduction to the subject of research into the economic efficiency of the State Forests and to review selected economic theories selected for the implementation of research on the above problem.

THE CONCEPT OF EFFICIENCY

Efficiency as an economic category is present in principle from the beginning of human history. Man has always struggled with the need to make the most favourable decisions for himself in conditions of limited resources. The progress of civilization caused that the efficiency category was assigned to many areas related to economic activity, e.g.: economic efficiency, effectiveness and equality, production efficiency, assets, operational and organizational efficiency, markets efficiency, management efficiency, global efficiency (Kożuń-Cieślak, 2013).

The universal application of the efficiency categories has caused great interest among economists. Over the years, it has gained a lot of explanation, depending on the application, which translated into many definitions of the concept.

The main categories of efficiency for which the definitions appear are:

- efficiency as a condition/element of achieving efficiency,
- efficiency as a criterion for effectiveness evaluation,
- effectiveness and efficiency as independent categories,
- efficiency = productivity/performance,
- effectiveness understood as the allocation of resources in the Pareto sense (Kożuń-Cieślak, 2013).

Samuelson and Nordhaus (1999) defined efficiency as using economic resources in the most effective way. In turn, Stoner, Freeman and Gilbert (2002) called effectiveness the measure of efficiency and effectiveness, the degree of achieving the set goals. Another definition of effectiveness was provided by Dudycz (2007), stating that it is, in the economic sense, a ratio of the value of the obtained effects to the effort of the factors used to obtain them. In the category of resource allocation in the Pareto sense, Kamerschen, McKenzie and Nardinelli (1991) gave[2] a wide definition of efficiency, describing it as maximizing production resulting from proper allocation of resources, with given supply constraints (costs incurred by producers) and demand (consumer preferences).

The development of the concept of efficiency has resulted in its different types. Kożuń-Cieślak presented typology in a full way. It divided efficiency into two main categories, i.e. static and dynamic efficiency, which are considered in the short and long term. Within the mentioned categories, efficiency types such as: economic efficiency, technical efficiency, X effectiveness, innovative efficiency and adaptive efficiency have been specified. Technical efficiency has been further divided into: production and allocation. In turn, such types of allocation efficiency were as-

[2] It is impossible to reallocate so as to make any one individual or preference criterion better off without making at least one individual or preference criterion worse off (Pareto, 1890).

signed to them in the following spheres: production, consumption and structure.

Economic efficiency requires the achievement of technical efficiency and allocation efficiency in the sphere of production, consumption and production structure. Technical efficiency is associated with technologically the most efficient use of resources. It is a necessary condition to achieve economic efficiency, but this does not mean that all technically effective solutions are also economically effective. Production efficiency is the economic expression of technical efficiency, which means that, from all technically efficient production methods, only production costs are minimally cost-effective. However, production efficiency does not guarantee that the produced goods maximize the satisfaction of buyers, who in the case of State Forests, are the buyer of wood raw material. Achieving such an entity requires allocation efficiency in the sphere of consumption and in the sphere of the production structure. The X-type effectiveness examines whether the company uses the resources at its disposal, such as work, land, capital, in the most cost-effective way – that is, whether a given level and set of effects is produced in the cheapest way possible (Kotarbiński, 1955) .

The allocation efficiency means that among all efficient production solutions only those that provide the greatest satisfaction on the consumption side have been selected. It is the allocation efficiency that is identified with economic efficiency, which means that the highest possible level of satisfaction has been achieved from the given resources.

Referring to efficiency in an organization, there are two dimensions that can be distinguished: operational and strategic. Effectiveness in the operational sense means implementing actions much better when doing what others do in the same industry, realizing the same concept of business operation. The strategic dimension of effectiveness is connected with the recommendation to act in a different way, thus realizing the unique concepts of business operation. In the situation of changing conditions of the environment, achieving natural goals of the company's operations, which include survival and development, requires efficiency both in the operational and strategic dimensions (Szymańska, 2010).

THEORETICAL BACKGROUND

The subject of assessment of management efficiency in forest areas has been repeatedly mentioned in research, both in Poland and abroad. The results of research carried out by Polish authors focused mainly on the methods of indicator analyses. An important contribution to the development of research on the effectiveness of forest management was presented by Marszałka (1974, 1975). A similar subject was also taken by Podgórski (1989), Szramka (1992, 1996) and Buraczewski and Wysocki (2000). The problem of the impact of natural and forest conditions on the efficiency of managing the organizational units of the State Forests was handled by Patalas (1987) and Kwiecień and Kocel (2006, 2010).

So far, no attempt to test the effectiveness of the State Forests as one enterprise has been made. Młynarski and Prędki (2016), using the DEA method, conducted a study of technical and financial efficiency on a given sample of forest divisions.

The use of non-parametric methods, and in particular DEA methods, to assess the effectiveness of forest management occurred in foreign studies. They mainly concerned forest management (Kao and Yang, 1991; Joro and Viitala, 1999; Bogatoft, Thorsen and Strange, 2003; Korkmaz, 2011), paper industry (Yin, 2000; Hailu and Veeman, 2001), harvesting timber (Lebel and Stuart, 1998; Hailu and Veeman, 2003) as well as the sawmill industry (Fotiou, 2000; Nyrud and Baardsen, 2003; Salehirad and Sowlati, 2005).

The characteristics of the DEA method assumes that the studied group of business entities applies similar technology. Two indicators $S1$ and $S2$ are calculated using the DEA methodology. If the first one equals one, then the object is characterized by a constant type of scale effect – it is also said that the unit is effective in scale. Otherwise, the unit is characterized by decreasing ($S2 < 1$) or increasing ($S2 = 1$) type of scale effect and in general is described as ineffective relative to the scale (Młynarski and Prędki, 2016).

The economic theory, whose features are part of the description of the State Forests, is New Institutional Economy. This theory in its assumptions fits into the model of State Forests, by capturing the main aspects that affect their functioning.

The concept of the New Institutional Economy was established in the 1930s. The development of theory research took place in the 1970s and 1980s. The main representatives of this trend were: Ronald Coase, Olivier E. Williamson, Steven N.S. Cheung, Benjamin Klein, Robert G. Crawford, Armen Alchian, Kenneth J. Arrow, Harold Demsetz, Douglas North (Daniłowska, 2007). The new Institutional Economy is based on four main theories: transaction costs, property rights, agency and contract. The key concepts associated with the discussed concept include: institutions, organizations, transaction costs, contract and property rights.

The theory of transaction costs, derived from the New Institutional Economy, is of significant importance for the analysis and assessment of the effectiveness of the State Forests organization. Transaction costs are understood as the costs of obtaining product information, prices and transaction pages, costs of negotiating and concluding a contract, monitoring parties and enforcing obligations (Czyżewski and Grzelak, 2011). The State Forests, operating under free market conditions, have to bear these costs. The assumed assumption of treating State Forests as a typical economic entity operating under market conditions allows for referring this organization to the model of transnational corporations that aim to concentrate in order to limit or even eliminate transaction costs (Kraciuk, 2012). A similar model can be observed in the case of the State Forests, where the forest inspectorate can be compared to branch offices or branch offices of one large corporation, strongly dependent on its headquarters. The specification of transactional costs theory and corporate models with the organizational system of State Forests allows to assess the current state and present forms of solutions that would improve the organizational performance of the entity.

The new Institutional Economy described above is the main theory on which the study of the economic efficiency of the State Forests is based. However, the implementation of a comprehensive study requires reference to other theories whose task will be to help clarify the so-called sub-problems. These include, among others, identifying the organizational model of the State Forests, identifying the system of redistribution of financial resources. For this purpose, additional theories have been indicated, which will refer only to individual aspects of economic effectiveness research. Among the auxiliary theories are located: Theory of financing sources hierarchy, Theories of monopoly.

The theory of the hierarchy of financing sources is based on the concept of information asymmetry and the occurrence of transaction costs that are derived directly from the New Institutional Economy. What is more, there is a distinction between own funds, i.e. generated by the company in the course of its current activity and foreign, acquired from the outside, in the form of debt or share capital (Frydenberg, 2011). In the theory of the hierarchy of financing sources, enterprises raise funds for operations and investments in a specific sequence. The source of financing first selected are own funds, then debt and share/share capital (Myers, 1984).

Theories of monopoly, whose assumptions refer to the activities of the State Forests, originate from the Austrian school. The assumptions of this school are similar to those from the New Institutional Economy. One can include methodological individualism and methodological subjectivism.

The phenomena of methodological individualism and methodological subjectivism are related to explaining consumer behaviour in categories that distinguish preferences, knowledge and expectations of individual individuals. In the case of State Forests, consumers should be understood as buyers of wood, whose presence cannot be ignored.

In the Austrian school, three main theories of monopoly can be distinguished: Ludwig von Mises, Israel Kirzner, Murray N. Rothbard.

The theory of von Mises's monopoly assumes that 'the whole supply is controlled by one producer or a group of working producers'. Mises assumed that monopolistic prices would arise if the demand for the product was inflexible and thus 'the monopoly price would be able to replace the competitive one'. 'The characteristic feature of monopolistic prices is ignoring consumer wishes'. Mises points out that although the majority of monopolies and monopolistic prices can only arise as a result of state intervention, there are also circumstances that would allow them to emerge on the free market (Von Mises, 1963).

Kirzner's monopoly theory indicates that the monopoly ceases to be sensitive to competitive activities. It also assumes that the tendency in the market covered by the monopoly of raw materials to establish a balance results in a higher price of the raw material and a higher price of the product obtained from this raw material. The important fact is that the term 'monopolist' refers to a producer who has a raw material monopoly, and is not necessarily the only producer of a given good. Such an entity is still subject to market processes because it is always possible to start competitive production. At the same time, when the supply of needed raw materials is limited by the exclusive ownership of the monopoly, the very possibility of competition is severely limited (Kirzner, 1973).

The theories of Von Mises and Kirzner have a common feature in the form of 'uniformity' of the raw material. This means that it is not possible to distinguish between existing resources. In practice, even the location of the raw material with identical characteristics distinguishes it from the others. Thus, it can be assumed that every entity with any resource is a monopolist. This simplification was noticed by Rothbard, who described the monopoly as a privilege granted by the state, reserving a given area of production for a specific group or individual. Giving a monopoly privilege makes the demand less flexible, because consumers cannot buy products from potential competitors of monopolists. In the free market, the price determined shows the voluntary decisions of consumers and producers. On the monopolistic market, a monopolistic price is set, as a result of which consumers lose, having fewer goods and paying a higher price (Rothbard, 1962).

CONCLUSIONS

The assessment of the economic effectiveness of the State Forest Economy State Forests requires work effort in many areas, which together form the overall result. The areas of technology, finance and management methods require great efficiency of decision-makers and an extensive organizational structure.

In economic sciences, it is difficult to find an entity with similar characteristics, which means that it is necessary to rely on various theoretical concepts. In the case of assessing the economic efficiency of State Forests, the theoretical core is the New Institutional Economy, supported by other theories, characteristics of entity are the most complete.

The selection of appropriate economic theories and research methods is an important element of research on the economic effectiveness of the subject. The specificity of the State Forests requires a very accurate interpretation of the obtained research results in both the theoretical and the empirical part. The concept indicated in the text above serves the most faithful representation of the reality in which the State Forests operate.

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IMPACT OF LAND CONFLICT ON AGRICULTURE PRODUCTION: A CASE STUDY OF THE ALAVANYOS AND NKONYAS OF GHANA

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ABSTRACT

Conflict largely is and has always been part of all human endeavours, however one particular area where conflict has created problems has been land conflict where tribes owing to their beliefs and cultures feel that lands they occupy has been a heritage property that had been handed down from generation. Land remains an important natural capital for every nation and individuals, and because of this, it is not unusual that there is land conflict across the world, especially in developing nations like Ghana where a huge population depends on agriculture for their livelihood. A case of a protracted land conflict in Ghana is between the people of Nkonya. and Alavanyo. The objective of this paper was to access the impact of land conflict between the Nkonyans and Alavanyos of Ghana on agriculture production. It also professes some recommendations. The paper was conducted as a desk study and the author relied mainly on secondary data.

Keywords: impact, land conflict, agricultural production
JEL code: Q15

INTRODUCTION

Agriculture remains one of the fundamental drivers of the Ghanaian economy as it is expected to grow at an average of 3.3% yearly until the end of 2018 and contributes 25% to the nation's Gross Domestic Product (GDP). According to the Food and Agriculture Organisation (FAO) (2016), food security and agriculture have an essential role to play in preventing conflicts and crises on the African continent, blunting their impacts and acting as engines for post-crisis recovery. The rate of urbanization and whether food production can keep pace with population growth have been an issue of concern and analysis dating back to the past couple of centuries since Malthus' days (Salih, 1995). Conflicts of land use has become the norm of the day as clans, chiefs and individuals claim lands for themselves without the recourse of what happens to the people who are using the land for farming purposes. Land conflicts between private developers and native rural communities over what constitutes native customary land have being a source of controversy in Ghana. A case in point is the Nkonya-Alavanyo conflict.

From the sociologists' point of view, conflict is defined as a social fact in which at least two or more parties are involved and whose origins and differences either in interests or in the social position of the parties (Imbusch, 1999). Niklas and Mikael (2005) described conflicts as a struggle or contest between

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people with opposing needs, ideas, beliefs, values, or goals. According to Boulding (1963) conflict 'is a situation of competition in which the parties are aware of the incompatibility of potential future positions and in which each party wishes to occupy a position that is incompatible with the wishes of the other'. The Heidelberg Institute for International Conflict Research (HIIK, 2005) explains conflict as 'the clashing of interests (positional differences) on national values of some duration and magnitude between at least two parties (organised groups, states, groups of states, organisations) that are determined to pursue their interests and win their cases'. This definition establishes the fact that, conflict takes place between organised groups on national values within a period, depending on the intensity of their differences.

Wehrmann (2005) opines, 'land conflict is a social fact in which at least two parties are involved. The roots of which are different interests over the property rights to land: the right to use the land, to manage the land, to generate an income from the land, to exclude others from the land, to transfer it and the right to compensation for it'. He further added that, 'land conflict could be understood as a misuse, restriction or dispute over property rights to land'. There are four descriptions which according to him differentiates land conflict from all others conflicts. These are Boundary conflicts, Ownership conflicts linked to inheritance, Ownership conflicts due to legal pluralism and Ownership conflicts due to lack of land registration. At a microscopic analysis of the Alavanyo and Nkonya conflict one can identify some, if not all of the description given by Wehrmann as the cause for the conflict.

While Ghana has been so described as peaceful, it is evident that violence occurs from time to time involving various protagonists that may be ethnic, religious, economic or political. Attempts have been made by various agencies to establish a database of conflict zones and to design early warning systems to help pre-empt violence. Some parts of Ghana have been plagued with communal struggles, particularly land and chieftaincy related conflicts in the past two decades or more. Some of these conflicts easily engage the attention of the country as a whole and, in some cases, the international community. The ethnic conflicts between Nanumba-Kokomba, Nkonya-Alavanyo, Konkomba versus Gonja, Dagomba, Nanumba; Gonja versus Vagla wars as well as violent chieftaincy conflicts in Dagbon, Winneba and Gushiegu are examples. Economic violence (settler farmers versus host communities, pastoralists versus farmers), political violence and cultural violence that are more subtle are constantly threatening the peace. The study looks at the Impact of Land Conflict on Agriculture Production using the Alavanyos and Nkonyas of Ghana as a case study.

THE ALAVANYO AND NKONYA CONFLICT

Boucher, Landis and Clark (1987) argue that differences between ethnic groups have been a primary source of unrest in the world. Aapengnuo (2010) advances a contrasting view when he argues that ethnic differences have not been a driving force for conflict but rather, it is when their differences are used as 'barrier to advancement and opportunity' that conflict ensue. Ethnic conflict by extension to Bates (1982) refers to disagreements between 'rational agents over scarce resources'. While the basic resource under contention in the Nkonya-Alavanyo conflict is land and fought along ethnic lines. The size of the disputed land covers an area of 6,459.82 acres or 2,616.23 hectares, and is rich in timber, fertile for agrarian activities and alleged to have deposits of gold, mercury and clay (Gariba, 2015).

An Nkonya chronicle asserts that the Guans were the first settlers of their present day location, long before the coming of the Europeans in 1484. A claim Nana Okotor Kofi III argues is yet to be refuted (Nkonya Traditional Council, 2013). The Alavanyos according to Dzathor (1999) were fugitives who flew persecution from their original home in Saviefe through Akrofu to Soviet (near Kpando), to their present location. His version points that the Alavanyos, who were originally known as Bubulubu, which means 'someone or something big', were upon the request of Fia Tatse Koku, granted them residence in their current location by Kondodze of Nkonya Akloba on accounts of their friendship. Upon settling on the apportioned piece of land and realising that the place was not very

attractive, their leader declared: 'miamo fii kpo; adabanyo' which means that 'let us venture into settling here; it might turn out to be successful'. It is worth mentioning that 'adabanyo' is what has been corrupted over the years to mean Alavanyo (Ohene, 2013). The attempt to resolve this conflict saw the various communities seeking assistance from the colonial authorities. Ultimately, it resulted in the designing of a map by a German Cartographer called Dr Hans Grunner in 1913. This came about because, Some allegation have also been directed towards the upshots from the sharing of the erstwhile German Colonies to Principal Allied and Associated Powers as specified in the Treaty of Versailles on 28 June 1919. According to Article 119 of the treaty, Germany was mandated to relinquish her right and titles over her overseas territories, including German Togoland paving the way for their repossessions (Kumado and Gyandoh, 2009). With time, the conflict took different shapes and tangents. While a number of the escalations have been triggered by land related issues, an outbreak in 1983 was largely out of a conflict between two individuals over the fetching of water. This quickly escalated into an Nkonya-Alavanyo affair with resultant loss of lives.

LAND TENURE SYSTEM AND CONFLICTS IN GHANA

Land, a natural resource and a necessary tool in human life is highly valued in all African societies and there are many rules and rituals concerning its use (Sarpong, 1974). Land is also of basic importance in the identity, integrity, solidarity and culture of any group of African people (Quarcopoome, 1992). In Ghana, as a rule, land is vested in the descent groups and families, but in centralized political societies like the Akans and Dagomba is not a society the stool/skin lands, where land is entrusted to the king or chief who administers it on behalf of his people. According to Asabere (2004), in Ghana, 'chiefs' dominate the traditional land tenure system. Among the Ewes, however, stool lands do not exist as ultimate land ownership is vested in descent groups (Nukunya, 2003). The notion that land is communally owned was expressed in the statement that land is actually owned by the present living members of the society who inherited it from the ancestors and are expected to use it and pass it on to the next generation.

Lasterria-Cornhiel and Frais (2009) have categorized land tenure into private, communal, open access and state. Ghana has both traditional and statutory land tenure systems. The different types of land tenure and the land administration prevailing in Ghana today evolved over-time from the interplay of sociopolitical organization of various ethnic groups, clans and families, through trade, wars and incorporation. Gyasi (1994) identified lands acquired through leasing and sharecropping as the forms of land acquisition processes relating to the tenure systems among the Akans in Ghana.

IMPACT OF LAND CONFLICT ON AGRICULTURE PRODUCTION

Land conflict reduces agricultural productivity as identified by the government has in recent times realized the economic and political impacts of such conflict on the country's agricultural production capacity (Kairaba, 2002). Francis and Tomoya (2013) found that land conflict could reduce agricultural productivity on plots by 17%. Unfortunately, this affects vulnerable groups like female-headed households and widows (Deininger and Castagnini, 2004). It could be added that vast land for agricultural production in the affected areas of the conflict lies fallow because people are afraid to go to the land to farm. Again, in all areas in Ghana where land conflict had erupted, agricultural production is affected because high intensity farming is reduced to low intensity farming. Further to that, the conflict within the two communities has become a menace as farmers in their agricultural production activities employ all manner of negative or aggressive conflict handling methods, leading to a reshaping of agricultural landscape of the areas. Not only that, in any conflict situation in any community, agricultural productive activities of the feuding parties are often reduced and the people of Nkonya and Alavanyo are no exception. This happens because time, energy, material and human resources are diverted into fighting.

Land conflicts impose costs on economic production through two broad channels: aggressions and attacks leading to a situation where non-state armed actors pushes households to modify behaviour in spite of not facing violent shocks. In Ghana, women contribute 70 to 75% of the overall agricultural production, however owing to the conflict in the Alavanyo and Nkonya districts, the level of the percentage in agricultural productions have been low. The women are forced to flee for their lives due to the conflict. Again, contribution by women to agricultural development are being constrained by limited property rights to access and control over land (World Bank Group, 2008; Deininger, Goyal and Nagarajan, 2010; Vandana, 2010). Peters (2004) asserts that conflict over land intensifies when rural community increases their production level with the retrenched members seeking for more land to improve their food security and income level. With the declining soil fertility and population growth rate land tenure security need to be safeguarded in order to address the growing demand for food.

Although richly endowed with natural resources, Ghana remains comparatively underdeveloped, primarily because of protracted civil strife and poor economic management, (FAO, 2005). Ownership of large agricultural lands is not a common phenomenon to the natives of Alavanyo and Nkonya as most of them own small farms, often cultivating on arable lands about three hectares. Agriculture is and still is the foundation and the main source of economy for the natives of Alavanyo and Nkonya. Other major agriculture-related activities that are disrupted due to the land conflict were the transportation and credit services (including both government-run and private local service providers). Credit service providers, such as banks and microfinance institutions, left the conflict zone. Informal credit options, such as obtaining loans from other members of the community, were also limited given the urgent need by every individual to care foremost for his or her farm before providing additional funds as sources of credit for other community members. The liberties of the citizens are curtailed because they are forced to sleep under curfew and also increased in military or security spending to protect life and property.

CONCLUSIONS AND RECOMMENDATIONS

This paper looked at impact of land conflict on agricultural production. It explored the effect the land conflict in the Alavanyo and Nkonya area is having on agricultural production. The study revealed that land conflict with its impact on agricultural production in the study area was triggered by local factors and some weaknesses in government, which do not allow most people to defend their land rights or to purchase their personal land. The cases of land conflict in the district is getting high compared to the past years, the drivers to such rise in the conflict level are among others; greed which force people to initiate land grabbing, land inheritance system, lack of boundary, misinterpretation of customary laws and lack of understanding of the existing land laws and order, resources scarcity triggered by population increase, declining soil productivity, poverty and high rate of unemployment in the country. Land conflict have serious impacts on the lives of men and women especially if they are losers. Also, land conflict has a negative impact on the agricultural production which ranges from missing of planting seasons, leaving of land to lie idle, a fall in capital investment and eventually. There is also a decrease in production level and reduced income, which contributes to food insecurity of households, which is further extended to the community through promoting of illegal practices like stealing of unharvested crops.

To reduce incidences of land conflict at the local community and that of Alavanyo and Nkonya areas, especially, the government should first address the weaknesses in the economy and in the implementation of land laws and policies. The existing land laws and policies should be translated into the local languages and made available to the local communities to help them understand the laws in place. Traditional post-conflict policies should focus on reconstruction efforts, which are necessary to increase agricultural production in a short period of time. Policies should also create favourable conditions to reduce uncertainty. As a means of finding a lasting solution to land conflicts in the country, the government through the various Houses of Chiefs is encouraging the use of the law courts to solve most of the land conflicts

because the citizenry are see the courts as a means to resolve their differences. Added to that, existing traditional and cultural systems are being encouraged and this is yielding positive results. A clear case in point was the Bimbilla land conflict, something that could also be used to solve the Alavanyo and Nkonya land conflict.

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CHANGES OF BANKRUPTCY PROCEEDINGS: IMPLICATIONS FOR AGRIBUSINESS SECTOR

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ABSTRACT

Corporate bankruptcy generates the externalities that affect also agribusiness and local communities. Economies around the world have undertaken reforms aimed at improving their insolvency systems. The majority of the countries including Poland focused on introducing or strengthening reorganization mechanisms. The aim of this study was to present the changes of bankruptcy proceedings that support agribusiness entities survival from economic perspective. This study indicates also the role and support of the State in the restructuring proceedings creation. This is a conceptual article. The methods include comparative and descriptive analysis. As a result, restructuring proceedings provide an opportunity for a debtor to avoid declaration of bankruptcy through enabling him return to going concern status.

Keywords: bankruptcy, restructuring proceedings, agribusiness sector
JEL codes: G33, Q13, Q14

INTRODUCTION

The properties of agribusiness can either catalyse or inhibit liquidation of the businesses. Agribusiness characteristics – unique for this subset of the economy – determine not only their specificity, but also the propensity of economic entities to develop and fail in this environment. Over the past three decades, liquidation, discontinuance, and bankruptcy studies have presented approaches to describe business failure and its consequences (Evans and Borders, 2014; Amankwah-Amoah, 2016). Franc-Dąbrowska, Porada-Rochoń, Suwała, (2016) examine the issue of enterprise insolvency and the effect it has on local and regional communities. The study by Franc-Dąbrowska, Porada-Rochoń, Suwała (2016) included the following stages: a survey of the relevant literature, the development of two panel models, the opportunities and the risks factors determining solvency problems of SMEs on the local and regional community. The research material was balanced and structured as a panel about microdata on financial-economic considerations. The micro-panel includes aggregate information on an annual basis for the years 2007–2011 for 215 SMEs, giving a total of 1,075. The analysis of cross-sectional data uses a linear regression model for panel data with random effects. The companies being researched are divided into two groups: Model 1 for enterprises that present the level of current liabilities below the median level of current liabilities for the whole sample, Model 2 for enterprises that present the level of current liabilities higher than the median level of current liabilities for the whole sample. Two types

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of estimation are applied: fixed effects and random effects (Franc-Dąbrowska, Porada-Rochoń and Suwała, 2016).

Due to the first symptoms of insolvency, such as difficulty or an inability to settle liabilities when they come due, a model was adopted for the dependent variable level of commitments. It was found that companies with excessive level of commitments are more exposed to the risk of insolvency. The research enabled the identification of determinants for forming commitments. It is very important that the inability of just one company to meet its obligations can have significant consequences for the local market (Franc--Dąbrowska, Porada-Rochoń and Suwała, 2016).

The study by Boratyńska (2016) focused on implementing fuzzy set Qualitative Comparative Analysis (fsQCA) and asymmetric thinking to corporate bankruptcy evaluation in the food industry. It examined the main reasons for corporate bankruptcy, namely, lack of financial liquidity, exceptionally high level of liabilities, losses, weak management, and late recovery actions.

Economies around the world have undertaken reforms aimed at improving their insolvency systems. The majority of them concentrated on introducing or strengthening restructuring mechanisms. Empirical evidence on how these reforms affect the chances of agricultural businesses restructuring is limited, thus the topic deserves for an investigation.

THEORETICAL FRAMEWORK

The study presents conceptual framework in the area of restructuring and bankruptcy reforms that are the most efficient for business survival. Figure 1 presents the concept of key elements implications of restructuring reforms for agribusiness practice. Considering, early warning systems are one of key factors of a successful agribusiness entities restructuring. Bankruptcy generates public and private costs, making it extremely important to avoid this negative phenomenon in agribusiness practice. The implementation of early warning system for bankruptcy prediction could help restructuring in advance.

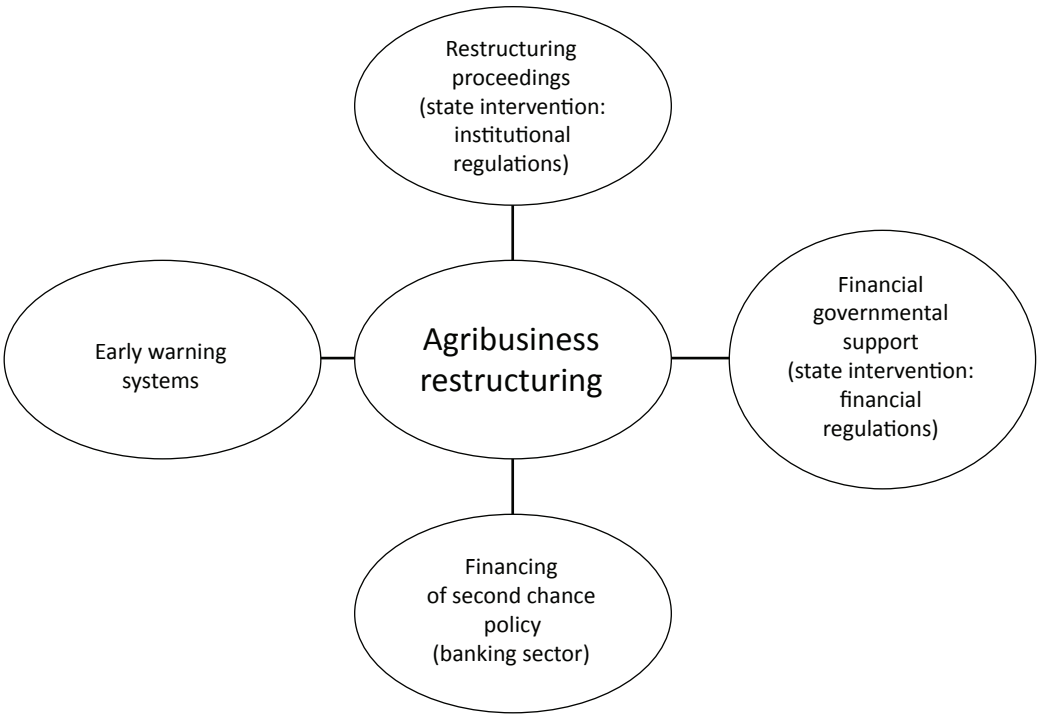

Figure 1. Concept of key elements implications of restructuring reforms to agribusiness practice
Source: own study.

This concept emphasizes also the role of the State intervention, namely institutional and financial regulations. On 1 January 2016 the new restructuring law of 15 May 2015 (the so-called Restructuring Law) came into force. It implements a significant reform of Polish insolvency law, comprising: the introduction of new restructuring procedures, allowing the restructuring of a debtor's undertaking and preventing its bankruptcy, and major amendments to the Bankruptcy and Rehabilitation Law of 28 February 2003 (the so-called Bankruptcy Law) in order to streamline 'classic' bankruptcy proceedings, reduce unnecessary formalities and expedite liquidation and to implement substantive changes, such as: implementing procedures facilitating pre-packs (Act of 15 May 2015 Restructuring Law; Act of 28 February 2003 Bankruptcy and Rehabilitation Law). The next part of the article indicates and describes the ways that State support restructuring reforms in agribusiness practice. Banking sector should be also involved in financing of second chance policy, when a debtor is in the position to overcome the financial distress.

MATERIALS AND METHODS

The aim of this study was to present the changes of bankruptcy proceedings that support agribusiness entities restructuring and survival from economic perspective. This study indicates also the role of the State in the restructuring proceedings creation. The specific objective includes evaluation of the role of the State in the restructuring reforms of indebted farms. This is a conceptual article. The methods include comparative and descriptive analysis.

RESULTS AND DISCUSSION

Aspects of reorganization proceedings are the focus of an important part of the literature, including LoPucki and Triantis (1994), Eisenberg and Sundgren (1997), Segal (2007). All over the world, from 2009 to 2014, 60 economies implemented 87 reforms on resolving insolvency. Reforms in the area of corporate reorganization were the most common: 10 economies introduced a new reorganization proceeding, and 21 promoted reorganization or made improvements to their existing reorganization framework (World Bank Group, 2016). Along with the Recommendation by the European Commission (2014), Nagham and Boughanmi (2017) have recognized some innovative ways to resolve distress which are good practices found in different countries. These include, e.g. auction approach, debt equity swaps, empowering creditors by expanding their rights under bankruptcy, training, speeding up court procedures, promoting out-of-court workouts and pre-packs, encouraging early filings, and use of the Internet and authenticated professional platforms to sell assets.

This part of the article describes bankruptcy and insolvency law reforms in Poland that strongly supports restructuring procedures. The main advantage is that they give the opportunity for the second chance and business survival increase and allow to take proper restructuring actions in advance and in right course. Poland is one out of seven EU countries (Denmark, Germany, Belgium, Italy, Poland, Greece, Spain) that has been participating in the programme 'Early Warning Europe. Early Warning Poland'. This program helps businesses and the government to build mutual trust, protect companies, job places and the creditors rights. Poland follows the Danish experience, namely 10 years of program existance, 5,000 companies supported, the effective network of *pro publico bono* mentors. Polish Ministry of Development supports business survival in many ways, especially by second chance policy, new legislation introduction, legal and financial support. This financial aid, namely loan is for regaining financial liquidity of the companies in the period of restructuring plan preparation. Poland receives the financial support from EU sources of PLN 765 million for the period of 2016–2020. The annual budget constitutes approximately 153 million, that includes PLN 53 million for public liabilities restructuring (Ministerstwo Rozwoju, 2017).

New funding provided to a debtor company after the start of insolvency proceedings – known as post-commencement finance –helps businesses in financial distress to recover. Polish insolvency legislation includes two types of proceedings for businesses in financial distress: bankruptcy and restructuring. These two types of procedures that entered into force on 1 January 2016 have different statutes: 1. Bankruptcy

and Rehabilitation Law, 2. Restructuring Law. The following four restructuring proceedings are available in Poland: 1. Arrangement approval proceedings; 2. Accelerated arrangement proceedings; 3. Arrangement proceedings; 4. Remedial proceedings.

Table 1 presents all restructuring proceedings that may be entered if the debtor is insolvent within the meaning of the Bankruptcy Law or at risk of insolvency (his economic situation indicates that he may soon become insolvent). A bankruptcy proceeding usually leads to the liquidation of the debtor's assets, but it is also permissible to: approve pre-pack application; and conclude an arrangement between the creditors and the debtor aimed at restructuring of liabilities and maintaining the operation of the debtor's business.

According to Table 1 the important component of restructuring proceedings is an arrangement: the legal act similar to court settlement, containing terms of restructuring. The arrangement is concluded as a result of collecting creditors' votes by the debtor himself, without involvement of the court. The debtor is allowed to manage all of his assets without limitations. Pending execution proceedings concerning a receivable debt covered by the accelerated arrangement and arrangement are suspended by operation of

Table 1. Comparison of changes of Polish bankruptcy and insolvency proceedings

Specification	Bankruptcy and Rehabilitation Law	The new act on Restructuring Law proceedings			
	Bankruptcy proceedings	Arrangement approval	Accelerated arrangement	Arrangement	Remedial
Initiation of the procedure	Debtor or by any debtor's personal creditor.	Only the debtor by entering into a contract with a licensed restructuring counsellor chosen by the debtor.	Only the debtor by filling an application to the court.	Only the debtor by filling an application to the court.	Personal creditor of the debtor or by the debtor himself.
Purposes	Main aim is to satisfy the claims of the creditors and, if possible, for the existing business of the debtor to continue operating on the market.	The debtor is entitled to negotiate the terms of the arrangement without the court involvement.	Restructuring proceedings combined with a court supervision.	Restructuring proceedings combined with a court supervision.	Entered when ordinary proceedings are not effective.
Outcomes from the proceedings	Bankruptcy may be declared in case of a debtor who becomes insolvent.	The total disputed claims that give the right to vote on arrangement has not exceed 15% of the total claims giving the right to vote on the arrangement.	The total disputed claims that give the right to vote on arrangement has not exceed 15% of the total claims giving the right to vote on the arrangement.	The total disputed claims that give the right to vote on arrangement has exceed 15% of the total claims giving the right to vote on the arrangement.	The debtor has to cover the cost of the proceedings and the liabilities arising after its opening.

Source: own study based on Deloitte. Legal (2017).

law on the day when the proceedings are opened. The arrangement is reached on the meeting of creditors convened by the judge-commissioner. The arrangement proceedings require greater involvement of the court supervision than accelerated arrangement. In case of arrangement the debtor has to cover the cost of the proceedings and the liabilities arising after its opening. On the contrary remedial procedure the debtor has to cover the cost of the proceedings and the liabilities arising after its opening. Accelerated arrangement allows the debtor to manage his assets, but he cannot perform activities which fall beyond the scope of ordinary business activities. Such activities require consent of the court supervisor. The same above conditions refer to the arrangement proceeding. After the opening of the remedial proceedings the debtor loses the authority to manage his assets (as a rule) and the court appoints the receiver, who is authorized to manage the debtor's assets. In case of the remedial procedure the debtor can manage his assets only in special circumstances and only under the court's permit.

This part of the article presents the restructuring possibilities of indebted farms. According to banks that cooperate with ARMA 1690 producers have problems with loans repayment (PLN 158.64 million). The draft act on restructuring the debt of agricultural farms includes the rules and conditions for the restructuring of farmers' debts. The condition for using the assistance is to conduct agricultural activity at least three years before the loss of ability to service debt. The farmers who are insolvent or at risk of insolvency in the meaning of the Act of 15 May 2015 Restructuring Law can apply for this support.

The project provides four forms of assistance:

- granting by ARMA subsidies for interest on restructuring loans that support repayment of debt;
- ARMA granting loans for repayment of debt;
- granting by KOWR a guarantee for the repayment of restructuring loans;
- takeover of debt by KOWR.

This new law proposal is a special form of state aid that will be granted to entities that are in financial distress without ability to regain financial liquidity that refers to market conditions.

CONCLUSIONS

The Restructuring Law provides important, large-scale changes to the Polish insolvency regime. As a result, a new approach to agribusiness failure and insolvency that aims to shift the focus of insolvency proceedings from liquidation to pre-insolvency restructuring, enables viable companies to return to going concern status. Restructuring proceedings are intended to provide an opportunity for a debtor to avoid declaration of bankruptcy through enabling him to start restructuring. The implementation (contents) part of the restructuring plan contains provisions on how the legal positions of the bankruptcy debtor and other participants in the proceedings will be affected by the execution of the plan.

In order to increase the efficiency of restructuring procedures the following conditions are needed: possibility to file early with the objective of avoiding insolvency, legal position of the creditor/s and debtor with the objective of maintaining his business activities, possibility of a stay on individual enforcement actions, adoption of the restructuring plans by creditors, protection for new finance granted in restructuring procedures.

Restructuring proceedings support the permission for the debtors to retain control of the business and provide lenders with various protections to implement new financing to assist the restructuring plan and allow second chance for entrepreneurs.

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REGIONAL DISPARITIES OF INCOME SITUATION AMONG RURAL HOUSEHOLDS IN THE CONTEXT OF THE COHESION POLICY IN POLAND

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ABSTRACT

The aim of the study was to assess regional income disparities among rural households in Poland in 2005, 2010 and 2015. Simultaneous analysis of changes in affluence and its inequality allowed for a deeper look at the convergence processes in the context of the cohesion policy. The research drew on microdata from the Household Budget Surveys conducted by the Central Statistical Office (GUS). Household income situation or its affluence was proxied by total expenditure. Between 2005 and 2015, despite rising affluence and falling overall inequality, the divergence processes were found to prevail.

Keywords: household income, household affluence, income inequality, rural households
JEL codes: D31, D63, R2

INTRODUCTION

One by one the countryside embraces households attracted to the rustic but reluctant to give up the urban lifestyle. What they seek are rewards of living just outside the city: lower costs, cleaner air, lack of noise. The country now, especially within the reach of a large metropolis, has become a mix of agricultural and non-agricultural households, following major demographic changes, such as positive net migration and better age structure than in the cities (Łącka 2017; Stanisławska and Głowicka-Wołoszyn 2017). Also, between 2007–2014 employment in rural areas fell notably for agriculture and rose for industry, construction and services (Łącka, 2017). These changes contributed to the improvement of the households income situation – still though, the place of residence 'remains a discriminating factor of the level, dynamics and structure of household income and expenditure' (GUS, 2010).

Poland's accession to the EU provided an important stimulus to reduce inequalities in social and eco-

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nomic development, promising improvement of the income situation also to rural households (Kozera, Stanisławska and Wysocki, 2014). Behind the promise stood various EU programs, such as the Common Agricultural Policy and the Cohesion Policy. The average real income of farmers households has in fact been rising, and markedly so, both through direct payments and as a result of increases in agricultural prices and production coupled with real decrease in expenditures (GUS, 2010). This positive trend notwithstanding, low income level of many rural households still persists due as it seems to regional divides that manifest themselves in unequal access to education, labour market, and social and physical infrastructure. Such setback hinders the progress towards a socio-economic cohesion, especially in its territorial aspect, which is the main objective of the Strategy for Responsible Development adopted in 2017 by the Polish government. Its 2020 objectives include: 'increasing the average household gross disposable income per capita to 76–80% of EU average' and reducing the income disparities between regions (Resolution No 8 of the Council of Ministers, 2017). Monitoring of regional rural household income inequalities is an important element of each country's cohesion policy. It helps policy makers recognize potential threats to the accomplishment of social and economic objectives, and predict the scope and character of negative consequences of their failure. Such failures often affect underdeveloped regions more deeply and range from mass migrations and ensuing population aging, through worsening investment climate, to social apathy paired with prevailing entitlement attitudes.

The aim of the empirical research was to diagnose changes in the income situation of rural households across the regions of Poland and between 2005, 2010 and 2015, including the level of income and its inequality.

MATERIALS AND METHODS

The research drew on microdata from the Household Budget Surveys conducted by the Central Statistical Office (GUS) in 2005, 2010 and 2015, that examined respectively 34,767; 37,412 and 37,148 households, roughly 42% of which were rural.

In the study, the income (or affluence) was proxied by the level of spending. According to Kot (2003) affluence of Polish households is better reflected by total expenditures, being less prone to deliberate misclosures than net disposable income. Brzeziński (2002) also supports this view citing Slesnick's (1998) 'consumption smoothing hypothesis', that equates consumption affluence with Friedman's 'permanent income' affluence. The last idea is especially important in the case of farmers households, were monthly disposable income seasonality can be extreme (cf. Wołoszyn, 2013). To compare households with different demographic composition, modified OECD scale was used (Dudek, 2011) arriving finally at real (in 2015 prices[5]) equivalent expenditures[6] as the measure of household affluence or income[7]. The two last expressions will be used interchangeably throughout the paper.

Income inequality of rural households in Polish provinces was assessed with Gini coefficient (Cowell, 2009; Panek 2011; Kot, 2012), the most popular index of inequality, that ranges between 0 (for perfectly equal distribution) and 1 (for perfectly unequal one):

$$G = \frac{1}{2\mu} \frac{\sum_i \sum_j |y_i - y_j|}{N^2}$$

where:
N – number of households;
μ – average expenditures;
y_i, y_j – expenditures of the i-th and j-th households.

[5] The calculations were based on CPI indices from *Roczne wskaźniki* (GUS, 2017).

[6] The exact classification of household expenditures covering expenditures on consumer goods and services and other expenses is presented on pp. 62-63 of *Metodologia Badania Budżetów Gospodarstw Domowych* (GUS, 2011).

[7] One should bear in mind that inequality calculated from this measure will be smaller than from the theoretical 'permanent income', MPC being lower for the richer than for the poorer households.

RESULTS

In 2005 the most affluent were the rural households of Opolskie, Lubuskie and Śląskie (Table 1). They averaged, by real equivalent expenditures, PLN 1,365; 1,322 and 1,211 respectively, higher than the average for Polish rural households by 25, 21 and 11%. Conversely, the northern provinces of Warmińsko-Mazurskie, Zachodniopomorskie and Pomorskie recorded the lowest levels of affluence, between PLN 964 and 970, that were all roughly 11% below the national average.

Economic prosperity, continuous rise of household income nationwide (GUS, 2010), Poland's accession to the EU with increases in agricultural prices, subsidies and production (Kozera and Wysocki, 2014) all translated into significant improvement of rural households income situation between 2005 and 2010 (by 28.4% to the level of PLN 1,400). The largest increases were recorded in the following provinces: Pomorskie (by as much as 45.5%), Mazowieckie (by 44.2%) and Kujawsko-Pomorskie (by 42.9%). In 2011 all Polish households felt clear signs of economic downturn: it was the first year since 2004 when year-to-year disposable income fell down (GUS, 2011). The ensuing period of depression and slow recovery, up until 2015, saw reduction of rural households affluence levels in six provinces (by 1––4%) and only slight growth in the remaining ones (by 1–9%), except in Zachodniopomorskie, where an increase by 14% was recorded. Overall rural household affluence growth between 2010 and 2015 was small – of only 2%.

In 2015 the rural affluence level averaged PLN 1,428 and was less unequal across provinces than in 2005. The highest levels were recorded in Śląskie, Mazowieckie and Dolnośląskie (respectively 15.2, 11.8 and 10.9% higher than the national rural household average), while the lowest in Warmińsko-Mazurskie and Świętokrzyskie (respectively 14 and 11% lower) – Table 1.

Income inequality among all rural households, determined from equivalent expenditures and measured by the Gini coefficient, was 0.299 in 2005 (Table 2), slightly lower than for all households, which was 0.320 (Wołoszyn, 2013). The period between 2005 and 2015 witnessed reductions in the rural inequality both nationwide and province-wide, with the exception of Świętokrzyskie (Table 2).

All in all, between 2005 and 2015 a 31% increase in overall affluence of rural households (Table 1) was accompanied by a decrease in income inequality by 0.011 (Table 2), which might suggest unfolding of some convergence processes. However, in-depth analysis of the rural affluence of individual provinces does not give such an unambiguous assessment of changes.

A particularly high increase in affluence was recorded in the following provinces: Śląskie (by 35.8%), Mazowieckie (by 40.5%), Dolnośląskie (by 50.6%), Pomorskie (41.0%), Kujawsko-Pomorskie (41.5%) and Zachodniopomorskie (by 45.9%). However, only in the cases of Kujawsko-Pomorskie, Zachodniopomorskie and Pomorskie the increase may be considered as cohesion enhancing, as their affluence in 2005 was below the national average by 8% and 11% (the gap having shrunk in 2015 to just 0.4% and 1.5% respectively for Kujawsko-Pomorskie and Zachodniopomorskie and to 4.0% for Pomorskie). Increases in the first three provinces, where in 2005 affluence had already been well above the average, were clearly cohesion weakening. The reason for this is rather simple: the existence of three strong and expansive metropolises, where advancing suburbanization sprawls onto adjacent rural communes. On the other hand, small affluence increase in Lubuskie and Opolskie provinces (that had the highest initial affluence in 2005), translated into sharp falls of relative affluence (to 104.6 and 108.3%, respectively), that were seemingly cohesion enhancing. It is worth noting however, that slow growth in Lubuskie and Opolskie was largely due to mass emigration, drop in birth rates and rapid population ageing (Bartkowiak-Bakun and Standard, 2014; Kubiciel-Lodzińska and Mąkolska-Frankowska, 2016). It is unclear how durable is the current slowdown, but if the trend continues, the rural affluence of these provinces will drop below the national average, reversing the apparently good cohesion indicators.

Figure 1 presents the affluence of rural households in 2005, 2010 and 2015 together with its

Table 1. Real and relative (in relation to the average of rural households in Poland) affluence level of rural households by province and its changes between 2005, 2010 and 2015

Province	Affluence (PLN/equivalent person)			Affluence changes (const. = 2005) (%)		Relative affluence (Poland = 100) (%)		
	2005	2010	2015	2010	2015	2005	2010	2015
Dolnośląskie	1 052	1 452	1 584	38.0	50.6	96.5	103.7	110.9
Kujawsko-Pomorskie	1 006	1 438	1 423	42.9	41.5	92.3	102.7	99.6
Lubelskie	1 092	1 242	1 334	13.7	22.2	100.2	88.7	93.4
Lubuskie	1 322	1 470	1 494	11.2	13.0	121.3	105.0	104.6
Łódzkie	1 135	1 423	1 506	25.4	32.7	104.1	101.6	105.5
Małopolskie	1 102	1 344	1 369	22.0	24.2	101.1	96.0	95.9
Mazowieckie	1 137	1 640	1 597	44.2	40.5	104.3	117.1	111.8
Opolskie	1 365	1 586	1 546	16.2	13.3	125.2	113.3	108.3
Podkarpackie	1 039	1 270	1 286	22.2	23.8	95.3	90.7	90.1
Podlaskie	1 109	1 250	1 327	12.7	19.7	101.7	89.3	92.9
Pomorskie	970	1 411	1 368	45.5	41.0	89.0	100.8	95.8
Śląskie	1 211	1 547	1 645	27.7	35.8	111.1	110.5	115.2
Świętokrzyskie	997	1 309	1 269	31.3	27.3	91.5	93.5	88.9
Wielkopolskie	1 069	1 370	1 387	28.2	29.7	98.1	97.9	97.1
Warmińsko-Mazurskie	964	1 272	1 226	32.0	27.2	88.4	90.9	85.9
Zachodniopomorskie	964	1 233	1 406	27.9	45.9	88.4	88.1	98.5
Poland	1 090	1 400	1 428	28.4	31.0	100.0	100.0	100.0

Source: own calculations based microdata from House Budget Survey (2005, 2010, 2015).

Table 2. Income inequality of rural households by province and its changes between 2005, 2010 and 2015

Province	Gini · 100			Gini changes · 100 (const.= 2005)	
	2005	2010	2015	2010	2015
Dolnośląskie	31.4	31.4	29.6	0.0	–1.8
Kujawsko-Pomorskie	28.1	30.0	28.0	1.9	–0.1
Lubelskie	29.2	30.5	28.0	1.3	–1.2
Lubuskie	33.1	27.8	26.8	–5.3	–6.3
Łódzkie	28.5	30.1	28.2	1.6	–0.3
Małopolskie	28.8	25.6	28.2	–3.2	–0.6
Mazowieckie	30.2	33.9	28.5	3.7	–1.7
Opolskie	30.1	29.6	28.3	–0.5	–1.8
Podkarpackie	27.4	24.7	27.4	–2.7	0.0
Podlaskie	31.8	29.5	28.8	–2.3	–3.0
Pomorskie	30.5	33.8	29.5	3.3	–1.0
Śląskie	29.6	30.7	28.7	1.1	–0.9
Świętokrzyskie	27.1	30.5	28.8	3.4	1.7
Wielkopolskie	30.8	27.4	28.9	–3.4	–1.9
Warmińsko-Mazurskie	30.9	32.5	28.8	1.6	–2.1
Zachodniopomorskie	28.2	27.3	26.0	–0.9	–2.2
Poland	29.9	30.1	28.8	0.2	–1.1

Source: own calculations based microdata from House Budget Survey (2005, 2010, 2015).

Province designations: DSL – Dolnośląskie, KPM – Kujawsko-Pomorskie, LBL – Lubelskie, LBS – Lubuskie, LDZ – Łódzkie, MPL – Małopolskie, MZW – Mazowieckie, OPL – Opolskie, PKR – Podkarpackie, PLS – Podlaskie, PMR – Pomorskie, SLS – Śląskie, SWK – Świętokrzyskie, WPL – Wielkopolskie, WRM – Warmińsko-Mazurskie, ZPM – Zachodniopomorskie, POL – the whole country.

Figure 1. Affluence and inequality in rural households in Poland in 2005, 2010 and 2015

Source: own calculations based microdata from House Budget Survey (GUS 2005, 2010, 2015).

inequality by provinces, illustrating simultaneously the range of both measures and the changes that happened between the studied years. One can see immediately that diamonds corresponding to provinces in 2005 are placed far to the left of triangles and squares that correspond to provinces in 2010 and 2015. This shows that the significant increase in rural affluence occurred mostly between 2005 and 2010. Also, the squares keep rather to the lower right side of the chart, while triangles to the upper right side (although with much overlap), demonstrating slow affluence growth coupled with reduction in its inequality that took place between 2010 and 2015 for most provinces.

CONCLUSIONS

The research on the income situation of rural households in Poland found a significant affluence increase in all provinces between 2005 and 2010, concurrent with a slight rise of affluence inequality in most provinces. Conversely, the period between 2010 and 2015 saw only a minor affluence growth, but generally with a pronounced drop in inequality.

In some provinces convergence processes were observed: rural affluence levelled towards the national average and income inequality decreased. I would be impossible however, to claim these changes were the result of a targeted cohesion policy. Only in the

case of three provinces, Kujawsko-Pomorskie Zachodniopomorskie and Pomorskie, can one speak of simple convergence processes – improvement of the relative income situation, approaching affluence levels of the national average and a decrease in income inequalities. This is not exactly the case of Opolskie and Lubuskie. These provinces formally exhibited outward signs of cohesive processes, having in 2005 lead the ranking of rural affluence and moving down in 2015, but these changes were most likely a result of a profound demographic crisis, and not of a more dynamic growth in the remaining provinces.

On the other hand, changes in two provinces: Śląskie and Mazowieckie were clearly of divergent character, and likely the result of influence exerted by their large urban centres. That influence was channelled through suburbanization and multifunctional development of metropolitan rural hinterlands. All in all, the study did find some evidence of ongoing convergence processes, but restricted or hardly tenable. Divergence processes, on the other hand, seemed to be rising on sounder foundations and manifested themselves far more clearly.

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THE IMPLICATIONS OF THE UNITED KINGDOM'S EXIT FROM THE EUROPEAN UNION ON THE COMMON AGRICULTURAL POLICY

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ABSTRACT

The two-year Brexit process, formally initiated on March 2017, is coming to an end, intensifying public discussions and concerns about the future of the EU, including the community budget and policies. This paper articulates the likely implications of the United Kingdom's withdrawal from the EU on the Common Agricultural Policy using a political economy approach. It focuses on the budgetary and agricultural trade consequences of the Brexit for the EU remaining member states. The European Commission's proposed reduction by 5% of the CAP budget for 2021–2027 is one of the first Brexit consequences that potentially can result in a decline in EU farm incomes. The leaving the single market and customs union by the UK, traditionally taking a liberal market position, will probably affect not only the CAP, but also agricultural policies amongst WTO and G20 member countries. With lack of some kind of free trade agreement between the UK and the EU, agri-food net exports from the EU27 to the UK will decrease.

Keywords: Brexit, European Union, Common Agricultural Policy
JEL codes: Q18, F5, F02, F36

INTRODUCTION

One of the major challenges facing the European Union (EU) in the coming years will be the handling the consequences of the United Kingdom's withdrawal from the EU – generally referred as to the 'Brexit' (British exit). Although the UK – the EU's third largest state according to population size, has been so far the greatest beneficiary of EU member states' differentiation (e.g. opt-outs from the Economic and Monetary Union and the Schengen system, permanent rebate on the EU budget), it decided to leave the EU. It was the first time in the EU history when a member state took steps, which finally will result in its withdrawing from the membership.

The procedural articulation of a member state's intent to leave the EU is provided in Article 50 of the Treaty of the European Union, according to which 'Any Member State may decide to withdraw from the Union in accordance with its own constitutional requirements' and 'A Member State which decides to withdraw shall notify the European Council of its intention' (Consolidated version of the Treaty, 2012). On the 23 June 2016, the people of the UK voted on the historic referendum (with modest majority of 51.9%) in favour of leaving the EU. On the 29 March

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2017, the UK's Prime Minister, Theresa May, notified the European Council of the intention to terminate its EU membership (Miller, 2016).

Article 50 allows for a two-year period of negotiations over terms of the exit and the future Britain's relationship with the EU regarding, i.a. the rights of EU citizens living in the UK, immigration, trade regimes, and the UK financial commitments to the EU. There are now (June 2018) exactly ten months to go before the UK officially becomes the first-ever former EU member state on the 29 March 2019. The UK and the EU have provisionally agreed on a large part of joint withdrawal deal, including a 21-month implementation or transitional phase which is due to last from Brexit day to the 31 December 2020. The UK will retain the benefits of the single market and customs union for this period but legal certainty will only be achieved once the final agreement is signed and ratified – likely in 2019 (Boffey, Asthana and O'Carroll 2018). It is widely reported, however, that the UK would pursue a 'hard' or 'clean' break from the EU, i.e. complete separation and a return to an arrangement that existed before its 1973 entry into the then European Economic Community. It would mean the UK outside of the single market and the EU customs union after 2020 (HM Government, 2017; Hamilton, 2018; Hunt, 2018; Piper and MacAskill, 2018).

As the level of interdependence between the UK and the EU is high, and the Great Britain's role in shaping and supporting the EU was seen as key, its departure will prompt significant changes and economic consequences for the remaining EU-27 member states.

The Brexit creates both individual and aggregate uncertainties on many fronts (political, policy, economic, financial, social, environmental, legal etc.) throughout the UK, the EU and even global economy. Individual uncertainty arises when there is doubt about the identities of likely winners and losers of change. Aggregate uncertainty occurs when there is uncertainty about the economy – or its sector-wide effects of given change – whether the overall effects will be positive or negative (Roland, 2002). Given these uncertainties, it becomes pertinent to consider what would be the likely post-Brexit effects on the Common Agricultural Policy (CAP). The purpose of the paper is to provide an overview of potential consequences that the Brexit may have on the CAP.

THEORETICAL BACKGROUND

This article takes a political economy perspective which integrates the analysis of political process (politics or rules of game) and economics (a game played within rules) (Buchanan, 1964). The basic proposition taken from Buchanan (1964) is that economics is about (1) exchange and (2) choices (over the rules and made under the rules chosen) and processes of adjustments. We follow normative political economy strand which investigates what economic policy should be enacted to produce ideal/desired effects or what policy would be enacted under some set of circumstances that may or will not obtain.

The UK's relationship with the EU has historically been determined by a complex interplay between political and economic interests framed in terms of costs and benefits of the EU membership (Jensen and Snaith, 2016; Menon and Salter, 2016). The bulk of the EU's spending in the UK is for agriculture – the European Agricultural Guarantee Fund is the largest fund (Keep, 2018). But British farmers are benefiting not only from the CAP subsidies but also from single agro-food market access.

As it concerns the EU agricultural sector, it enjoys political assets that can be translated into an influence on the CAP. Since the CAP came into existence in 1962, the governments of member states that benefit most from this policy have been its strong defenders – including France taking generally protectionist attitude towards the CAP and being the most notable permanent member of its 'anti-reform' club, and Germany (Nugent, 2017). The UK, in turn, long have been the EU most euro-sceptic member state that has continually pressed for European integration proceeding on a minimalist basis (a liberal internal market and most of other policy areas left to inter-governmental cooperation). Successive UK governments have been critical of the EU's blanket approach to supporting farmers through decoupled payments (CAP's Pillar 1), the policy that according to many observers (e.g.Swinbank, 2017b) is difficult to justify in social welfare terms, and results in the inflated

land prices. The UK government traditionally takes a strong stance for a smaller CAP budget.

The agriculture is also sphere where there is significant interest group representation at national and supra-national levels (Zawojska, 2011). Farm unions and agri-cooperatives from across Europe are represented by the powerful lobby organization, Copa-Cogeca, the statutes of which require full member organizations to be from the EU countries. After the Brexit (29 March 2019), the National Farmers' Union of England and Wales (NFU) as well as the National Farmers' Union of Scotland, which played a vital part in work on the CAP, would no longer be Copa-Cogeca members. In the latest news, the NFU stated that it wants to remain in the membership group – at least during the transition period (Tasker, 2018).

The CAP is financed jointly by the member states out of the EU budget, and has a strong position within it since accounts for almost two-fifths of its total spending (EUR 59 billion in 2017). According to Begg (2018), the EU budget is a balancing act between three competing sets of demands: (1) the net contributors who want to keep EU expenditure as low as possible, especially against the backdrop of losing the national contributions resulting from the Brexit; (2) the powerful interest groups used to benefiting from EU funding, from the agricultural lobby to the rural regions receiving economic developments support; (3) new priorities, such as dealing with economic migration and refugee crisis, securing the EU external borders, countering terrorist threats and promoting the digital transformation.

As for the CAP effect on the relationship between the EU and non-EU states, this policy has fuelled many trade disputes between the EU and other agricultural exporters.

MATERIALS AND METHODS

The paper is descriptive in approach. It discusses the Brexit likely effects on the CAP. The analyses stem from a political economy perspective and are based on secondary sources such as more recent scientific papers, the EU and the UK official documents, disclosure bulletins, statistical databases, and news articles.

The study aims to address three main research questions: (1) How could Brexit impact the EU budget and the CAP financing?; (2) How could Brexit impact agricultural trade?; and (3) How could Brexit impact future CAP development?

RESULTS

The Brexit means the departure of the UK from the CAP – its subsidy and regulatory regimes. The nature and scale of any impact of Great Britain leaving both on the CAP and the EU agriculture will depend on the details of the agreement finally reached with the EU. In this section, the potential Brexit implications on different aspects of the CAP will be articulated.

Impacts of Brexit on the CAP budget and farm incomes

In 2016, the UK was the third largest net contributor, after Germany and France, to the Community budget (even allowing for a rebate on its contribution) with operating budgetary balance of EUR –5.6 billion (in 2015: EUR –11.7 billion). The total British contribution, and therefore potential loss for the EU budget revenue, amounted to EUR 12.8 billion in 2016 (in 2015: EUR 18.2 billion). This equals to 8.75% (2016) and 12.46% (2015) of the EU total budgetary revenue (European Commission, 2018a). In 2017 the UK made an estimated gross contribution (after the rebate) of GBP 13 billion while received GBP 4.1 billion of public sector receipts from the EU. So, the UK's net public sector contribution to the EU was an estimated GBP 8.9 billion. Considering additional EU funding allocated directly by the European Commission to UK organisations, an average annual net contribution was of GBP 8.5 billion between 2011 and 2015 (Keep, 2018).

The European Commission's budget proposals for the period 2021–2027, published on 2 May 2018 (European Commission, 2018b) indicate the negative financial effects of the UK departure both on the CAP budget and farm incomes. Having taken into account the UK withdrawal, the proposal includes reductions of roughly 5% both in the CAP and in the Cohesion Policy allocations since they have the largest financial envelopes and shares of the common budget (CAP:

EUR 365 billion for 2021–2027; ca 30% of budget commitments). The agricultural budget, if accepted by the member states and the European Parliament, would assume the full CAP-Brexit bill (EUR 18.9 billion). Additionally, it would loss EUR 24.2 billion due to its redeployment in order to fund other EU policies.

According to Farm Europe (2018) estimates, the actual net cost of Brexit for the CAP is EUR 2.7 billion per year in constant prices (40% of the UK annual average net contributions to the EU budget in 2010–2016 which accounted for EUR 6.6 billion). If the entire decrease was affected to the Pillar 1, direct payments would be reduced by roughly 6.5%. Majority of member states would face a decline in farm income, ranging from 2% to 4.5%. The Brexit would lead to a fall in agricultural income of 3.6% on average in the Community.

Impacts of Brexit on agricultural trade

For the UK, an exit from the EU presents a trade-off between lacked or reduced access to the single market in exchange for greater freedom from the legal, regulatory and fiscal obligations related to the membership (Boulanger and Philippidis, 2015).

The UK Prime Minister has stated that the UK is leaving the single market and the customs union (what means the UK and EU will enjoy less access to each other's markets) so that the UK can strike its own trade deals around the world (Asthana et al., 2018). The UK government is keen to draw up a bespoke trade deal ('customs partnership') with the EU, allowing for the free flow of goods and services.

Nevertheless, under the political pressure and uncertainty surrounding the negotiations, it is worth considering the UK preferential access to the EU market. On the 8 May 2018, the House of Lords of the British parliament has backed calls for the UK to effectively remain in the EU's single market after Brexit. An amendment to the EU withdrawal bill obliging the UK to stay in the less stringent version of the single market – European Economic Area (EEA) after Brexit was backed by 245 votes to 218, despite neither the government nor the Labour leadership backed it (BBC, 2018). Moreover, a hundred organisations from across the UK's food supply chain call for any Brexit deal that 'maintains continuity in existing trade arrangements as far as possible' (McDonnell, 2018).

Without the UK membership in the single market and any new trade agreement between the two sides, relative trade barriers will change by making UK's trade with the EU countries more expensive compared to outside EU trade. It could result in British trade creation with the non-EU countries and trade diversion away from the EU (Brakman et al., 2018).

The EU is the world's largest agricultural trader and has a positive trade balance with the rest of the world. The UK economy relies significantly on the EU for agri-food trade and vice versa. According to British Department for Environment, Food & Rural Affairs (2017), the EU states are the leading foreign supplier of food consumed in the UK (30% in 2016). In 2016, the UK exports of food, feed and drink stood at GBP 20 billion whereas the UK imported a total of GBP 42.6 billion of these goods[3]. It is important to note that out of total British exports of these items, 60% were sold to EU countries while 70% of the UK imports came from the EU, mainly from the Netherlands (GBP 5.1 billion), the Irish Republic, France and Germany (GBP 4 billion each).

Considering that the UK – a net importer of agri-food products – imports twice as many these goods from the other EU countries than it exports, the negative impact of hard Brexit for the agri-food sector in the remaining member states would be a loss in their sales to the UK.

Another consequence arises from the ambition of the UK government 'to be a proud champion of global free trade and a strong supporter of the rules-based global trading system' (HM Government, 2017). As the UK departs from the EU, it will again take up its independent seat at the World Trade Organization (WTO) and thus will have potential influence on policy reform amongst the WTO (and G20) members

[3] The UK imports of agricultural products reached GBP 8.56 billion in 2017.

after 2020. According to Mitchell (2017), following Brexit, the UK has a chance to demonstrate global leadership in the development of market-based model of agriculture that is better integrated and aligned with environmental and climate aspirations and commitments.

The results of quantitative assessment (Boulanger and Philippidis, 2015) of both budgetary and macroeconomic impacts on EU member states resulting from the post-Brexit establishment of the UK-EU Free Trade Agreement, narrowed to cover the agri-food trade and (extrapolated) CAP budgetary implications, reveal that this element of the UK's divorce would be beneficial to this country (net gains from CAP budget withdrawal exceed even the upper bound losses arising from trade facilitation costs on agri-food single market access).

Impact of Brexit on future CAP development

The impact of the UK's decision to leave the EU on the future CAP is generally unclear. We can suppose that with the UK (a strong advocate for the CAP reforms and greater market orientation of agriculture) exit from the EU, the balance of power within the EU-27 would shift towards member states sceptical of the CAP radical change.

Also according to Matthews (2016), the absence of the UK in future discussion of CAP would boost those voices among European parliamentarians and member states who wish to roll back some of the recent reforms and to focus more upon supporting farm incomes through strengthened public safety-nets and greater public intervention on agricultural markets. As concerns excessively high import tariffs on CAP agricultural commodities and associated food products, it seems questionable that the challenges posed by the UK departure would prompt the EU to unilaterally reduce them (Swinbank, 2017a).

From a more general political perspective, key challenges are relations between France and Germany in post-Brexit EU. Krotz and Schild (2018) suggest three basic future scenarios for the EU: (1) German hegemony; (2) the decline of the European project; and (3) the most likely and plausible – a rejuvenated Franco-German tandem at the EU's centre, called by them as a 'back to the future'.

CONCLUSIONS

The study leads to the following conclusions:

1. The consequences of the UK's departure from the EU in March 2019 will depend both on the final version of the EU-UK withdrawal agreement and national policies adopted by the UK government after the Brexit.
2. The Brexit will probably have not significant effect on future CAP development due to the exclusion from the EU policy-making process of one of the most reform-minded and liberal member states. The British moderating pressure has hitherto been a key factor in the developing a less protective EU agriculture and more open agricultural trade policy.
3. The UK status as the G20 member and developed economy, and fact that agriculture still remains a highly politicized area at the international level, together mean that British future agricultural and trade policy would have global relevance. The post-Brexit UK would exert an influence on policy reform in WTO and G20 member countries by shifting their attitudes to the market-oriented model of agriculture.
4. The Brexit-related reduction of roughly 5% in the CAP budget proposed by the European Commission for the 2021–2027 EU Multiannual Financial Framework may be expected to lead to a negative impact on farm incomes in several EU countries.
5. With hard Brexit option (no new trade deal between the EU and the UK) tariffs would be imposed on agri-food commodities that the UK sells to and buys from the EU. As the UK is now a net importer of these commodities from the EU countries, the agri-food sectors in the remaining member states would suffer loss of British agricultural markets.

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CONDITIONS OF RURAL DEVELOPMENT IN THE WARMIA AND MAZURY VOIVODESHIP (POLAND) IN THE OPINION OF LOCAL AUTHORITIES

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ABSTRACT

The aim of the paper was to identify positive as well as negative local development factors in the opinion of the authorities (mayors) of rural and semi-urban (urban-rural) municipalities in the Warmia and Mazury Voivodeship, Poland. The research was based on a survey within local authorities of the Warmia and Mazury region and was carried out in 2017. The results show that the local authorities have been aware of numerous opportunities and barriers of local economic development. Sometimes, if there is one barrier, it causes the formation of new ones, for example the shortage of own financial resources or municipal debt make it impossible to finance investments from the local budget or to apply for EU funds, which require co-financing from the beneficiary's own resources. Most of mayors make efforts to mitigate exogenous conditions by local activeness, such as co-operation with neighbouring or foreign municipalities or offering preferential tax rates to investors. Municipal authorities perceive the opportunity in applying for EU funds for projects aimed at improving the quality of life of local communities, including the development of technical and social infrastructure.

Keywords: rural areas, local development, development factors
JEL codes: O11, O18, R51, R56

INTRODUCTION

In the experience of Poland and other countries, it is observed that local authorities can play a very important role in promoting economic development (Kotala and Basaj, 2004; Wiatrak, 2006). However, there is one condition: the management methods used by local authorities should change to more modern ones and local governments must adapt techniques and methods of strategic management used by private companies, including strategic management. Responsibility for local (municipal) development and the standard of living of inhabitants in the conditions of a market economy imposes entirely new tasks on local authorities (Kłodziński, 1996; Zalewski, 2006; Wiatrak, 2011). Municipal authorities, for example, can become a factor accelerating development of small enterprises in their area, but through a precipitate attitude to enterprises, local governments can also constitute a strong barrier to their formation and development (Kłodziński and Rosner, 1995). Moreover, the amount of funds allocated by the municipality to investment is an essential issue in shaping local development (Klank,

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2005). As local authorities have been playing such a crucial role in the socio-economic development of municipalities, the aim of the paper was to identify positive or negative development factors in the Warmia and Mazury Voivodeship, in the opinion of the authorities (mayors) of rural and semi-urban (urban-rural) municipalities.

THEORETICAL BACKGROUND

Literature provides numerous classifications of local development factors. A quite synthetic and, at the same time, comprehensive approach was applied by Wong, who divided 11 factors into 2 groups (Wong, 2010). The first group included traditional factors (derived from works of Ricardo and Weber), among which the following could be distinguished: natural environment, geographical location, infrastructure, human resources, finance and capital, knowledge and technology, and finally structure of the economy. The second group of factors, called non-material, included: quality of living, institutions, entrepreneurship culture as well as local identity and image.

Local development has been particularly important in the context of (sustainable) rural development. Wilkin defines the rural area in two ways. On the one hand, highly-urbanized units with a relatively dense settlement network with the dominance of non-agricultural functions, not much different from small towns or suburban villa areas, recognized as a village. On the other hand, rural areas are traditionally perceived as monofunctional (agricultural) areas, with traditional buildings, low population density and a remote location (Wilkin, 2005). The peripheral character of areas located outside urban centres makes it possible to preserve traditional landscapes and their rural character. However, some analyses show that these areas usually have a low or very low level of development (Pomianek, 2017). The natural environment is an element of sustainable development which affects social and economic growth (Gwiaździńska-Goraj and Goraj, 2013). At the same time, environmental conditions and the presence of legally protected areas force commune authorities to carry out activities in line with the principles of a sustainable economy. It can be either an opportunity or a barrier of municipal and entrepreneurial development. For example, in municipalities of the Warmia and Mazury Voivodeship, with a very low demographic potential, natural protected areas were recognized as a barrier to economic development (Pomianek, 2018). Geographical location is a universal factor, which municipal authorities have no influence over. Other traditional factors as well as non-material ones, pointed out by Wong (2010), can be modified by local authorities. Therefore, it is important to assess the local authorities' perception and awareness of development factors and local community needs, even though there is a wide range of factors shaping local development that makes it impossible to be unambiguously defined (Będzik and Brelik, 2015).

MATERIALS AND METHODS

The paper presents the results of a questionnaire-based survey conducted from March to September 2017 in 100 municipalities of the Warmia and Mazury Voivodeship (including 67 rural and 33 semi-urban ones). The voivodeship is known as one of the biggest and at the same time one of the most problematic regions in Poland. Answers of the municipal mayors were collected from 42% of surveyed self-government units (the same percentage distribution in both groups of communes). The presented questions were multiple-choice, so the answers do not sum up to 100%. The resulting structure of respondents (34% in the Elbląski subregion, 26% in the Ełcki subregion and 40% in the Olsztyński subregion) was in line with the structure of the surveyed population, which enables generalizations of findings to be made.

RESULTS AND DISCUSSION

In the opinion of local authorities of rural and semi-urban municipalities in the Warmia and Mazury Voivodeship, the most important opportunities for local development were based on environmental (natural) resources, especially: climate and geographical location, but also location along water trails and tourist attractions. The second issue

having a positive impact on local economic development was the involvement of different social groups in local problems, more important for rural authorities (Fig. 1). Over 1/3 of respondents from semi-urban municipalities saw development opportunities in co-operation with national or foreign municipalities. However, in rural municipalities there was no indication of the possibility of co-operation with foreign municipalities, and only 12% of rural units were convinced of development opportunities through cooperation with national municipalities. Inter-municipal co-operation in the implementation of common goals may allow to achieve economies of scale (Teles, 2016), which in turn may be an important stimulus for local development – so important in rural (peripheral) areas.

Quality of technical infrastructure was also crucial for local self-governments; about 40% of them stated that a well-developed infrastructure was a driving force for the economic development of a municipality, whereas 32% of rural respondents and as many as 50% of semi-urban ones pointed to a low level of technical infrastructure as the second most important barrier of local development (Fig. 2).

The most popular barrier of local development was connected with a lack of funds, pointed out more often by rural authorities (75%). It could cause problems with co-financing EU projects or the realization of investment. Indebtedness of a municipality (public debt or unpaid bank loans) was an obstacle to obtaining investment loans that could result in the lower development of technical and social infrastructure, considered to be other barriers of local development. Politicization of self-government administration was not a problem for rural respondents.

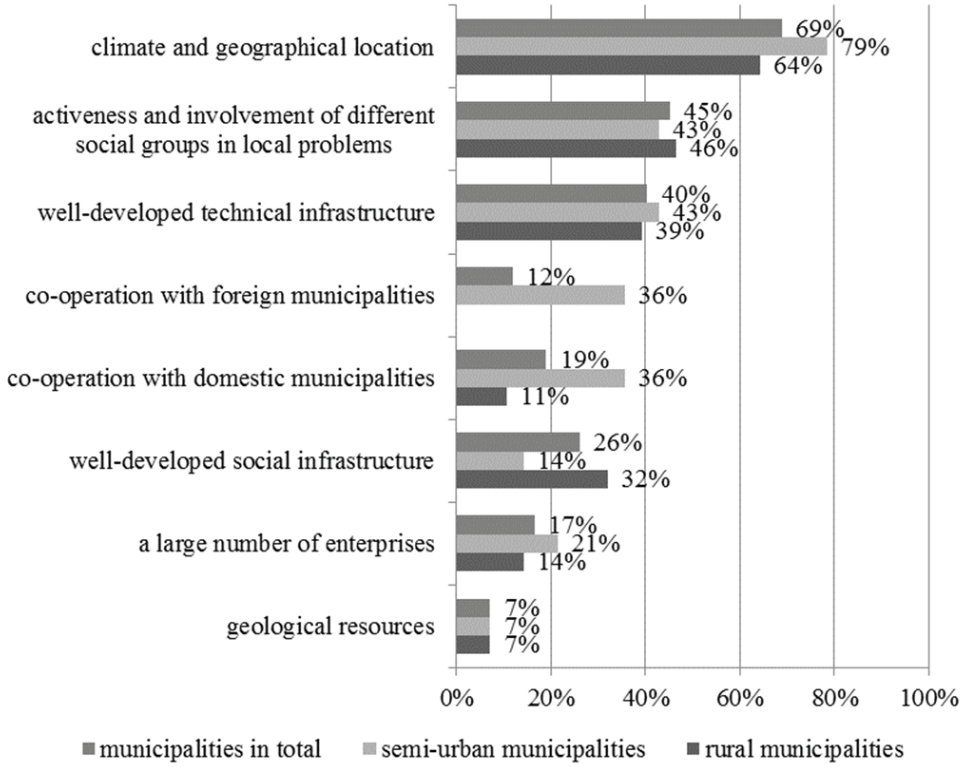

Figure 1. Opportunities for economic development of municipalities in the Warmia and Mazury Voivodeship, Poland, in the opinion of local authorities (2017)

Source: author's own research.

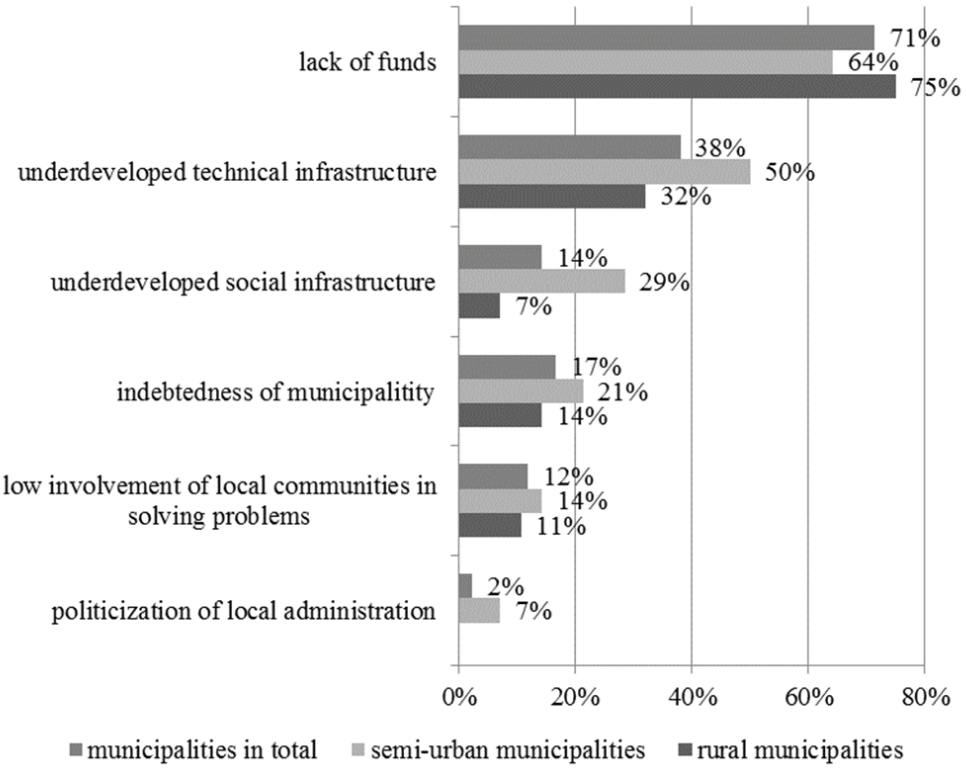

Figure 2. Barriers of economic development of municipalities in the Warmia and Mazury Voivodeship, Poland, in the opinion of local authorities (2017)

Source: author's own research.

CONCLUSIONS

Local authorities in rural and semi-urban areas of the Warmia and Mazury Voivodeship, Poland, have been aware of numerous opportunities and barriers of local economic development. Sometimes, if there is one barrier, it causes the formation of new ones. The best example is the shortage of own financial resources or municipal debt, which makes it impossible to finance investment from the local budget or to apply for EU funds, which require co-financing from the beneficiary's own resources. Most mayors make efforts to mitigate exogenous conditions by local activeness, such as co-operation with neighbouring or foreign municipalities or offering preferential tax rates to investors. Municipalities perceive the opportunity in applying for EU funds for projects aimed at improving the quality of life of local society, including the development of technical and social infrastructure. Inter-municipal co-operation in the implementation of common goals may not be popular within municipalities. In the case of rural communes in particular, this is a potentially unused opportunity of achieving a synergy effect − having an impact on local development, which is vital in rural (peripheral) areas.

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EUROPEAN FUNDS FOR RURAL AREAS VERSUS REGIONAL CONVERGENCE OF AGRICULTURE IN POLAND

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ABSTRACT

The objective of the work is the assessment of the phenomenon of convergence of agriculture in the provinces/voivodeship (NUTS 2) in Poland in the years 2003–2014 in relation to the use of European funds designated for development of agriculture and rural areas. The study specified dimensions of support under the European Funds granted for agriculture and rural areas in individual regions, which were compared to the size of gross added value of agriculture, forestry, hunting and fishery. Within the analysis, data of the Agency for the Restructuring and Modernisation of Agriculture as well as The Local Data Bank of Central Statistical Office were used. Data regarding productivity of agriculture and other rural sectors in the regions as well as data on the used resources from the European funds were availed of in the assessment of the correlation between these expectations and the phenomena of sigma-convergence and beta-convergence in the regional system. The conducted analysis confirmed the occurrence of a phenomenon of convergence in the tested scope.

Keywords: convergence, rural areas, European Funds
JEL codes: R11, R12

INTRODUCTION

Countries which joined European Union in 2004, located in the Central-Eastern Europe, had a significantly lower level of GDP per inhabitant at the time of accession than countries that had already been members of the European Community. Differences in the level of income, reflecting the differences in the level of economic development of former and new member states created the possibilities of revealing the phenomenon of convergence. The convergence, meaning the reduction of development disproportions between the member states created them in the regions is one of the main goals of European integration and the key instrument of its reaching is the inflow of community funds from the budget by means of different EU funds supporting the policies and development strategies which refer to economic sections, regions and countries.

Agriculture, characterized by low productivity of the labour factor, functioning in diverse natural and social-economic conditions, strongly supported by common agricultural policy is a sector with a significant convergence potential. The objective of the work is the assessment of the phenomenon of convergence of agriculture and other natural sectors of rural economy in the provinces of Poland in 2003–2014 and its relation with the use of EU funds designated for the development of agriculture and rural areas. Statistics were elaborated by Adam Szepeluk.

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MATERIALS AND METHODS

In order to obtain the assumed goal the dimensions of support granted for the agriculture and rural areas in individual regions must be specified, along with the methods of measurement of the state of development of agriculture in the regions, as well as elaboration of the essence and the methods of measuring the convergence phenomenon.

Data concerning the use of EU funds were obtained from Modernisation of Agriculture as well as Local Data Bank of Central Statistical Office. The level of use of resources covers, above all, all agricultural funds which finance Objectives I and II of the Pillar of Common Agricultural Policy. The analysis assumed the sum of funds for direct payments towards agriculture and subsidies from the Cohesion Fund for the development of rural areas (Adamowicz and Szepeluk, 2018).

The results as well as the level of development of agriculture in individual regions may be specified by means of various indexes and indicators (Sapa and Nawrocka, 2014). The indicator which displays the results obtained by agriculture, forestry, hunting and fishery, measured by means of gross added value was assumed in the study.

Convergence, constituting a decrease in disproportions occurring between regions, at best by acceleration of development of delayed regions may be considered in the form of sigma-convergence, beta-convergence as well as club convergence (Czyżewski and Kułyk, 2009; Sapa and Bear-Nawrocka, 2014; Smędzik-Ambroży, 2014; Hamulczuk, 2015; Barath Ferto, 2017; Adamowicz and Szepeluk, 2018). Sigma-convergence defines the scale of disproportions in a given phenomenon in time, mainly from the beginning to the end of the researched period. Its measure is the variance and standard deviation (Wójcik, 2008). Beta-convergence defines the tempo of increase of the researched indicator in individual regions in time. The occurrence of beta-convergence signifies the occurrence of a phenomenon of making up for the lagging in the weaker developed regions against the regions with initially higher development indexes. The club convergence is of conditional nature and occurs in groups of regions featured by a certain similarity of results or development factors.

Apart from an attempt to define the size of the phenomenon of convergence, also correlation account was applied within the work between the level of gross added value (GAV) and the size of the obtained funds in PLN from the European Funds (EF).

RESULTS

Polish agriculture and rural areas availed of the support from PHARE and ISPA programmes even in the pre-accession period. After becoming a member state, sources of funding expanded as well as the level of funding which increased. Average value of the obtained funds per province from the UE funds by agriculture increased from the level of approx. PLN 188 million in 2004 to approx. PLN 1,744 million in 2015. In the period of 2004–2014 an increase tendency may be observed with certain slumps in the years 2007, 2012, 2014.

In 2004, with an average of PLN 188 million per province, the largest funds were obtained by the following provinces: Mazowieckie (PLN 348 million) and Lubelskie (PLN 340 million), while Lubuskie obtained PLN 35 million and Zachodniopomorskie obtained PLN 82 million. In 2014, the biggest beneficiaries with an average of PLN 1,632 per province were the following provinces: Mazowieckie (PLN 3,949 million), Wielkopolskie (PLN 2,828 million) and Lubelskie (PLN 2,675) (Adamowicz and Szepeluk, 2018).

The comparison of the gross added value and the values of the obtained funds from the EU funds by individual provinces revealed the fact that in the first year of membership the average gross added value exceeded ten times the value of obtained funds falling on average per one province. The GAV ration to the volume of the obtained European Funds was at the level of 3.76 in the Podkarpackie province, to 24.66 in the Lubuskie province. In 2014 the average indicator of GAV per value of the obtained funds was at the level of 1.57, ranging within the limits between 0.8 in the Podkarpackie province to 2,26 in the Mazowieckie province (Table 1).

Table 1. Dynamics of the distribution of gross added value calculated for the obtained funds from the EU funds in 2004–2014 by province (PLN)

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Dolnośląskie	7.78	2.43	1.73	2.25	1.43	1.34	1.64	1.51	1.23	1.20	1.28
Kujawsko-pomorskie	8.45	2.77	1.51	2.29	1.48	1.52	1.54	1.77	1.45	1.64	1.61
Lubelskie	5.34	1.87	1.32	1.78	1.45	1.24	1.42	1.60	1.27	1.35	1.18
Lubuskie	24.66	2.72	1.64	2.90	1.54	1.64	2.00	1.74	2.00	1.65	1.71
Łódzkie	12.04	3.09	2.37	3.00	2.35	2.83	2.12	2.13	1.91	1.72	2.01
Małopolskie	6.44	3.02	2.25	3.53	2.59	2.76	2.15	1.96	1.73	1.50	1.30
Mazowieckie	14.26	3.54	2.30	3.40	2.83	2.59	2.55	2.44	2.46	2.46	2.26
Opolskie	7.62	2.74	2.15	2.32	1.52	1.54	1.72	1.60	1.81	1.44	1.31
Podkarpackie	3.76	1.78	1.31	1.93	1.71	1.61	1.17	1.11	0.96	0.98	0.81
Podlaskie	10.22	2.07	1.10	2.26	1.35	1.60	1.44	1.30	1.70	1.66	1.53
Pomorskie	5.91	1.75	1.17	2.09	1.22	1.35	1.30	1.39	1.58	1.27	1.55
Śląskie	9.59	3.34	3.02	3.67	3.47	3.17	2.76	2.26	2.02	1.93	1.90
Świętokrzyskie	7.24	2.58	1.75	2.39	2.17	2.04	1.65	1.67	1.46	1.33	1.35
Warmińsko-mazurskie	11.58	2.38	1.34	2.16	1.46	1.48	1.85	1.76	1.81	1.47	1.87
Wielkopolskie	17.81	3.40	2.28	2.88	1.85	2.18	2.17	1.85	1.88	2.00	2.13
Zachodniopomorskie	17.47	2.00	1.75	2.07	1.28	1.25	1.61	1.14	1.54	1.19	1.41
Average	10.64	2.59	1.81	2.56	1.86	1.88	1.82	1.70	1.68	1.55	1.57

Source: own elaboration on the basis of data from Agency for Restructuring and Modernization of Agriculture and Local Data Bank of Central Statistical Office.

Relative gross added value calculated into the funds obtained from the EU funds (GAV/EF) in 2004 reached the highest value in case of Lubuskie province (248.3%) Wielkopolskie province (179.2%) and Zachodniopomorskie (175.8%). The lowest GAV/EF value in 2004 was noted by Podkarpackie province (37.9%), Lubelskie province (53.8%) and Pomorskie province (59.5%). This diversification stems mainly from the diverse use of the pre-accession funds SAPARD. After the accession and covering the entire agriculture with the financing form the European Funds, these disproportions were significantly decreased. Between 2004–2014 the average GAV/EF value dropped from the level of 107.1 to 94.7%, with the highest values in 2014 obtained by Mazowieckie province (136.1%), Wielkopolskie province (127.8%) and Łódzkie (120.9%). When in 2004 extreme values of indicators increased from 37.9% (Podkarpackie province) to 248.3% (Lubuskie province), then in 2014 the extreme values decreased to the value from 48.7% (Podkarpackie province) to 136.1% (Mazowieckie province) – Table 2.

When analysing the three year's means at the beginning and at the end of the researched period the largest positive change of the indicator GAV/EF was felt by the following provinces: Pomorskie (+37.9 p.p.), Wielkopolskie (+30.3 p.p.) and Podlaskie (+20.6 p.p.). Negative change covered almost half of the provinces, including Lubuskie (–27.5 p.p.), Dolnośląskie (–16.8 p.p.) and Małopolskie (–10.9 p.p.) – Table 3.

Median of the change amounted to: –9.5 p.p. which indicates the fact that half of the tested provinces diminished the analysed indicator by –9.5 p.p.

Table 2. Dynamics of distribution of the level of gross added value translated into the obtained EU funds with regards to the country scale by province (%)

Specification	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014
Dolnośląskie	78.4	90.4	96.3	87.2	77.2	71.9	88.7	85.7	71.1	72.5	77.0
Kujawsko-pomorskie	85.1	103.0	84.3	88.7	79.7	81.9	83.1	100.4	84.0	99.0	96.8
Lubelskie	53.8	69.5	73.7	68.9	78.3	66.7	76.6	91.0	73.7	81.6	70.8
Lubuskie	248.3	101.0	91.1	112.4	83.4	88.6	108.0	99.0	115.8	100.2	103.1
Łódzkie	1 21.2	1 14.9	131.9	1 16.2	126.7	152.7	114.5	121.2	110.9	104.2	120.9
Małopolskie	64.8	112.3	125.1	136.6	139.8	148.4	116.2	111.4	100.6	90.6	78.2
Mazowieckie	143.5	131.6	128.3	131.5	153.0	139.3	137.6	138.6	142.5	149.0	136.1
Opolskie	76.7	101.8	119.5	89.8	82.1	82.9	92.8	90.8	104.8	87.1	78.9
Podkarpackie	37.9	66.2	73.0	74.7	92.6	86.7	63.2	63.2	55.9	59.2	48.7
Podlaskie	102.9	77.2	61.3	87.6	72.9	86.4	77.8	73.7	98.6	100.4	92.1
Pomorskie	59.5	65.3	64.9	80.8	65.6	72.5	70.1	78.7	91.7	76.9	93.0
Śląskie	96.6	124.2	168.1	142.0	187.5	170.6	149.2	128.6	117.1	117.0	114.1
Świętokrzyskie	72.9	96.0	97.2	92.6	117.4	110.1	89.1	95.1	84.8	80.5	81.1
Warmińsko-mazurskie	1 16.6	88.4	74.4	83.4	78.7	79.5	100.1	100.1	105.2	88.8	112.5
Wielkopolskie	1 79.2	126.4	126.7	111.6	99.9	117.6	117.3	105.2	108.8	121.1	127.8
Zachodniopomorskie	1 75.8	74.3	97.3	80.1	69.2	67.5	87.0	64.9	89.5	72.1	84.5
Average	1 07.1	96.4	100.8	99.0	100.2	101.5	98.2	96.7	97.2	93.8	94.7

Source: own elaboration on the basis of data from Agency for Restructuring and Modernization of Agriculture and Local Data Bank of Central Statistical Office.

from the level of 111.2% to the level of 101.7%. In seven provinces a decrease in GAV/EF with regards to the average national was noted while in the nine provinces this indicator increased.

Data concluded in Table 3 enable the testing of the flow of regions between the selected groups of regions on the basis of the levels of GAV/EF against the country average. Four groups of provinces were distinguished, two groups above average (I high level, II medium high level), while the value of 110.25 was assumed as the average, constituting an average for the years 2004–2006 and 2012–2014, below the average (III medium low level, IV low level). In the initial period, within the extreme groups, representing level I – high and IV – low – 5 provinces were placed, while within the groups close to the average country level, 3 provinces were found (Table 4). In the final period of the analysis the end group with the highest level decreased from 5 to 4, while III group – of the medium low level – increased from 3 to 4 provinces. The highest level of GAV, falling for the used funds from the European Funds, was obtained in the entire period by three provinces: Zachodniopomorskie, Mazowieckie, Warmińsko-Mazurskie and Wielkopolskie, whilst those with an initially high level of GAV/EF in the years 2004–2006 moved to the III level – medium low in the period of 2012–2014. Provinces: Podkarpackie, Lubelskie and Pomorskie in the entire period have continuously remained in group IV-low level of GAV/EF, while Podlaskie province exchanged its low position in the group IV with Małopolskie province from group III. Flows presented in Table 4 indicate

Table 3. Changes in the distribution of the level of gross added value translated into the obtained EU funds in the regions in comparison to the country Three year averages with regards to the country scale in % in the years 2004–2006 and 2012–2014

Specification	2004–2006	Group	2012–2014	Group	Change (p.p.)	Change (%)
Dolnośląskie	88.4	IV	73.5	IV	–14.8	–16.8
Kujawsko-pomorskie	90.8	III	93.3	III	2.5	2.7
Lubelskie	65.7	IV	75.4	IV	9.7	14.8
Lubuskie	146.8	I	106.4	III	–40.4	–27.5
Łódzkie	122.7	II	112.0	II	–10.7	–8.7
Małopolskie	100.7	III	89.8	IV	–10.9	–10.9
Mazowieckie	134.5	I	142.5	I	8.1	6.0
Opolskie	99.3	III	90.3	III	–9.1	–9.1
Podkarpackie	59.0	IV	54.6	IV	-4.4	–7.5
Podlaskie	80.5	IV	97.0	III	16.6	20.6
Pomorskie	63.2	IV	87.2	IV	24.0	37.9
Śląskie	129.6	II	116.1	II	–13.6	–10.5
Świętokrzyskie	121.6	II	121.9	II	0.3	0.2
Warmińsko-mazurskie	133.5	I	152.7	I	19.1	14.3
Wielkopolskie	130.1	I	169.5	I	39.4	30.3
Zachodniopomorskie	178.7	I	199.8	I	21.1	11.8
Average	109.1	×	111.4	×	2.3	2.1
Standard deviation	33.6	×	38.3	×	4.7	13.9
Median	111.2	×	101.7	×	–9.5	–8.5

Source: own elaboration on the basis of data from Agency for Restructuring and Modernization of Agriculture and Local Data Bank of Central Statistical Office..

that the highest stability is a feature of group II – medium high level of GAV/EF.

Changes which occurred in this group brought the level of entire group upwards to the country average. However, deviations which occurred were not sufficiently strong to trigger the shift to the group from another level. To a certain degree, this group shows features of club convergence. The provinces belonging to the group of low level, such as Pomorskie and Lubelskie improved their ranking positions most strongly. So did the provinces belonging to group I – high level of GAV/EF (Wielkopolskie, Warmińsko-Mazurskie and Zachodniopomorskie). An unusual shift from group I to group III took place in case of Lubuskie province. Tendencies of increases in GAV towards the used funds, thus the tendency to catch up with the better ones, were revealed in case of three provinces of the fourth group with the lowest level of the discussed indicator. This might speak in favour of the occurrence of a phenomenon of beta-convergence.

The value of indicator of relative variability of GAV/EF amounted to 42.1% in 2004 and until 2014 it dropped to the level of 22.3%. The analysis of sigma indicator in the tested period suggests the convergence of regions. The direction value of the regres-

Table 4. Flows of regions between four groups of levels of GAV/EF in the regions of Poland with regards to the three year national average between the initial period and the end period of the analysis in the years 2004–2014

Level of GAV/EF in comparison to the national average	Number of regions in the years		Balance of flows	
	2004–2006	2012–2014	+ growth, – loss	
I high level > 130.0%	5	4	+0	–1 (III)
II medium high level 130.0%	3	3	+0	–0
III medium low level 90.1–110.1%	3	4	+2 (I, IV)	–1 (IV)
IV low level < 90.0%	5	5	+1 (III)	1 (III)

Source: own elaboration on the basis of Table 3.

sion line, relative variability coefficient of the level of GAV/EF assumed a negative value (–1.11) which is confirmed by the convergence of regions (Fig. 1).

In the case of beta ratio analysis, a large increase in the voivodship indicator was observed, in which the GVA/EF logarithm was relatively low, as well as a very low increase in voivodships, whose initial GVA/EF value was high. The above situation confirms the occurrence of the convergence of regions (Fig. 2).

The highest correlation coefficient between GVA and co-financing from EU funds in the years 2004–2014 was recorded in the case of Mazowieckie province (r = 0.92), Lubelskie province (r = 0.89) and Śląskie province (r = 0.86). The lowest values were recorded for Wielkopolskie province (r = 0.56), Małopolskie province (r = 0.59) and Kujawsko-Pomorskie province (r = 0.63). Nevertheless, in each case the correlation coefficient was positive and relatively high. When analysing the relation between GVA for the entire Poland and the sum of funds obtained for agriculture in 2004–2014, a high positive correlation (0.87) was demonstrated (Fig. 3).

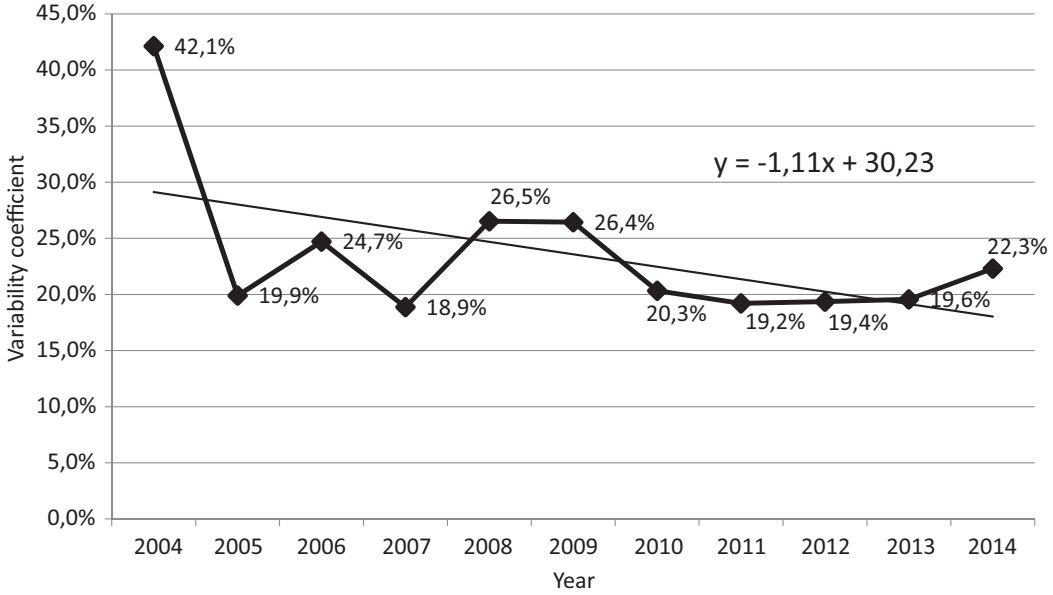

Figure 1. Analysis of sigma-convergence of gross value added per funds obtained from EF 2004–2014

Source: own elaboration based on data from the Agency for Restructuring and Modernization of Agriculture and Local Data Bank of Central Statistical Office.

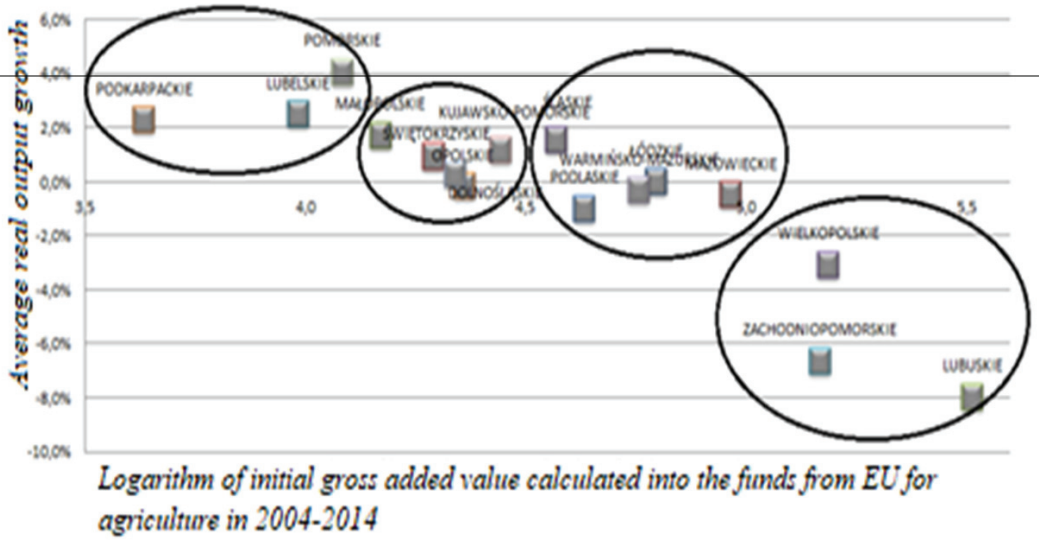

Figure 2. Analysis of beta-convergence of gross value added per EU funds acquired in Poland by province

Source: own elaboration based on data from the Agency for Restructuring and Modernization of Agriculture and Local Data Bank of Central Statistical Office.

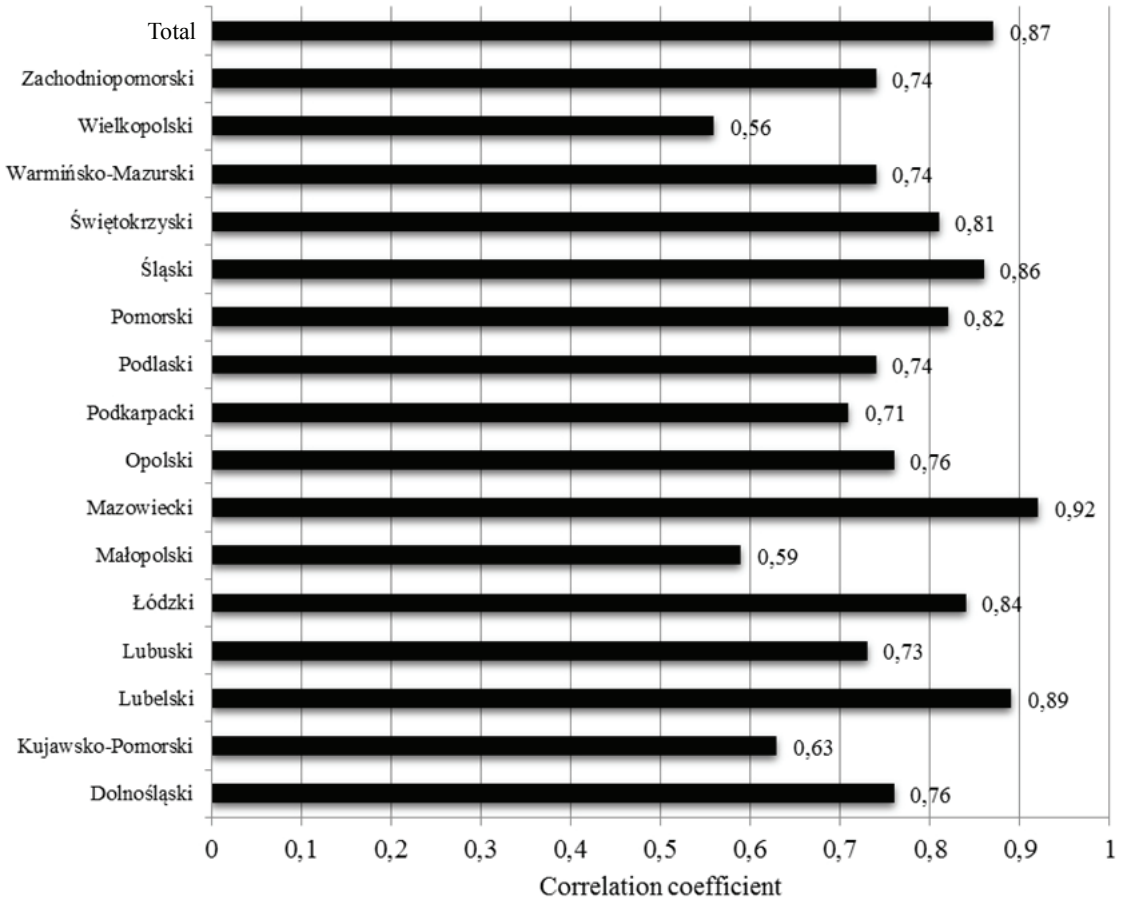

Figure 3. The correlation coefficient of gross value added and funds obtained from the EU by agriculture in the years 2004–2014 for regions

Source: own elaboration based on data from the Agency for Restructuring and Modernization of Agriculture and Local Data Bank of Central Statistical Office.

CONCLUSIONS

1. Reducing development disparities between countries and regions is one of the most important general goals of European integration. The Community budget established for this purpose is directed to individual countries and regions by means of various European funds and policies. The task of these policies and funds is to support the development of countries and regions that are lagging behind in development, which may result in the occurrence of phenomenon of convergence. One of the most supported economic sectors is agriculture and other forms of farming in rural areas. In Poland, agriculture and other rural sectors of all regions benefited from the support of the common agricultural policy and cohesion policy. In this work it was assumed that support for agriculture, forestry, hunting and fisheries is a factor contributing to regional convergence in Poland.
2. The research confirmed the positive correlation between the gross value added of the natural sectors of the rural economy and the amount of appropriations from European funds used by the regions for the development of agriculture and rural areas. The correlation coefficient in the country was 0.87 and ranged from 0.56 in the Wielkopolskie province to 0.92 in the Mazowieckie province. High correlation indicators show strong relationship between management effects in all regions of Poland and the level of utilization of EU funds for the development of agriculture and rural areas.
3. The study of the productivity expressed by the level of Gross Value Added (GVA) obtained in the sectors of section A: agriculture, forestry, hunting, and fisheries, in relation to the value of funds received from the European Union (EF) and used for the development of agriculture and rural areas, confirmed the occurrence of the phenomenon of sigma-convergence and beta-convergence. In 2004–2014, in the regions of Poland the coefficient of relative GVA/EF value became negative: –1.1, which confirms the reduction of the coefficient of variation from 42.1% in 2004 to 22.3% in 2014. The direction of the regression line in relation to the value of the GVA/EF coefficient of variation indicates the occurrence of convergence of regions in the studied range.
4. The occurrence of the is indicated by a lower initial level of the logarithm of GVA/EF coefficients in regions with high growth rate and a higher initial level of this logarithm in regions with a negative real growth rate. This results in a slight but noticeable limitation of regional differentiation by catching up by regions considered to be less advanced in the studied range.
5. The change of the existing productivity pattern of regions at the beginning of the examined period was not dynamic. Regions with a little higher than average level of GVA/EF demonstrated a kind of particular stability. The group of provinces with a highest level of the GVA/EF indicator decreased, while the largest shift between province groups occurred in groups of provinces representing the productivity level lower than the average in national scale.

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ECONOMIC STATUS OF FARMS IN POLAND AND SPAIN IN THE YEARS 2011–2016 BASED ON FADN STATISTICS

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ABSTRACT

The paper presents a comparison of the economic status of farms in two selected EU countries, Poland and Spain, in the period of 2011–2016. Both these countries were selected based on comparable qualitative and quantitative parameters characteristic of agriculture. An additional determinant for the selection of these countries was connected with the similar economic situation before and after their accession to the European Union. The economic status of these two countries was compared using the statistical data of the European Farm Accountancy Data Network (FADN), the Macroeconomic Data Bank (Poland) and the Instituto Nacional de Estadistica (Spain). In turn, the economic situation of farms in Poland and Spain was assessed on the basis of selected economic measures: Gross Farm Income, Farm Net Value Added, Farm Net Value Added/AWU, Family Farm Income/FWU, Total output of crops and crop production, total crops output (ha), total output of livestock and livestock products, total livestock output (LU), Total assets, total fixes assets, Total labour input and unpaid labour input. The study was summarised with the conclusions.

Keywords: common agricultural policy, economic measures, agriculture in Spain, agriculture in Poland
JEL codes: M40, M41, M42

INTRODUCTION

The agricultural sector in the European Union has undergone considerable changes in recent years. The above resulted mainly from the stimulating influence of Common Agricultural Policy payments on the competitiveness of the EU agricultural sector as well as growing levels of economic interdependence in the EU. Globalization and improved access to foreign markets have enabled the European agri-food sector to compete with global food producers (Pawlewicz and Pawlewicz, 2018; after Ajitabh and Momaya, 2003). Polish–Spanish cooperation has been deepening for over 20 years. The Treaty of Friendship and Cooperation between the Republic of Poland and the Kingdom of Spain was signed in 1992, and came into force in 1994. While the Spanish economy was booming (1996–2007) Spain was an interesting

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economic model for Poland. The Spanish experience of accession to the EU was also useful for Poland during its own negotiation process. Not only had both countries experienced smooth transitions to democracy, but they had also focused their foreign policy on becoming core EU countries. Since 2003 they have held annual intergovernmental summits at the prime ministerial level, leading to the construction of a common agenda. Consequently, political and economic dialogue has been improving constantly, while bilateral relations have become more symmetrical and balanced (Elcano Policy Paper 2/2013). Within the last century both Spain and Poland have undergone revolutionary economic changes, thanks to which both countries have changed the character of their economies, transformed from that based primarily on agriculture to economy dominated by the secondary and tertiary sectors. In the opinion of Perez-Méndez (1992) 'the direction of development for a country's economy is focused on the development of economy based on the services and the industry rather than agriculture'. That author stressed that the resources of agriculture are not adequately used and this does not facilitate attainment of its entire potential. When comparing the volume of investments per agricultural worker per farm and per 1 ha of farm area in Spain and in Poland it is evident that these values are lower than the mean for the European Union (EU) in other branches of the economy (Carballido Veiga, 2013). Additionally, the character of agriculture is different from that of the other branches of the national economy.

Nevertheless, we need to remember that over millennia agriculture was developing into two basic models of farms, i.e. family farms and large commercial farms. In view of the above, Klepacki (2005) distinguished three groups of farms operating in Polish agriculture:

1. Small farms, which are treated by their owners as a place of residence and (or) as a capital investment, and not as an entity of commercial agricultural production.
2. Intensively developing farms, characterised by the growing land area, development of production, e.g. through investments and a high degree of market integration.
3. Large market-oriented farms, characterised by simplified large-scale production, which may be easily mechanised.

We need to remember that irrespective of the size of a given farm and its legal ownership type each farm 'is a set of assets and rights organised by the owner to meet the requirements of agricultural production, mainly for commercial purposes. It is the primary source of income for the family, it may provide the family with means to maintain the socio-economic status comparable to the standard for other sectors' (Carballido Veiga, 2013). In order to ensure a similar socio-economic standard both Spain and Poland declared to accept the Community acquis, including also law regulating the Common Agricultural Policy (CAP). The principles and instruments of the common agricultural policy were stipulated in the Treaty of Rome of 1957 and subsequently specified at the Stresa conference in July 1958, entering into force in 1962 (Molle, 2017). In accordance with Article 39 of the Treaty the CAP is assigned the following objectives (Wieliczko, 2013): to increase the efficiency of agricultural production, by supporting technical change and ensuring rational development of agricultural production and optimal utilisation of production factors, particularly labour; to ensure a decent standard of living for rural communities, mainly by increasing individual incomes of individuals employed in agriculture; to stabilise markets; to ensure availability of supplies; and to guarantee prices. The Stresa conference also addressed the problem of methods to be applied to reach these objectives. In the future the common agricultural policy was to be modified by three primary principles (Tracy, 1994; Bieluk et al., 2012): (1) Market unity, i.e. throughout the Community prices of agricultural products should be unified, while trade in these products should be free; (2) Preferences for the Community: a system of customs barriers should be established to protect the internal market against instability of world markets; (3) Financial solidarity: a common fund should be created to finance common expenditure in the agricultural sector.

The aim of this paper is comparison of the economic status of farms in Poland and Spain, in the period of 2011–2016 on the basis of selected economic measures.

MATERIALS AND METHODS

The paper is based on statistical data concerning specific branches of agriculture in two selected EU countries, i.e. Poland and Spain. Statistical data used in this paper refer to the period from 2011 to 2016, such as reports of the European Statistical Office – Eurostat, FADN, the Macroeconomic Data Bank (Poland) and the Instituto Nacional de Estadistica (Spain). Next the objectives specified in the Common Agricultural Policy were analysed and evaluated of certain indicators of economic efficiency, such as: Gross Farm Income, Farm Net Value Added, Farm Net Value Added/AWU, Family Farm Income/FWU, Total output crops and crop production, total crops output (ha), total output livestock and livestock products, total livestock output (LU), Total assets, total fixes assets, Total labour input and unpaid labour input. Subsequently conclusions were formulated.

RESULTS AND DISCUSSION

The share of the agricultural sector in the EU countries in the generation of GDP in 2015 was on average approx. 1.2% and the European Union for many years has been a net exporter of agricultural products. Poland (2.2%) and Spain (2.5%), next to Bulgaria, Estonia, Greece, Lithuania, Latvia, Romania and Hungary, are countries with the share of agriculture in GDP exceeding 2% (World Bank, 2017). The share of agriculturally utilised area in the total area in 2015 in the EU was 184.5 million ha, in Poland it was 14.5 million ha and in Spain it was 26.3 million ha. Both countries are characterised by a considerable fragmentation of farms owned by individual farmers. In relation to the total number of farms in Poland, small farms with an area of max. 5 ha accounted for as much as 55%, while in Spain it was 53% (GUS, 2017). Such a significant fragmentation of farms is highly disadvantageous for the development of agriculture. Among other things, it limits the potential of increasing the marketable value of agricultural production.

The first and at the same time the basic statistic concerning agricultural income is provided by the Gross Farm Income, being the most important measure defining economic efficiency of farm resources. Gross income of Polish farms in the years 2011–2016 was considerably lower than in Spain (Table 1). The average income was only EUR 16 thousand, while in Spain it exceeded EUR 38 thousand. We need to focus particularly on the fluctuations of changes in income. Revenue of Polish farms starting from 2016 in relation to 2011 decreased by 14%, while in Spanish farms it increased by as much as 71%.

Differences in the volume of income generated from agriculture in individual countries result from many factors, particularly structural differences, i.e. farm size, directions of production, ownership structure and the initial condition of agriculture in the accession period, as it was presented by Zawalińska, Majewski and Wąs (2015).

Information on income structure of farms is also provided by the statistic concerning value added generated by farms. In the analysed period net value added for farms in Poland was over 2-fold lower than that of farms in Spain. Value added in Polish farms in 2016 was by 23% lower in comparison to 2011, while in Spain it increased by almost 73%. According to a study by Czyżewski and Kryszak (2015) in the years 2007–2012 the rate of change in value added in Poland was 7.8%, while Spanish farms recorded a decrease by 19.5%. In this context it may be disturbing that in recent years value added in Poland has been decreasing from year to year.

An important aspect in the evaluation of farms is also connected with the analysis of labour efficiency. It is expressed in the value of standardised production per one Annual Work Unit (AWU). Analysis of data presented in Table 1 indicates that a greater efficiency was recorded in Spain (average EUR 19,492). The low effects in Poland (average EUR 6,741) may result from the low price levels for agricultural products. Next to Malta, Cyprus, Slovenia and Romania, Poland is a country with one of the lowest labour efficiencies in the EU (Sadowski et al., 2015).

The primary measure informing on economic efficiency is provided by income from a farm expressed in value per Family Work Unit (FWU). Labour profitability in farms in Spain increased in the period of 2011–2016 from EUR 21,083/FWU to EUR 34,699/FWU, while in Poland it decreased from EUR 6,976/FWU to EUR 5,318/FWU and it was almost 7-fold lower.

Table 1. Gross Farm Income, Farm Net Value Added, Farm Net Value Added / AWU, Family Farm Income / FWU in years 2011–2016 in Spain and in Poland

Year	Specification	Spain	Poland
2011	Gross Farm Income	31 936	17 018
	Farm Net Value Added	28 830	12 802
	Farm Net Value Added / AWU	20 619	7 444
	Family Farm Income / FWU	21 083	6 976
2012	Gross Farm Income	32 042	17 160
	Farm Net Value Added	28 555	12 895
	Farm Net Value Added / AWU	20 261	7 484
	Family Farm Income / FWU	20 078	6 930
2013	Gross Farm Income	32 738	16 685
	Farm Net Value Added	29 292	11 904
	Farm Net Value Added / AWU	21 393	7 017
	Family Farm Income / FWU	21 246	6 510
2014	Gross Farm Income	32 786	15 635
	Farm Net Value Added	27 855	10 751
	Farm Net Value Added / AWU	20 317	6 441
	Family Farm Income / FWU	19 593	5 804
2015	Gross Farm Income	48 383	14 868
	Farm Net Value Added	43 173	9 927
	Farm Net Value Added / AWU	26 416	6 045
	Family Farm Income / FWU	28 160	5 427
2016	Gross Farm Income	54 806	14 651
	Farm Net Value Added	49 834	9 802
	Farm Net Value Added / AWU	28 059	6 018
	Family Farm Income / FWU	34 699	5 318

Source: the authors' study based on: Farm Accountancy Data Network, Instituto Nacional de Estadistica (Spain).

The FADN data indicate that plant production predominated over animal production in both analysed countries (Table 2). The volumes of plant and animal production were greater in Spain (Table 2). The value of plant production in 2016 in comparison to the initial period of analysis in Spain increased by approx. 81%, while that of animal production – by approx. 51%. In the analogous period in Poland the value of plant and animal production decreased (for plant production it was by approx. 10%, while for animal production – by 12%). Per 1 ha the mean value of plant production in Poland was higher than in Spain, i.e. EUR 841, at EUR 838 in Spain. Animal production per 1 ha in Poland is also higher, on average amount-

Table 2. Total output crops and crop production, total crops output (ha), total output livestock and livestock products, total livestock output (LU) in years 2011–2016 in Spain and Poland

Year	Production	Spain	Poland
2011	Total output crops & crop production	29 004	16 027
	Total crops output / ha	896	850
	Total output livestock & livestock products	19 423	12 920
	Total livestock output / LU	795	979
2012	Total output crops & crop production	31 993	17 592
	Total crops output / ha	885	936
	Total output livestock & livestock products	17 625	12 232
	Total livestock output / LU	781	1 044
2013	Total output crops & crop production	32 574	16 289
	Total crops output / ha	873	865
	Total output livestock & livestock products	19 543	13 474
	Total livestock output / LU	831	1 154
2014	Total output crops & crop production	32 067	15 153
	Total crops output / ha	872	817
	Total output livestock & livestock products	18 833	13 441
	Total livestock output / LU	858	1 109
2015	Total output crops & crop production	47 114	15 065
	Total crops output / ha	1 081	812
	Total output livestock & livestock products	28 210	12 673
	Total livestock output / LU	871	1 042
2016	Total output crops & crop production	52 667	14 424
	Total crops output / ha	1 210	766
	Total output livestock & livestock products	29 482	11 423
	Total livestock output / LU	868	942

Source: authors' study based on: The Macroeconomic Data Bank (Poland), Farm Accountancy Data Network, Instituto Nacional de Estadistica (Spain).

ing to 882 LU in comparison to 701 LU in Spain. A typical characteristic of most farms in Poland is connected with the high value of fixed assets in relation to the owned agriculturally utilised area and a high share of fixed assets in the total value of assets (Mańko and Płońka, 2010). The mean value of total property (assets) in farms in the analysed years in Poland exceeded EUR 16 thousand, while in Spain it was EUR 30 thousand (Fig. 1). In the first three years of the analysis the value of assets was decreasing

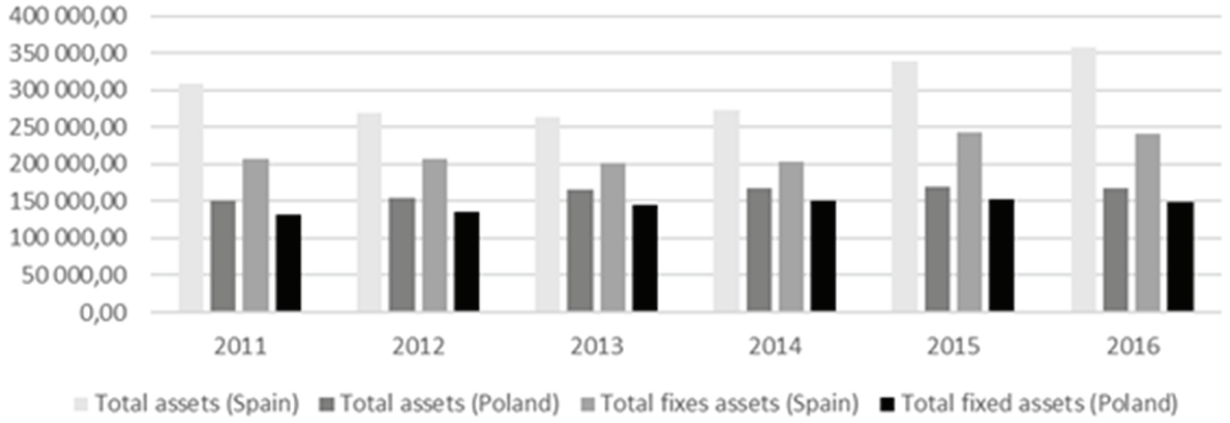

Figure 1. Total assets, total fixes assets in years 2011–2016 in Spain and Poland
Source: authors' study based on: Macroeconomic Data Bank, Farm Accountancy Data Network.

both in Poland and in Spain, while after 2014 it was increasing. In the investigated period the mean share of fixed assets in total assets in Poland was approx. 47%, whereas in Spain it was around 42%.

The population employed in agriculture comprised mainly residents of rural areas, for whom in the past income from employment in agriculture constituted the foundation for livelihood. As a consequence of economic development in both countries, particularly non-agricultural activity, the situation was changing markedly (Kapusta, 2014). The total Family Work Unit (FWU) in 2011 in Poland amounted to 1.72, while in 2016 it decreased to 1.63 (Fig. 2). The reduction in the total value of family work on a farm in Poland was connected, among other things, with considerable mechanisation of agriculture. This trend has been observed since 1992, with labour inputs per 1 farms systematically decreasing (Karwat-Woźniak, 2009).

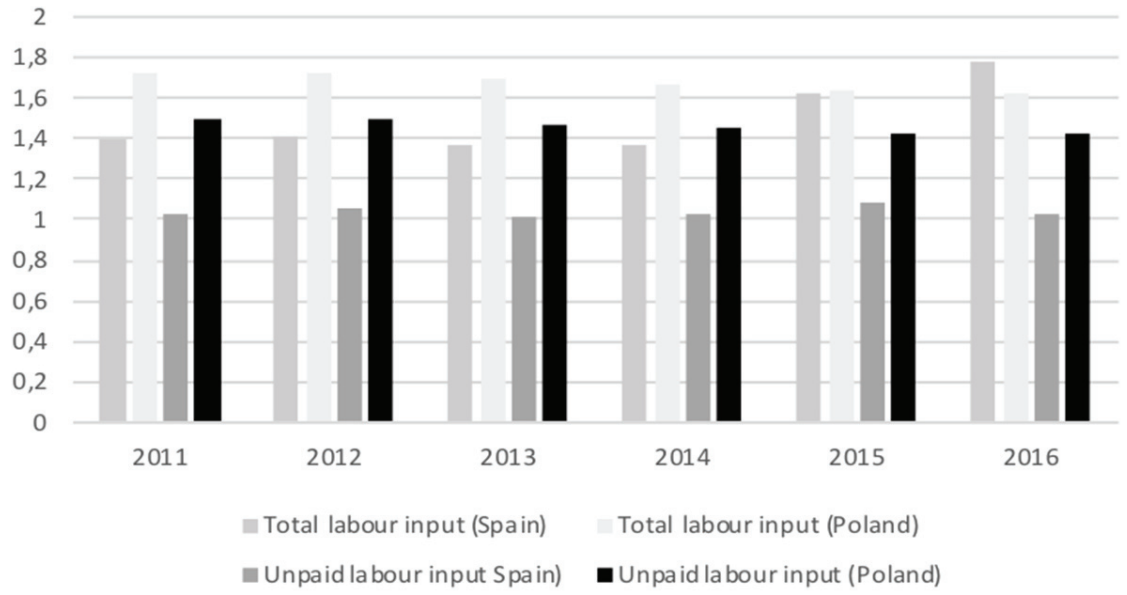

Figure 2. Total labour input and unpaid labour input in years 2011–2016 in Spain and Poland (FWU)
Source: authors' study based on: Farm Accountancy Data Network.

Additionally, the share of family work in the case of farmers in Poland was 1.49 in 2011, decreasing systematically to 1.43 and being by approx. 50% greater in comparison to Spain in the analogous period (Fig. 2).

CONCLUSIONS AND RECOMMENDATIONS

The results of the presented analysis point to significant differences in the productive potential of agriculture in Poland and Spain. Those discrepancies can be attributed to variations in geographic and natural conditions, type of agricultural production, population and economic development. The conducted comparative analysis of Polish farms covered by the FADN system with Spanish farms for the period of 2011–2016 showed that: Polish farms record poorer economic results, both in terms of gross and net income, as well as value added in comparison to Spanish farms. Higher volumes of plant and animal production in the investigated period were recorded in Spain. In turn, in Poland plant production was higher per 1 ha, while animal production was higher in terms of Livestock Units. The mean value of total assets in farms in the analysed years in Poland exceeded EUR 16 thousand, while in Spain it was EUR 30 thousand. In the analysed period the total value of family work in farms decreased both in Poland and Spain.

To fully achieve its growth potential, Polish agriculture would have to assist companies to increase investment in brand creation, and address the fragmented sectoral structure by encouraging consolidation of smaller farming units into larger business entities of a large enough scale to satisfy international demand.

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PART 3

INNOVATION OF THE NATIONAL ECONOMY, WITH PARTICULAR EMPHASIS ON AGRIBUSINESS

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THE ECONOMIC ASPECTS OF SOLAR ENERGY PRODUCTION BY HOUSEHOLDS IN UKRAINE

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ABSTRACT

In recent decades considerable attention has been paid to alternative and renewable energy. Among the alternative sources, the sun's energy is most appealing. Therefore, the development of solar energy, in the long run, is one of the top priorities. In practice, there are numerous barriers to the growth of the solar energy market. First of all, economic: fairly high prices for solar systems and payback period; the absence of working capital from manufacturing enterprises, the absence of specific mechanisms for stimulating production in the form of subsidies, tax exemptions, preferential tariff policies, etc. Therefore, research into the development of solar energy, as a real tool for a comprehensive solution to economic and environmental problems, is becoming increasingly relevant. The paper considers the energy policy of the use of renewable energy sources in rural areas. The theoretically feasible and technically achievable potential of solar energy in the territory of Ukraine was characterized. It was noted that the sun is the most affordable supplier of energy on earth today. The use of solar radiation is expedient for the development of thermal and electric energy and is possible throughout the territory of Ukraine. The dynamics of the commissioning of solar power plants by private households was analysed. The attention is focused on the application of the 'green' tariff, which stimulates the increase in the number of solar projects implemented in households. A financial model of private households of choosing a solar power plant option was proposed. The problems were identified and the possibilities of using solar energy for ensuring energy independence of households and profit generation were assessed. The forecast for the development of solar energy of the period up to 2020 was made.

Keywords: solar power, electricity, household electric energy, solar panels, bioeconomics
JEL code: D1

INTRODUCTION

The current development of the world economy is inextricably linked with the growth of energy production. The most important problem facing energy is the sources of its supply. Today it is important to carry out scientific research, which should be directed to a quick and effective solution to existing problems.

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The most promising source of electricity is the energy of the sun. One can get this energy permanently, for free and anywhere in the world. At the same time, the behaviour of the sun is more predictable than other meteorological factors. Modern technologies allow to use this potential with sufficiently high efficiency.

The most widespread use of solar energy has been found in heat supply systems. They serve for hot water supply, heating and other needs, which significantly reduces the use of traditional fuel resources. The current trend is the rapid expansion of the use of solar power for both centralized power generation at solar power plants and in individual electricity supply systems for public and private buildings (Plachkov et al., 2013).

The purpose of the study is to assess the state of development of solar energy in Ukraine and the prospects of its use in the energy supply system of private households.

THEORETICAL BACKGROUND

Climate change, population growth, environmental pollution, resource scarcity have led to the need to find and develop modern, renewable and sustainable technologies. Bioeconomy, which arose at the junction of ecology and economics, explores the interaction of man and nature, which takes as a basis for the introduction into human activities of biotechnology, using renewable bioenergy for the production of effective products, contributing to the improvement of the entire life of society as a whole. An important component of research is the use of energy based on renewable raw materials (Odintsova, 2014).

Solar power is one of the perspective and environmentally friendly areas for the development and implementation of renewable energy in Ukraine. The development of solar energy is not only a factor in reducing the energy dependence of Ukrainian households from monopolists, but it also has a significant impact on the balance of prices in the energy market of the country (Chornyy et al., 2016).

In the wider solar power sector, two main directions can be distinguished: solar thermal power that uses solar energy to generate heat, and solar power, which uses solar energy to generate electricity. In countries where there is a high level of solar energy development, there are corresponding state programs that provide favourable conditions, including economic ones, for its use and development (Plachkov et al., 2013).

Today, households can install a private solar power plant with a capacity of up to 30 kW. This opportunity has come about due to the developed in conjunction with the State Department of Energy Efficiency and the adopted Law of Ukraine in 2015. Under this Law, the wholesale electricity market of Ukraine in each accounting period is obliged to purchase from entities subject to the green tariff and to carry out full payment for the cost of electric energy produced at the objects of electric power from alternative sources (Law of Ukraine No 514-19).

MATERIALS AND METHODS

1. The following documents and materials were used to conduct research on the state of development of solar energy in Ukraine: materials I.V. Plachkov Power Engineering: History, Present and Future, Scientific and Cognitive Edition 2013; of the State Energy Efficiency of Ukraine; Agroexpert; Law of Ukraine No 514-19.
2. In the process of collecting materials that characterize the state of development of solar energy in households in Ukraine, the method of statistical observation was used to collect the primary statistical material through the registration of facts.

To analyse the totality of the obtained materials, the method of grouping the indicators into homogeneous groups was used.

To present the results of the study were tabular, graphical, calculation methods that allowed to analyse the dynamics of solar energy development for the period 2014–2017 years. The simulation method was used to construct a financial model of the solar power plant of a private household. The forecasting method allowed, using the Excel spreadsheet editor, to use the correlation analysis to calculate the forecasted indicators for the installation of solar power stations in private households for 2018–2020.

RESULTS AND DISCUSSION

An important role in human life is played by the energy of the sun, because it is the most affordable source of energy on earth. It is solar power that has the greatest impact on energy markets because of its share in the structure of the cost of 'green' electricity.

Theoretically, the potential energy of the sun in Ukraine is annually 63.01 tonnes of oil equivalent, technically achievable is annually 29.63 tonnes of oil equivalent, or annually 33.77 kWh. For the development of thermal and electric energy, the most expedient is the use of solar radiation, which is available throughout the territory of Ukraine. From the ecological point of view, solar power may have very limited constraints in its implementation as it has no significant negative environmental impact. Regarding social characteristics, it should be noted that the quantitative forecasting of the creation of additional jobs is about 3.46 thousand people The dynamics of solar power generation is the largest among renewable energy sources in Ukraine, and there is a tendency to increase the capacity of solar power plants annually. At the same time, the average number of hours of work of stations at full capacity in recent years has decreased to 928 hours per year, which corresponds to the utilization rate of installed capacity at 10.6% (Kucher et al., 2017).

For partial electricity provision, private sector residents use photoelectric elements that are located on the roof of the house. For the production of solar power, households can choose power plants of the required capacity. To make a decision on choosing a variant of a solar power plant, a financial model for private households was presented (Fig. 1).

Ukraine continues to increase the potential of renewable energy. Over 2016, more than 700 solar homes with a capacity of less than 100 kW were built, and their total number exceeded 1,000 installations. Especially solar panels and batteries are in demand among farmers and suburban residents, since this equipment allows you to generate energy for own use, and under the Green Tariff programme to sell part of the energy. Therefore, an increase in the number of solar power stations in this sector is justified and profitable (Prel.prom, 2017).

Over the past four years, 3,010 private households in Ukraine have installed solar power plants with a total capacity of 51 MW. It is about 2 thousand families, switched to 'clean' electricity by the end of 2017

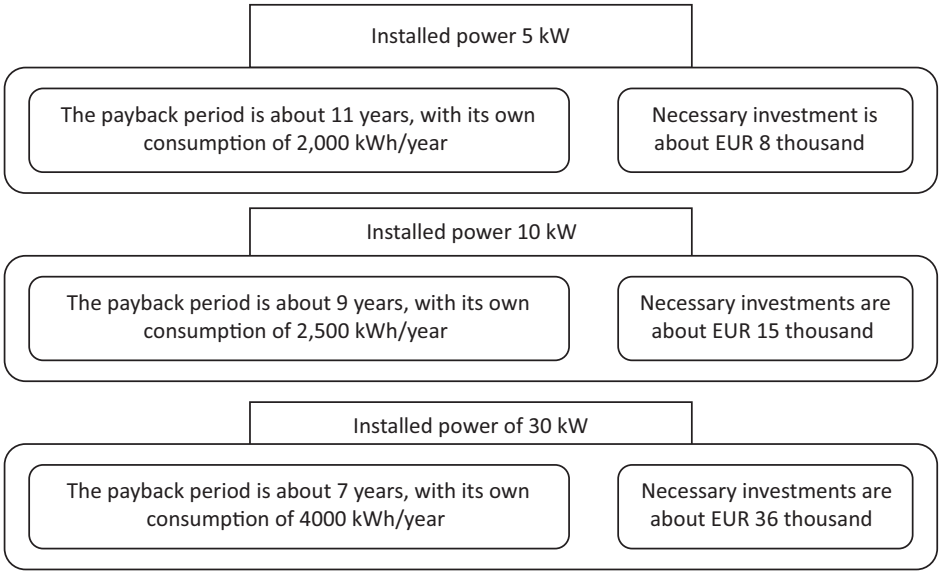

Figure 1. Typical financial model of SES of a private household
Source: State Energy Efficiency of Ukraine (2014).

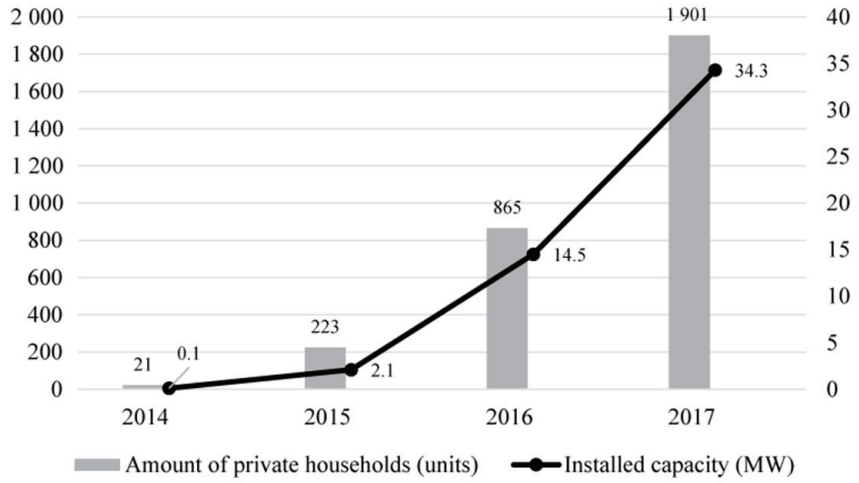

Figure 2. Dynamics installation of solar electrical installations for private households in the years 2014–2017
Source: State Energy Efficiency of Ukraine – 2170 (2018).

(Fig. 2). Over the years, nearly EUR 52 million have been invested by private households in the installation of solar panels. It should be noted that households that installed in 2017 stations with a capacity of up to 30 kW could by 2,030 sell electricity at a rate of EUR cents 18.09 per 1 kWh. Due to the established 'green' tariff for solar power, the number of implemented projects for the installation of domestic solar power plants is increasing (State Energy Efficiency of Ukraine – 2170, 2018).

According to experts, the installation of solar power stations with a capacity of up to 30 kW makes it possible to earn on sale of 'solar power' UAH 20––25 thousand in a month. The ability to sell surplus generated 'clean' electricity also stimulates households to rational energy consumption: in particular, install LED lighting, purchase electrical equipment with the highest energy efficiency class, etc. As far as solar power stations are concerned, this sector is also actively developing. As of the end of the first quarter of 2018 Ukraine has installed 1,534 MW of renewable power. Of these, 841 MW is a solar power plant, which is 54.8% (Government portal, 2018).

It should be noted that for the wide introduction of both heat and power equipment and photovoltaic equipment, the potential of solar energy use in Ukraine is quite high. The average annual amount of total solar energy entering the 1 km^2 territory of Ukraine is almost 1,070 kWh in the northern part of the country and 1,400 kWh in the southern regions. It is able to provide savings of up to 6 million tonnes of conventional fuel per year (Agroexpert, 2016).

The forecast of the potential of development of this sector of the electric power industry for the period until 2020 was made based on the study of the state of installation of solar power plants in private households for the period 2014–2017 (Table 1). Using the Excel spreadsheet editor, a linear trend

Table 1. Dynamics of installation of solar power plants by private households

Indicators	2014	2015	2016	2017	2018	2019	2020
Amount of private households, units	21	223	865	1901	×	×	×
Trend line	–189.8	438.4	1 066.6	1 694.8	2 323.0	2 951.2	3 579.4

Source: calculated by the author.

graph was obtained that illustrates the relationship between periods and number of installed solar power plants and the determination coefficient (R^2), which was calculated automatically. On the graph presented $R^2 = 0.919$, which classifies the connection between the values as high, that is, the constructed model was adequate to the real data (Fig. 3).

Taking into account the obtained trend equation $y = 628.2\,x - 818$ predicted indicators of the installation of solar power plants in private households for 2018–2020 were calculated, according to which the status of their coverage in 2018 will be at 2,323 units: in 2019 – 2,951 units, and in 2020 – 3,579 units. In comparison with actual figures in 2017, the projected growth in 2020 will be 88% (Fig. 3).

To ensure the development of renewable energy and to provide certain guarantees to investors and to encourage the development of the latest technologies and innovations in this area, the Cabinet of Ministers of Ukraine by its Order No 791-p of 3 September 2014, approved the plan of measures for the implementation of the Directive 2009/28/EU of the European Parliament and of the Council. By order of 1 October 2014 No 902-p, the National Renewable Energy Action Plan for the period up to 2020 was approved, which envisages an increase of installed electric power capacities of renewable energy to 10,900 MW and bring the production of 'green' electricity to 26 billion kWh per year in 2020 (State Energy Efficiency Ukraine, 2014).

The potential of solar energy development is provided by its own scientific and industrial base, design bureaus that design solar collectors, mono- and polysilicon production, nanotechnology, the availability of necessary metal products, etc. Photovoltaic projects are being actively implemented in Ukraine since 2010. The benefits of solar power are the universality and inexhaustibility of the energy source (Agroexpert, 2016).

The unfavourable investment climate in the country's economy creates barriers for the development of innovative technologies, including of renewable energy. For the sustainable development of solar energy in Ukraine, nationwide energy sector support and stimulation programs are needed.

CONCLUSIONS

Among the renewable energy sources in Ukraine, solar power generation and solar power plants are growing at the fastest pace. The research carried out by the authors showed that the dynamics of the

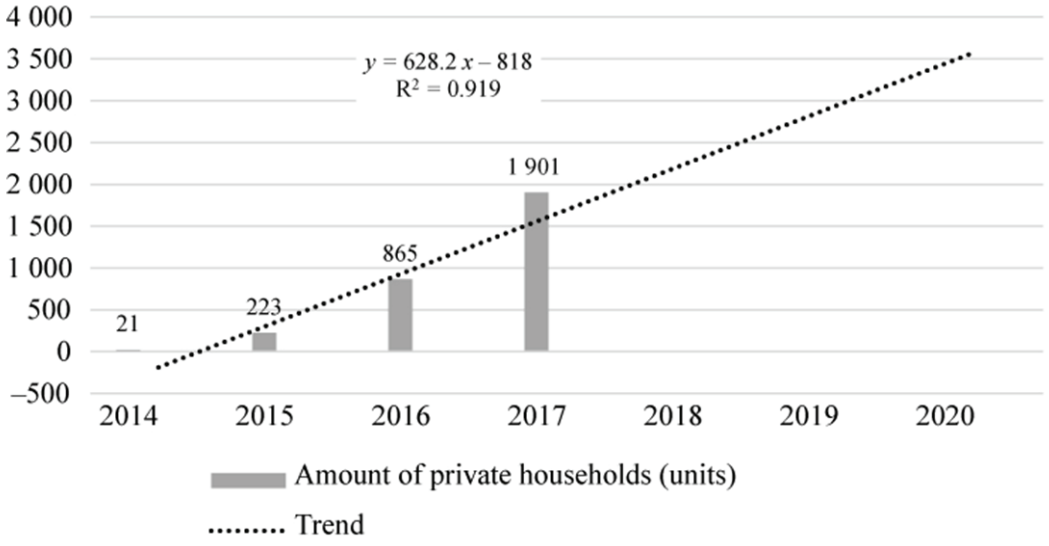

Figure 3. Forecasting the development of the installation of solar power plants by private households
Source: calculated by the author.

growth of the number of installed solar power plants by households, with the purpose of self-generation of electricity for own needs, remains stable.

According to the results of the analysis, the authors calculated the prospect of installing solar power plants by private households by 2020. In order to implement solar energy development plans in Ukraine, there is a scientific base with a sufficiently large number of institutes, specialists, and experience in implementing modern technologies into practice. An important factor is also taking into account foreign experience in this field.

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IN SEARCHING FOR BUSINESS MODEL OPEN FOR INNOVATIONS ON AGRICULTURAL MARKET – CONCEPTUAL APPROACH

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ABSTRACT

Open innovation requires skills to manage various processes of knowledge development, such as the ability to acquire knowledge, its commercialization, development and protection of intellectual property, shaping the relationship between the company and its surroundings. Many companies declare openness to innovations, at the same time the organizational structure, existing procedures, management culture, incentive systems are not ready to seek and transfer knowledge. The biggest challenge for managers is to carry out a transformation process from closed organization to an origination that is open to innovation. The article analyses the possibility of building an organizational and legal structure with the so-called 'permeable borders', open to innovation. After reviewing the literature, analysing the cases of chemical companies, conducting interviews with members of the Grupa Azoty Puławy consortium, I propose a cooperation platform for various organizations operating for the agricultural market which is open to acquiring and implementing innovations, but also for outsourcing.

Keywords: open innovations, business model, cooperation platform, foundation
JEL codes: O320, O310

INTRODUCTION

In the Polish agriculture and food industry, the advantage of low value-added products is visible (McKinsey and Company, 2015)[2]. In order to change this situation and reduce the distance of productivity, one should enter a higher degree of product processing, and thus enter a higher position in the value chain. Agricultural business must become more receptive to innovation. The issue concerns not only increasing expenditures on research and development, but also changing the attitudes and habits of knowledge providers interested in its commercialization as well as its potential recipients. Openness to various external partners is a great opportunity for both science and business in increasing the efficiency and productivity of their resources. The formula of the business model open to innovation indicates possible directions of building competitive advantages on the market.

The knowledge needed in the company is widely dispersed, so it must learn to acquire innovations from various internal and external sources and incorporate them into its business model (Chesbrough and Vanhaverbeke, 2014). However, this model must be

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[2] Poland has a share of 43% of the total gross value added generated in German agriculture, but only 28% in processed products.

ready to seek these innovations from various sources, it must be able to implement them into its business model and convert them to market value. Observation of the Polish market indicates that companies wishing to engage in systemic acquisition of knowledge from the outside are not prepared for that. Organizational structure, existing procedures, management culture, incentive systems are not ready to seek and transfer innovations to organizations. Similarly, reverse transfer, outside, is not popular.

The publication is the result of a research process based on a literature review of management dealing with the issues of open innovation, interviews with members of a consortium established by Grupa Azoty Puławy, research by PWC Polska and participating observation of the author[3]. Its goal is to propose a model of a cooperation platform for various organizations functioning for the benefit of the agricultural market open to acquiring and implementing innovations, but also for their transfer to the external environment.

THEORETICAL BACKGROUND

Chesbrough (2003) formulated the paradigm of open innovations, assuming that companies can and should use external and internal ideas, as well as external and internal market paths in search of opportunities for their development. Businesses should be more open to sharing innovation, licensing and selling them, if they do not fit their business model (Chesbrough, 2006). He further develops the definition, indicating that open innovation is a dispersed process that is based on a deliberately managed flow of knowledge across organizational boundaries, using financial and non-financial mechanisms in line with the organization's business model to guide and motivate to share knowledge (Bogers and Chesbrough, 2014). Intellectual property should not be a barrier to opening up to innovation. It should be treated as a kind of asset that has its market value, is tradable and should be a source of additional income for the company (Chesbrough, 2017).

In 2012–2013, The Garwood Center for Corporate Innovation at the University of California, Berkeley (USA) US and the Fraunhofer Society in Germany conducted the first extensive open innovation survey on a sample of 2,840 companies in Europe and the United States. The result of this work was a report describing business's attitude to open innovations. We learned, among other things, that 78% of the surveyed companies confirm the use of open innovation practices, although they are not formalized in a form of applied procedures. However, they explain that formal documentation helps, but the growth of the organizational culture that supports open innovation is at least as important to the effectiveness of innovation processes. None of the companies in the last three years has abandoned this practice, and 71% say that support for them among the top management of the company is growing. Research also shows that the biggest challenge for managers is to conduct a change process from a closed organization to the organization that is open to innovation (Brunswicker and Chesbrough, 2013).

Opening an enterprise to innovations is likely to affect the company's business model. Interference of external sources of knowledge can change, for example, relations between organizational units of the company, it may also require changes in management (Saebi and Foss, 2015). The authors admit, however, that we still do not know how these processes take place in companies. We do not know much about what is going on inside the company, which helps, and which is detrimental to the implementation of innovative processes (Du, Leten and Vanhaverbeke, 2014).

MATERIALS AND METHODS

Grupa Azoty Puławy (GAP), seeking a new formula for acquiring ideas for the development of its research and development projects, referring to the typology of Saebi and Foss (2015), adopted the strategy of building an innovative community. It was decided to build

[3] The author describes the case of the Consortium of the Puławy Competence Center from the perspective of a participating observer as the vice-president of Grupa Azoty Puławy, supervising the implementation of the project as in the period 2009–2016.

a cooperation platform between the participants of the project, in order to acquire and develop innovations to improve the efficiency of farming in agriculture, mainly by increasing the efficiency of fertilization. In 2011, a consortium called Puławy Competence Centre (CK) was established. After several years of activity, it was recognized that the adopted formula had exhausted its possibilities of further development. The search for a new model of action, which would be more open to acquiring innovations from the outside, was able to commercialize them at various stages of market maturity, and at the same time was subjected to the pressure of operational efficiency.

The analysis of the experience of such structures as: BASF, MONSANTO, SOLVAY and YARA and an overview of the functioning of ecosystems on the agricultural market, such as: The Fertilizers Institute in the United States, UNIFA – Association of French fertilizer producers, CropLife, Axelera (SOLVAY) from the South-East of France. Also, in 2015, interviews were conducted with consortium members and members of the consortium's Scientific Council, which enabled to define the expectations of the partners and served to prepare a new model concept.

The conducted research proved that the Group was not too open to external initiatives, it also reluctantly provided information about its projects, so the company's boundaries did not become more 'permeable' (Pokojski, 2017). The majority of agricultural market participants in Poland (research institutes, universities, producers of agricultural production resources, suppliers, agricultural entrepreneurs) work in a similar way trying to act on their own, independently of each other, thus the flow of information and knowledge is limited.

CONCEPT OF BUSINESS MODEL OPEN TO INNOVATION

Brunswicker and Chesbrough (2013) point out that change management from innovations closed within the company's walls to open innovation must entail a number of organizational changes at various levels of the company. Making these changes is extremely difficult. Companies from traditional industries are usually very closed to external innovations. On the other hand, they are looking for new cooperation platforms that would 'force' mechanisms of efficiency and effectiveness in implementing innovative solutions in close cooperation with their partners.

Conducted interviews, analyses, observations and literature review were used to prepare the concept of a platform for cooperation between entities working for various sectors of the agricultural market open to innovation in Poland, which is the most optimal from the organizational and legal point of view and the ability to source funding for knowledge exchange. It was assumed that the supply and demand side of innovation (Orłowski, 2013) should jointly initiate and implement research and development projects reducing the risks and costs of knowledge transfer.

Several assumptions were made to build the concept of the model:

- The new model of cooperation platform for organizations interested in the agricultural market should be more open to external innovations.
- Relationships between partners in the target organizational and legal structure should be based on economically justified projects.
- Decision-making processes within the structures of interested innovation partners should take into account the newly created entity.
- The model should create greater opportunities to raise funds from external sources and encourage partners to engage their resources to carry out joint innovation projects.
- An important function of the model should be the image aspect that serves to increase the credibility of the communication message by an 'independent' expert addressed to various agricultural environments.
- The model is to ensure the construction of a new formula for the transfer of knowledge to business, freeing and creating the potential of R&D innovation, but it is not intended to duplicate the functions and processes of research and development taking place at partners' organisations.

In constructing the open innovation platform model, it was assumed that the basis for its construction will be the establishment of a new entity created by all interested members of the consortium. The analysis of various organizational and legal forms allowed

us to point to the foundation as the form that best meets the expectations of the consortium members. Appropriate regulations in the statute should secure the interests of all project participants.

The asset of the foundation is also the image aspect. It allows to build an effective reputation in the eyes of its main stakeholders. Expert competences can be used in the Think-tank formula. Many non-governmental organizations in Poland, having such a character, operate in the form of foundations. In the eyes of the public, a foundation is better perceived as an independent expert. Advocacy of such an organization will certainly increase the value of assets of non-material partners.

In the proposed model, the participating entities may, on the one hand, improve their economic results by reducing innovation costs, and on the other, generate additional revenues through technology sales, licensing agreements, spin-offs, when innovation cannot be commercialized with profit on the agricultural market. In this concept, it is emphasised that ideas are generated not only by the entities interested in the project, but are also obtained from external sources (Chesbrough and Vanhaverbeke, 2014).

Figure 1 presents a model of cooperation platform for various entities open to innovations working for the benefit of the agricultural market. The innovation supply and demand side participate in innovation processes for the same market segment.

The Foundation may also establish and participate in commercial companies, if it is justified by the implementation of statutory objectives. It may therefore, in business-specific cases, establish special purpose vehicles (SPVs) to manage the risk of running certain projects.

According to the basic assumptions of the open innovation model, the foundation would be the subject of:

- Initiating and supporting the implementation of research and development and innovation activities using the available resources of project participants for this purpose.
- Enabling optimal use of the know-how and resources of partners for the needs of other entities, seeking ways to use them differently.
- Enabling two-way diffusion of knowledge from the scientific environment, the market to business partners and in the opposite direction.

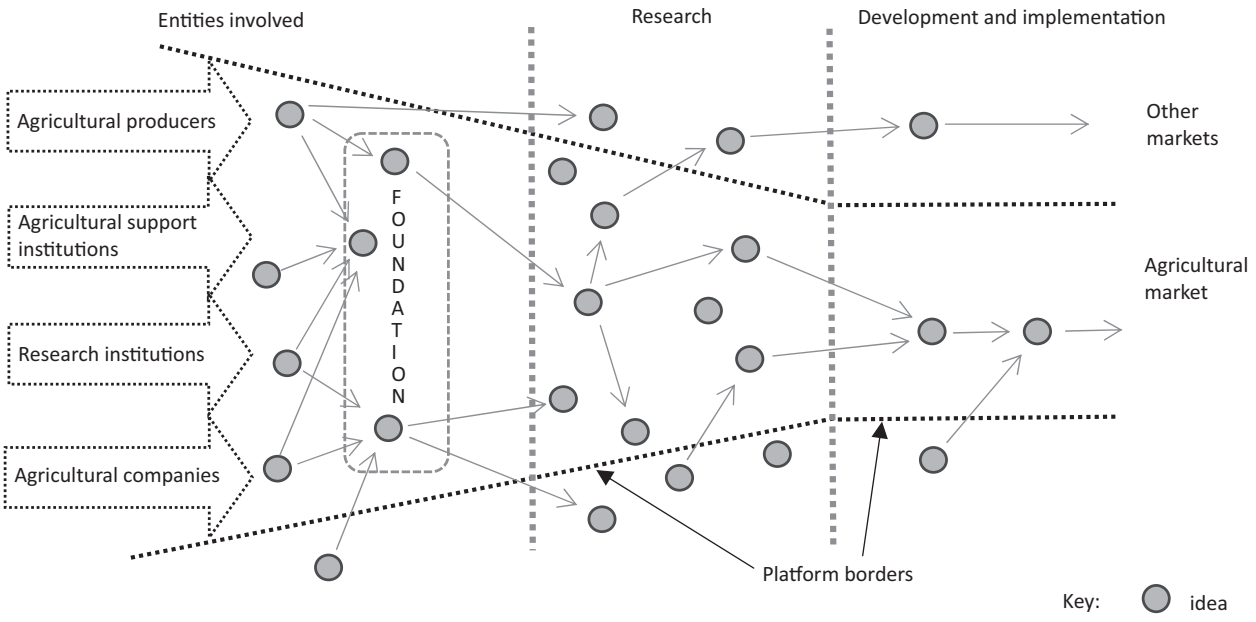

Figure 1. Model of cooperation platform for entities from different sectors in the framework of open innovation scheme

Source: Own elaboration based on Chesbrough (2003).

- Influencing the change of the organizational culture towards opening to cooperation and seeking new areas of synergy resulting from it.
- Shaping the image and influencing the behaviour of the participants of the agricultural market.

Foundation should show initiative and undertake research and development projects in which partners could participate if they consider it economically or commercially justified. Such a formula of cooperation creates much greater opportunities to obtain additional sources of financing for high-class projects, including the possibility of using financing from external sources, primarily the EU.

The proposed concept assumes some changes in the management of entities participating in it, for example regarding the permeability of the organization's boundaries for innovative processes or the ability to acquire additional resources.

CONCLUSIONS

Many companies declare their openness to innovations, stating at the same time that there are no formal procedures for their application. The process of making these changes in the company is a very difficult process. Companies looking for openness to innovation adopt different strategies of searching for and acquiring innovations. One solution may be to build a model of cooperation platform for various organizations that combines interest in a similar market segment.

The author recommends the creation of a mixed legal and organizational structure that would be based on a form of foundation. In order to manage the risk of running certain projects, the foundation would set up special purpose vehicles (SPVs).

The proposed solution will improve absorption and openness to external ideas, ensure effective management of projects, improve the ability to acquire additional resources, including EU funds, enforce the effectiveness and efficiency of implemented activities – as it is result oriented. Regardless of the indicated benefits, the entities participating in the platform gain a partner with expert knowledge who supports the construction of their market value.

However, it should be borne in mind that without the support of the top management of the cooperating entities, openness to innovation will not make any organization more effective in this area.

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INNOVATION AND RESEARCH AND DEVELOPMENT ACTIVITIES IN PODKARPACKIE VOIVODESHIP IN THE YEARS 2005–2016

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ABSTRACT

The article describes the activities related to running innovative activities and presents the dynamics of changes in expenditure on research and development as well as innovation in Podkarpackie Voivodeship in the years 2005–2016. Following article consist short characteristic of activities connected with innovation issue. It was found that the number of entities conducting R&D activities increased four times, and thus the employment of people dealing with research and development would grow as well. Similarly, the expenditure of these entities on the implementation of innovations increased, which, however, depended to some extent on the availability of EU funds. Thereby, in the period of reduced access to EU programs supporting the conduct of R&D activity, the expenditure of entities on these activities also slightly decreased.

Keywords: entrepreneurship, innovation, innovative company, innovation management, innovation processes, service innovation, technological innovation
JEL codes: O31, O32, O34

INTRODUCTION

The turn of the 20th and 21st centuries was characterized by intensive development of innovation implementations. In particular, this process intensified in the European Union countries, where appropriate standards were developed and the market was unified.

Innovations themselves are a very important factor stimulating the development of the company. The whole environment is subject to constant changes, and competition constantly improves an innovation management process; that is why it is so important to continuingly implement novelties causing the entity to grow rapidly, which results in its significant competitive advantage. Therefore, it can be stated that innovation is the source of entrepreneurship.

However, currently economic and development processes are forming in more and more specific systems of connections in which the creation of innovative or technologically advanced solutions requires the cooperation of enterprises with the environment, including public administration, business environment institutions and science and research units. Currently, intensive shifting of structures of developed economies towards industries and knowledge-based services is observed. The construction of a modern, knowledge-based economy requires long-term investments and system support for enterprises, universities, research and development units and business environ-

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ment institutions. An important element of this arrangement is to stimulate cooperation and implement solutions that will reduce the problem of insufficient mechanisms for binding scientific research with the ability of the company to absorb new technologies, products or innovative solutions (Pastusiak, 2009).

The above-mentioned issues relate to spending some outlays on research and development (R&D) and innovative activities. The analysis of funds invested for R&D allows for conducting research in the field of innovation in the economy on a regional or national scale, and in comparison with data on reported inventions, patents received, or sales of new and upgraded products and their export, it allows to determine the level of effectiveness of expenditures.

The main problem is to show dynamic changes on research-development expenditures and innovation in Podkarpackie Voivoidship in years 2005–2016.

The basic purpose of following article is attempt to answer if there is any growth of expenditures on the research-development and innovation activity and the same if there are any changes in the subject structure and persons running R&D activity.

Research and development and innovation in the light of theoretical considerations

In the continuous progress of globalization, the competitiveness of enterprises on the microeconomic scale depends on the degree of technological advancement and competitiveness of the entire country. Introducing new or significantly improved applications, products or processes onto the market is associated with the concept of innovation, which was introduced for the first time to economics by Schumpeter. He described innovation as (Schumpeter, 1960):

- introducing a new product or giving new features to an already existing product;
- introduction of a new production method or its improvement;
- opening a new market;
- acquiring and applying a new source of raw materials or semi-finished products;
- introduction of a new organizational structure for a given industry;
- applying a new way of selling or purchasing.

Nowadays, this definition has expanded considerably and has gone far beyond the realm of technology. Innovation is thought to take place when economically viable exploitation of new ideas takes place (Porter, 1990). Innovations are treated here as a series of technical and organizational changes, including on the one hand simple modifications of existing products, processes and practices (which may be new for the enterprise but not necessarily for the industry) to fundamentally new products and processes on the other (which are new for the industry as well as for the subject). Implementation of innovation involves a whole range of scientific, technological, organizational, financial and commercial activities.

The best-known definition, used almost anywhere in the world is the one presented in Oslo Manual, where innovation means the implementation of a new or significantly improved product (including goods or services), a new or significantly improved process, a new marketing method or a new organization method in the field of business practices, workplace organization or relations with the external environment. For the needs of scientific and technical policy, as well as for maintaining comparability over time with the results of previous statistical surveys of innovations, in many cases the so-called narrower definition is used, where innovation means only 'technical' innovations, i.e. new or significantly improved products and processes. Products (goods and services), processes and methods (technical, organizational and marketing) are innovations if they are new or significantly improved at least from the point of view of the enterprise implementing them (OECD, 2005).

This is very similar to the Oslo Manual hand book – an innovation concept is defined in the law bill dated 30 May 2008 about different forms of innovation support (where meaning of innovation is understand as activity of describing new technology it means technology as the industrial property or research – development service which enables to produce new or high upgraded goods, processes or services and don't exist longer than 5 years) and start from it production of new or highly upgraded goods, processes and services and as technology investment it means to buy new technology, elaborate own technology, and introduce and start producing new or highly upgraded goods and services.

The Polish authors describes innovation as ability and motivation business entitles to constant research and use in practice the scores of science researches, new concepts, ideas and inventions. This is the meaning of Kot (2007).

Very narrow meaning of innovation presents Pomykalski, who is showing us that innovation is process gathered all activities connected with creation of ideas, creation of inventions then introducing itself as new product or process (Pomykalski, 2001).

Another point of view presents Bogdarenko who thinks that innovation term means ability for making and introducing innovations which can be used in the different fields of economic – society life (Bogdarenko, 2006)

Above definitions also Polish as foreign authors and institutions and almost the same in meaning. But there is no explicitness to this term and this cause that is very difficult to use objective criteria and classification of innovation levels.

Despite of different interpretation of this term is possible to show four different basics of innovations:

- marketing, which is characterized by the implementation of a new marketing concept or strategy that differs significantly from the marketing methods used so far in the enterprise;
- organizational, i.e. the implementation of a new organizational method in the principles of operation adopted by the entity, in the organization of the workplace or in relations with the environment, which has not been used so far in the enterprise;
- process-based, indicating the implementation of new or significant improvement of the existing methods of production, distribution and support of activities in the field of products and services;
- product-based, which means the launch of a product or service that is new or significantly improved in terms of its characteristics or applications (OECD, 2005).

Process and product innovations belong to technological innovations. In turn, marketing and organizational innovations are classified as non-technological innovations (Mazur-Wierzbicka, 2015).

In order to develop new solutions or to create a new product, an innovator, i.e. a person or entity involved in implementing innovations, should conduct innovative activity through all scientific, technical, organizational, financial and commercial activities. Some of these activities are innovative in nature, while others are not new, but are necessary to implement innovations. Innovative activity includes also research and development (R&D), which is not directly related to the creation of a specific innovation (GUS, n.d.). An entity that is called an innovative one should be characterized by conducting activities and investing financial resources in the scope of research and development works. These activities should lead to the development of the enterprise.

The aforementioned R&D activity of a given entity consists of creative work, carried out in a methodical manner, undertaken to increase knowledge resources and to create new applications for existing knowledge that ultimately leads to the introduction of 'a new or significantly improved product, service or process to the economy, including the implementation of a new marketing or organizational method that redefines the way the company works or relations with its surroundings' (Buczkowski, Szpor and Śniegocki, 2012).

R&D activities include several types of research:

- basic research, which includes experimental or theoretical work, undertaken primarily to acquire new knowledge about the basics of phenomena and observable facts, without focusing on practical applications or use;
- industrial research (applied), that is research aimed at acquiring new knowledge and skills to develop new products, processes and services or to introduce significant improvements to existing products, processes or services;
- development work, i.e. acquisition, merger, shaping and utilization of currently available knowledge and skills in the field of science, technology and business and other knowledge and skills for production planning as well as the creation and design of new, changed or improved products, processes or services.

The following should be mentioned among the entities conducting research and development activities:

- scientific and research and development units, i.e. units whose main activity is to conduct research and development (scientific institutions of the Polish Academy of Sciences, state and private research and development units);
- science service units (scientific libraries, scientific archives, scientific associations and other science service units);
- development units, i.e. business entities, primarily industrial enterprises, having their own research and development facilities (laboratories, construction offices, technical development centres, etc.), conducting research and development activities mainly on the nature of development works, in addition to their core operations;
- higher education units (US Rzeszów, 2018).

MATERIALS AND METHODS

The research and analyses presented in the work are based on the theory of economics. The spatial scope of the research covers the area of Podkarpackie Voivodeship, and the time scope applies to the years 2005–2016. The analyses were based on the literature of the subject, analysis of current research and mass statistics data provided by the Central Statistical Office. Methods of processing and interpretation of optional knowledge were used using a descriptive method, a method of tabular and descriptive analysis and graphic presentation, as well as subject literature studies.

Detailed analyse takes under consideration numerous data gathered all business entitles running R&D activity from Podkarpackie Voivodeship with showing factories and universities.

To the analyse of these business entitles working as R&D factories used the factors of workers as number of persons hired in that factories and also the time of working. In case of research-development expenditures took appointment of type of expenses (R&D activity, know-how, software, assets investment, training of workers and marketing).

RESULTS AND DISCUSSION

In the analysed period, the number of entities conducting business activity increased substantially. Since 2005, the number of units involved in R&D in Podkarpackie Voivodship has increased seven times. At the same time, it should be noted that this trend is constantly maintained and the largest increase in the number of entities was recorded in 2015, where research and development activities were declared by twice as many entities as in the previous year and six times more than in 2005 (Table 1). This probably results from the fact that there is more and more access to finance for conducting the discussed activity. These are mainly EU funds from such operational programs as: Knowledge Education Development, Innovative Development and Regional Operational Programs.

In the context of the analysis of the sector of entities conducting R&D activity, it should be stated that the number of business entities (industry and services) increased significantly from 48 in 2005 to 199 in 2016, which is a fourfold increase. By contrast, the number of higher education institutions that conduct such activities increased from 3 to 8 over the last decade and since 2013 has remained at the same level. Rzeszów University of Technology and the Univer-

Table 1. Entities conducting research and development activities in the years 2005–2016

Specification	2005	2007	2009	2011	2013	2014	2015	2016
Entities performing R&D (in total)	53	56	53	83	137	158	314	346
Business entities conducting R&D activity	48	51	46	68	120	136	172	199
Higher education institutions conducting R&D activity	3	3	5	7	8	8	8	8

Source: own study based on GUS data from 2005–2016.

sity of Rzeszów were joined by the State Higher Vocational Schools and non-public schools.

Adequate to the growing number of entities conducting research and development activity, the number of people working in R&D sector has also increased. In the analysed period, the number of employed persons increased almost threefold from 3,129 to 8,291 persons (Table 2). Even greater increase was recorded in the case of full-time employees (EPC), which amounted to nearly 400%. In turn, when conducting the analysis of the employed in particular sectors, it should be stated that there were more jobs in R&D in business entities (fourfold increase) than in higher education (threefold increase). This is due to the growing number of business entities implementing innovations.

Characterizing expenditures on innovative activity, an analysis was made of total expenditure and expenditure on direct R&D, purchase of knowledge from external sources, purchase of software, investments in the form of buildings and plots, land, machinery and technical equipment with tools and means of transport, personnel training or trainings relating to innovative activities, as well as marketing of new or significantly improved products.

In the analysed period, the overall expenditure on innovative activity gradually increased. Over the last decade, these expenditures increased more than twofold, from over PLN 670,000 to over 1.47 million (Table 3). The situation looks similarly in the expenditure on R&D, however, with the exception of 2015, when expenditures fell by 32% compared

Table 2. Employees in research and development in the years 2005–2016

Specification	2005	2007	2009	2011	2013	2014	2015	2016
Working in R&D (total)*	1 474.2	1 461.2	1 604.7	2 851.3	4 329.8	5 925.7	5 441.3	5 708.4
Working in R&D (total)*	3 129	3 115	3549	6 622	7 339	8749	7 935	8 291
Persons employed in R&D in business entities	977.9	936.3	1 028.9	2 209.5	3 486.1	4941.1	3 810.8	4 126.3
Persons employed in R&D in in higher education institutions	490.3	518.1	573.8	641.8	756.5	871.9	1 486.3	1 501.2

* so-called full-time equivalent.

Source: own study based on GUS data from 2005–2016.

Table 3. Expenditure on innovation by type of innovative activity in 2005–2016

Expenditures	2005	2007	2009	2011	2013	2014	2015	2016
in PLN								
Total	670 984	905 066	949 168	1 089 532	1 069 119	1 443 821	1 415 467	1 471 647
R&D activity	99 403	117 494	152 792	259 399	439 587	551 969	379 000	708 705
Purchase of knowledge	11 185	43 447	26 152	7 622	8 022	4 051	1 783	6 317
Purchase of software	11 025	17 864	28 266	16 734	34 120	14 392	11 316	11 566
Investments in fixed assets	425 245	475 432	458 044	634 683	364 210	621 559	750 327	606 207
Staff training	1 445	nd	nd	3 915	2 605	4 596	3 867	6 798
Marketing	nd	nd	nd	38 860	10 379	30 085	13 866	12 603

to the previous year. It is connected with the transitional period of access to EU funds for such activity. The same applies to the purchase of knowledge and software, or staff training, for which the units acquire external funds. In the case of investments in fixed assets, it should be noted that in the years 2005–2009, expenditures for this purpose remained at a similar level. In the following years, expenses increased by over 50%. Only in 2013 there was a decrease in expenses, which was also caused by reduced access to EU programs.

In the financing structure of innovative activity over the period under review, only little changed, as expenditures were dominated by own funds (80–89%) (Fig. 1). There is a noticeable decline in the financing of the said activity through loans granted to individual entities.

In the analysed period, expenditures on research and development activities grew significantly. In 2005 in Podkarpackie Voivodeship, PLN 111.6 million was spent on R&D, and in 2014 it was already nearly 931 million. However, from 2015, the amount of outlays began to decline slowly to reach PLN 762.9 million in 2016. This can also be explained by the end of the previous period of EU budgeting and the launch of the budget perspective 2014–2020 (Fig. 2).

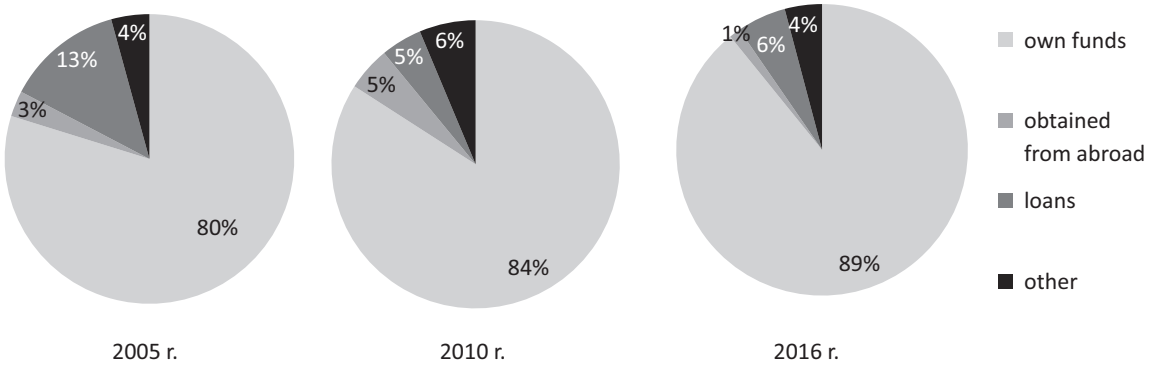

Figure 1. Structure of expenditures on innovative activity by sources of financing in 2010–2016
Source: own study based on GUS data from 2005–2016.

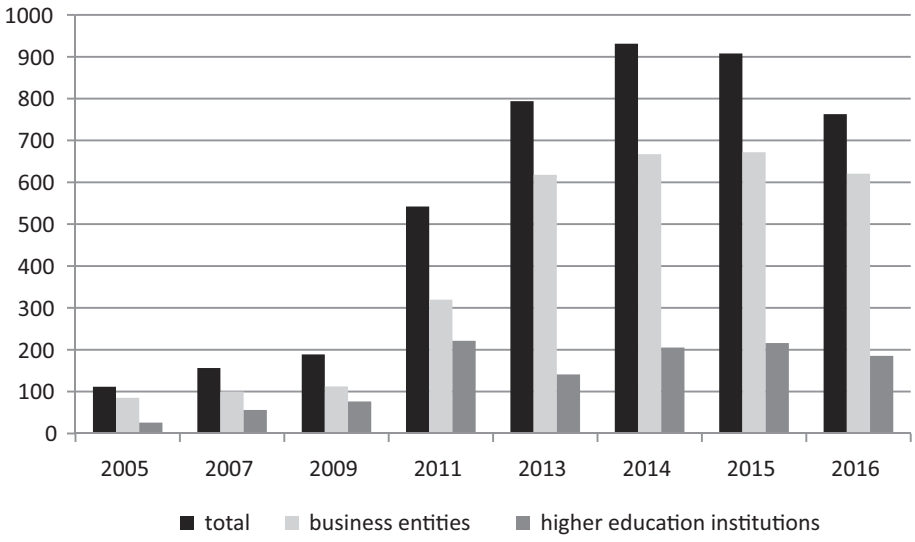

Figure 2. Expenditures on research and development activities by financing sectors in the years 2005–2016
Source: own study based on GUS data from 2005–2016.

It should be noted that significant increase in expenditure on research and development took place in business entities while in higher education institutions, after increase in the years 2005–2011, there was a stabilization of expenditure at a similar level of about PLN 200 million.

CONCLUSIONS

Analysed period of time shows that R&D field in Podkarpackie Voivoidship had considerable changes. Above data shows increased interesting in innovation and research – development activity by the different business entitles. In particular, manufacturing and service enterprises increased their activity in this area, thus trying to strengthen their position in a very competitive market. In the years 2005–2016, the number of entities increased more than four times, and as a result, the employment of research and development personnel also increased.

However, there is a noticeable dependence in expenditure on innovative activity on the availability of EU funds. Thereby, in the period of reduced access to EU programs supporting the conduct of R&D, the expenditure of entities on these activities also decreased.

In the next few years, a further increase in the number of involved entities, people employed in innovative activities and, above all, increase in research and development expenditures is forecasted. It is to be supported, among others, by so-called second act on innovation, adopted in 2017, which allows the entrepreneur to deduct from the tax base 100% of innovation expenditures. High impact was introduction of obligatory financing at 2% funds for Technology Transfer Centres (Act of 30 April 2010 on the principles of financing science).

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MODERN CHALLENGES OF AGRARIAN BUSINESS IN UKRAINE ON THE WAY TO EUROPE

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ABSTRACT

It is established that the Ukrainian agrarian sector in recent years suffered quite serious reformational impacts on the institutional environment of the functioning of economic actors, in particular the influence of regulators on the transformation of agricultural development. It is substantiated that under institutional transformations it is appropriate to understand the changes that occur as part of the creation of new rules of conduct of participants, containing a specific mechanism for ensuring compliance with these rules, as well as improving organizational and economic regulators within the existing set of rules for all participants It is determined that the institutional system is a structured set of interrelated informal rules that determine, on the one hand, a system of incentives for increasing the efficiency of interaction between subjects of the agrarian economy, and, on the other hand, restricts the activities of economic agents, which create a certain framework for implementation their target functions in accordance with the law and public interests.

Keywords: agrarian sector, agro-industrial complex, agricultural enterprises, institutional structures, EU economic policy, export
JEL codes: Q100, Q130, Q170

INTRODUCTION

The aim of the article is to substantiate the scientific principles of the development of the agrarian business of Ukraine in modern conditions: the state of development of agrarian business of Ukraine; export opportunities of Ukraine and factors hindering the growth of export of products; conditions and prospects of implementation of export policy of Ukraine; prospects of development of agrarian business of Ukraine in the direction of export.

In today's world globalization processes, the most countries of the world position themselves as open economies, the dynamics of which depends on the development of effective foreign economic relations of economic entities, in particular agrarian business. Exports in the open economy are an instrument for ensuring the expansion of the market space for the

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development of industries and industries ready for intense international competition. Given the natural resource, social and economic, national and cultural background, one can state that for Ukraine one of these industries is an agrarian business that is capable of providing significant currency and investment revenues for the expanded reproduction of the national economy and to create conditions for integration into the world economy as an equal and strategically important partner.

The development of the agrarian sector of Ukraine's economy during 1991–2018 has undergone two main directions: the decline of livestock sectors, intensification of crop production and an increase in the export of agricultural products. Since the early 2000s, most agricultural enterprises are engaged in the growing crop production. The emphasis is placed on crops in this area that are export and investment attractive: wheat, barley, corn, sunflower, soybean, rape (Sabluk and Kodenska, 2012). Favourable soil-climatic conditions, macroeconomic factors of production and demand for these products in the world are the general preconditions for this. Due to this policy, there was a significant increase in the income of agrarian units, increased the stability of their financial situation and formed the prerequisites for further investing in the technical re-equipment of enterprises.

In recent years, the application of genetic modification and other modern biotechnologies in animal and plant breeding has been a prominent issue in public debates. This is because concerns over modern biotechnologies transcend regulators' traditional risk assessment strategies. Indeed, they call for the explicit inclusion of ethical considerations when formulating public policies. In turn, this suggests that there is a need to develop appropriate ethical assessment tools (Beekman, Bakker and Sandoe, 2006).

The importance of discussing issues of sustainability with respect to food production is almost evident. Sustainability is on the public agenda and will not easily disappear. It has become an issue widely debated in many countries, and many organizations such as the FAO and retail multinationals have their own sustainable development department (Brom, Visak and Meijboom, 2007; Meijboom, and Brom, 2011).

MATERIAL AND METHODS

The data used for documenting the paper was collected mainly through desk research. Different information sources from European and national level, such as reports, country fact sheets and articles were consulted.

The work included an analysis of available Ukrainian and foreign scientific literature on the development of agrarian business and export of products. The criterion for choosing a literature for consideration was the current and potential impact of the dynamics of agricultural production and exports, taking into account the activity of agricultural enterprises and households (small businesses). The main aim of the study was to compare the diversity of agrarian structure and land productivity in Ukraine. The analysed changes in the agrarian structure concern, among other things, the structure of the number of farms and the structure of production in farms. The main export commodity positions of agrarian products are determined.

The ratio of gross added value of agriculture in producer prices to measure the costs and resources of productive factors was taken in this study to determine the productivity of land and labour. As for the land, the size of the agricultural land in hectares (ha) was adopted, while the volume of production in tonnes (million tonnes) and centners of one hectare (c/ha). The methods of induction and deduction, the method of expert Estimates were used. The daily range of analyses covered the years 2010–2017.

RESULTS AND DISCUSSIONS

The agrarian business of Ukraine

There are main groups of producers of agricultural products in agriculture of Ukraine: agricultural enterprises, farms, households:

- agricultural enterprises are enterprises that operate mainly on leased land and oriented to commodity production. This category includes joint-stock companies and subsidiary companies, private companies controlled by an entrepreneur-owner of private assets, etc.

- this category comprised about 12,000 enterprises in 2018, including small forms of economic activity, which carried out economic activities in the reported year and they employ approximately 60% of agricultural land value;
- farms are a form of entrepreneurial activity of citizens who have expressed a desire to produce commodity agricultural products, to carry out their processing and realization in order to generate profit on land plots given to them by property and/or use, including lease, for the management of a farm, commodity agricultural production, personal peasant economy, in accordance with the law. At present, this category has about 33,500 farms, which cultivate up to 10% of agricultural land;
- households – households engaged in agricultural activity both for self-provision of food products and for the purpose of production of commodity agricultural products; this category of producers is also referred to as individual entrepreneurs who carry out their activities in the field of agriculture; in 2017, the circle of households accounted for about 6.1 million households, processing 30% of agricultural land (Putsenteilo and Kostetskyi, 2017).

Setting new agricultural policies or measures to support farms requires monitoring income stability and variability as indicators of farm production conditions (Zgajnar, 2013).

The number of produced agricultural products of Ukraine is shown in Tables 1 and 2.

There are many studies where there is an analysis of agricultural production at the farms and sector level (Vrolijk and Poppe, 2008; Mary, Santini and Boulanger, 2013; Finger and El Benni, 2014).

The state of development of agrarian business of Ukraine

According to the data of State Statistics Service of Ukraine, in Ukraine, the area of agricultural land is almost 36.5 million ha, of which more than 20.7 million ha are located in agrarian enterprises (99% are registered according to land lease agreements). The remaining 43.1% (or 15.7 million ha) are owned by the population. However, 75% of businesses are involved in the business, since 5 million ha of land are used by the population for construction, maintenance of residential and commercial buildings, as well as subsidiary farming; about the same part by structural grouping belongs to the hayfields and pastures.

According to the data of State Statistics Service of Ukraine, the main part of the crops is occupied by crops of the grain group (55% or 15 million ha): wheat (45%), corn for grain (28%), barley (17%) and other crops (10%).

According to the data of State Statistics Service of Ukraine, among the technical crops, the most popular are oilseeds: sunflower, soybean and rape. Today technical crops occupy 8.8 million ha or 33%. Sunflower is sown on an area of 6 million ha in 2017; soybeans – 2.3 million ha; rape – 0.8 million ha; sugar beet – 0.5 million ha.

According to the data of State Statistics Service of Ukraine, in 2016, the production of grain crops was 66 million tonnes (2.7 times higher than in 2000). Wheat – 26 million tonnes; corn for grain – 28 million tonnes; barley – 9.2 million tonnes; rye – 392 thousand tonnes; oats – 500 thousand tonnes; buckwheat – 180 thousand tonnes; peas – 760 thousand tonnes; rice – 65 thousand tonnes. This was due to the intensification of cultivation technologies, which influenced the increase in yield, since the area under grain and leguminous crops declined by 390 thousand ha (or 2.7%).

The average yield in all group was 46.1 c/ha (more by 5.0 c/ha than in 2015). The crop yield after crops became: wheat – 42.1 c/ha; corn for grain – 66 c/ha; barley – 33 c/ha; rye – 27.3 c/ha; oats – 23.9 c/ha; buckwheat – 11.5 c/ha; peas c/ha; 31.3 c/ha; rice – 54 c/ha.

According to the data of State Statistics Service of Ukraine, among technical crops, the first place in the structure of production is sunflower, the share of which is 2/3 in this group of crops. In 2016, sunflower seeds have been produced in the amount of 13.6 million tonnes. In recent years, the agrarian enterprises have increased their attention to sugar beets, whose yield was 482.4 c/ha. Potato production amounted to 21 million tonnes at yield of 160.7 c/ha, vegetables grown 9 million tonnes at a yield of 220 c/ha.

Table 1. Agricultural production of Ukraine in 2010 prices (UAH million)

Year	All agricultural holdings		
	agricultural production	of which	
		crop production	animal production
2010	187 526.1	120 591.4	66 934.7
2011	225 381.8	157 561.9	67 819.9
2012	216 589.8	145 843.6	70 746.2
2013	246 109.4	172 131.2	73 978.2
2014	251 427.2	177 707.9	73 719.3
2015	239 467.3	168 439.0	71 028.3
2016	254 640.5	185 052.1	69 588.4
2017	249 157.0	179 474.6	69 682.4

Source: State Statistics Service of Ukraine data.

Table 2. Agricultural production enterprises and households of Ukraine in 2010 prices (UAH million)

Year	Agricultural enterprises			Households		
	agricultural production	of which		agricultural production	of which	
		crop production	animal production		crop production	animal production
2010	90 792.0	64 860.6	25 931.4	96 734.1	55 730.8	41 003.3
2011	117 110.9	89 572.9	27 538.0	108 270.9	67 989.0	40 281.9
2012	110 071.7	80 462.6	29 609.1	106 518.1	65 381.0	41 137.1
2013	133 683.1	101 297.0	32 386.1	112 426.3	70 834.2	41 592.1
2014	139 058.4	105 529.5	33 528.9	112 368.8	72 178.4	40 190.4
2015	131 918.6	99 584.7	32 333.9	107 548.7	68 854.3	38 694.4
2016	145 119.0	113 392.6	31 726.4	109 521.5	71 659.5	37 862.0
2017	140 535.2	108 601.1	31 934.1	108 621.8	70 873.5	37 748.3

Source: State Statistics Service of Ukraine data.

The number of animals contained 3.7 heads of cattle (2.1 million heads of cows) in 2016; 6.7 million heads of pigs and 1.3 heads of sheep and goats. The situation with poultry is an exception to animal husbandry. Its livestock enhances and since 2000 increased from 123.7 million head to 202.4 million head in 2016. This indicates the stable work of the poultry farm, especially with the growth of chickens and egg production. Another feature of this industry is the structure of the existing stock by categories of economic entities, where the share of farms remains tangible.

After all, agricultural enterprises, especially large holding associations, do not want to engage in livestock breeding. This is confirmed by the data on the reduction of their share of cattle from 53.4% in 2000

to 33.0% in 2016; sheep and goats – respectively from 22.0 to 14.3%. According to data of State Statistics Service of Ukraine, exception is the pig and poultry industry, where the share increased from 31.5 to 53.4% and from 20.5 to 54.7%.

In 2016 agrarians produced 2,300.9 thousand tonnes of meat (all types) in slaughter weight, which is 38.3% more than in 2000. But in the structure of this volume 49.3% (1,135.7 thousand tonnes) is poultry meat, although in 2000 it occupied only 11.6%. According to the data of State Statistics Service of Ukraine, most of the meat in Ukraine is produced by agrarian enterprises – almost 62%.

Compared to 2000, their share increased by 2.3 times. The volume of milk production in 2016 amounted to 10,387.2 thousand tonnes. The farms in poultry farming reached the largest increase in production volumes. Today they produce 15,113.5 million pieces eggs that by 1.7 times more than in 2000. It should be noted that poultry production is the most stable and profitable business in comparison with other branches of industry, which is confirmed by the share of production of enterprises.

Consequently, the volume of industry is currently equal to the actual level of solvent consumption. Therefore, it should be noted from the point of view of the consumption and export potential of the agricultural sector that the livestock sector is developing unevenly, especially as it concerns livestock, pig farming and other industries for the growing small domestic animals.

Export opportunities of Ukraine

43.02 million tonnes of grain was exported in the 2016/2017 marketing year, which is 5 million tonnes more than in the 2015/2016 marketing year. Grain crops (at the expense of corn and wheat), oilseeds (primarily soybean), oil (mainly sunflower) and products of the food industry occupy definitive positions in the commodity structure of Ukrainian agri-food exports. Their total share exceeds 90% in agrarian exports. In 2016, Ukraine exported maize for USD 2.65 billion or 17.4 million tonnes. Egypt, Iran and Spain included the first three main importers, while the volume of these countries amounted to 2.9 million, 2.1 million and 1.8 million tonnes, respectively. In the 2016/2017 marketing year, external deliveries of wheat amounted to 13.33 million tonnes, which is 1.78 million tonnes more than the same period of the last marketing year. Traditionally, the largest foreign consumer of Ukrainian wheat grain was India (3.3 million tonnes) (State Statistics Service of Ukraine, 2018).

Prospects for the development of export potential of Ukrainian wheat were due to several factors, including high interest rates for agricultural producers (farmers forced to quickly sell grain at low prices to increase liquidity), non-transparent terms of refund of export VAT and Memorandum of Understanding with grain exporters. The logistical problems within the country was one more reason, in which traders tried to take more wheat before entering the market of a large corn harvest, which is more attractive to them for the level of profitability of the business.

For export directed 32 thousand tonnes of flour. In 2016, more than 4.8 million tonnes of grain was exported to Ukrainian barley for an amount of USD 668 million. During January–May 2017, Ukraine exported 946 thousand tonnes of barley for an amount of USD 138.8 million (State Statistics Service of Ukraine, 2018).

The main buyer of this grain crop in the world market in 2016 became Saudi Arabia, which accounted for 42% of all exports of barley and a large party went to Libya – 17%. The third position among importers of Ukrainian barley to China is 6.5%. In the last 5 years, Saudi Arabia was the main buyer of barley from Ukraine, buying more than 60% of total exports. This grain crop is the main fodder crop for the country, which explains the steadily high level of its consumption. Regarding export prospects, according to analytical data, the world's production of barley is projected to decline, which will amount to 6.9 million tonnes in relation to last year (State Statistics Service of Ukraine, 2018).

The main buyers in the export market are the State Food and Grain Company of Ukraine, which leads the overall rating of exporters of agrarian and industrial complex with a total export share of agricultural products in 20%. NIBULON exported goods by UAH 15.6 billion in 2016, in particular wheat exports by UAH 5.4 billion and sunflower seeds with a

share of 43%. The main export positions of NIBULON are wheat (36%), corn (31%), barley (12%), the rest are seeds of sunflower and rape, grain sorghum. The main exporter of maize in 2016 is the agricultural holding, Kernel almost 10.4% of Ukraine's total exports of this crop (State Statistics Service of Ukraine, 2018).

The agrarian business of Ukraine is experiencing an obstacle for the export of products. With regard to the European integration of agrarian exports, a rather promising market in Europe of almost 480 million consumers was rather abusive for Ukrainian exports. Unlike the well-developed Asian market, where for the Ukrainian wheat, the Indian importer initially reduced import duties for products from 25 to 10%, and in December 2016 this fee was completely abolished the European market is rather rigid and limited.

In the first quarter of 2017, Ukraine fully utilized all duty-free quotas for export to the EU for the main groups of goods for the entire 2017: quotas for sugar, maize, natural honey, cereals and flour, grape and apple juices, and poultry meat (State Statistics Service of Ukraine, 2018).

Conditions and prospects of implementing the export policy of Ukraine

One of the conditions for the use of autonomous trade preferences and free trade area is the establishment of quotas for the duty-free import of products of Ukraine and the EU into each other's markets. In accordance with the bilateral agreements, quotas are an additional element of trade liberalization. They are set on goods, the export of which to the EU or Ukraine market provides for the collection of customs duties and allows the import of parts of the exported products (within the limits of the approved quota volume) without payment of the duty. After the exhaustion of the quota volume, products may continue to be exported by Ukraine and EU markets each other, but already with the duty.

That is, quotas actually create additional favourable conditions for the export of certain types of products. The mechanism of quota regulation of duty-free import of agricultural products to the EU envisages regulation in two directions: 'the first buyer came – the first is served' – provides for preliminary approval of quota volumes and their use depending on the available balance; – 'import licensing' – provides for the submission by importers of Ukrainian products of the relevant applications for import to the Directorate General of the European Commission 'Agrarian issues and rural development' and their gradual filling in.

Almost all quotas for agricultural products exported from Ukraine to the EU relate to raw materials. Their main purpose is to provide the processing industry of the EU countries with cheaper raw materials. In some cases, quotas have certain time intervals within which exports can be made. These time intervals help to avoid overflow of commodity markets and prevent 'collapse' of product prices.

Thus, the introduction of quotas for the duty-free export of Ukrainian products to the EU is a rational economic calculation, which, on the one hand, creates additional favourable conditions for the trade of Ukrainian producers in the EU market, and on the other hand, it provides the needs of the economies of its member countries in cheap raw materials under conditions, which reduces the risks of unfavourable price fluctuations.

Now introduction of systems for the identification of product quality by the HACCP system (Hazard Analysis and Critical Control Points – Hazard Analysis and Critical Control Points) is very important for the Ukrainian Agribusiness, which big business must definitely implement, and by 2019 – all entities (not only manufacturers, but also operators of the food market and implementers). It is quite expensive radical changes, but these changes will pay off or quotas? For further threat to Ukrainian exports represents a pan-European political direction, when the 'acceptable' importers will be established despite possible significant losses. How it happened with the closure of the Russian market.

Classic producers of agricultural products in Ukraine, almost not covered by the insurance protection (Klapkiv, 2016), due to the undeveloped insurance market and weak demand for insurance protection (Vakun, Klapkiv and Niemczyk, 2017). State subsidies that would have reduced the cost of insurance protection and ensure the continuity of reproduction are virtually absent.

Therefore, an alternative to Ukraine is a segment of organic production. This will allow you to get additional quotas for the duty-free sale of products in the European market. In any case, the European integration of the agrarian market involves the implementation of standards and requirements for the quality of products, and, as practice shows, high potential of Ukrainian sowing material, for example, wheat, ultimately – in finished products, except for feed class on their scale and does not deserve. Thus, organizational, technical and technological changes are inevitable.

Therefore, it is necessary to put the bar a little higher and create effective conditions, including investment, for the widespread development of organic production that is priority for the European consumer. Consequently, the main preconditions for the effective development of agrarian exports of the Ukrainian economy are the formation of efficient agricultural land use and improvement of logistics.

Ukraine and the EU are important trading partners. Their total amount for 2016 amounted to over EUR 5.6 billion in the segment of trade in agricultural food products. At the same time, the trade balance is positive for Ukraine, the export of which within the segment is EUR 4.1 billion, compared to EUR 1.5 billion of imports from the EU. As a result, Ukraine ranks eighth among the importers of agricultural products to the EU and is only 21st among the areas of export of products from this group of EU countries. Export volume in the range of EUR 4 billion (3.8–4.1) over the past five years is relatively stable and since 2013 maintains upward trend.

The average growth rate is about 2% annually. More than 85% of the total volume is raw materials. Basically it is grain and oil crops. The total exports of livestock products from Ukraine to the EU amounted to EUR 142 million (3.5% of the total exports of agricultural food products). Of these, 1.9% belongs to the dairy group, 1.5% is for meat and offal (mainly chicken), the rest – for live animals and livestock products. In this context, it is important to characterize the terms of trade between these trading partners, since this is precisely what the prospects for further increasing the volume of trade and strengthening cooperation.

Ukraine and the EU are currently in the process of deepening international cooperation, which is being implemented within the Association Agreement. Accordingly, from 1 January 2016 the Agreement on an In-depth and Comprehensive Free Trade Area of Ukraine-EU entered into force. The terms of the agreement provide for the gradual (within 10 years) the abolition of import duties on most goods imported to the markets of each other, the introduction of unified rules for determining the origin of goods, bringing Ukraine their technical regulations, procedures and phytosanitary measures for the safety of food products in accordance with European and other conditions for establishing the most favourable access to their markets.

For a long time, a significant volume of commodity nomenclature between the named partners is implemented within the General System of Preferences (GSP). According to it, on more than 400 groups of goods, import duty rates are lower than in the FTA. In addition, in April 2014, the EU unilaterally introduced for Ukraine a mode of autonomous trade preferences, which provided for the abolition of import duties by 94.7% of the total volume of industrial goods and 83.4% of Ukrainian agricultural produce. As a result of these actions, the EU tariffs on imports of Ukrainian products declined from 4.9 to 0.5% on average, which, taking into account volumes of goods turnover, averagely reduced from 5 to 2.6% (State Statistics Service of Ukraine, 2018).

Consequently, products with a low level of processing and added value predominate in agricultural exports to the EU, while the share of ready-made food products is still insignificant. The same applies to other areas for promotion of agrarian products to world food markets. In this regard, it should be recognized that the raw material orientation of Ukrainian exports makes Ukraine's position on foreign markets vulnerable, since the demand for commodities is volatile and characterized by significant seasonal price volatility. According to Anton (2008), agricultural support policies have a significant role in risk management, even if not directly oriented towards reducing risk; our research confirmed this finding.

Therefore, it is necessary to ensure an increase in the export of Ukrainian goods with high added value.

An important factor in increasing agricultural exports with high added value to EU countries is to increase the requirements for the safety and quality of food and raw materials through the introduction of quality management systems and food safety management systems at enterprises. Implementation of the Association Agreement between Ukraine and the EU can become an effective tool for improving the terms of trade with the EU and the work of the agricultural sector as a whole.

That the relevance of professional moral autonomy arises from the combination of three elements. First, the increasing distance in time and space between consumer and farmer, which implies that society has to rely on farmers in many matters of agriculture because they lack the expertise and time to control all activities in the agro-food sector. Second, the presence of a number of ethical issues on the public agenda that are not (yet) governed by laws and lack a shared moral understanding in society. Third, we have clear indications that farmers have moral beliefs and values that enable them to contribute to the public debate in a relevant way and that they increasingly are willing to contribute to the debate on, for instance, animal welfare, nature management or sustainable food production. Consequently, it can be possible and relevant to entrust farmers with professional freedom in moral matters (Meijboom and Stafleu, 2015).

According to scientist Paul B. Thompson 'It is only in our own time that it has become necessary to formulate ideals that express our hope for the fate of the earth itself. The ideal of a local food community is a very new kind of agrarian ideal. At best, it anchors our hope by expressing (and, through material practice, cultivating) the first-person plural perspective that licenses the use of words such as we and our and orients hope toward the sustainability of the soil, the earth, that binds our practice together' (Thompson, 2010).

CONCLUSIONS

The development of a strategy of foreign economic activity should be a prerequisite for successful development for agricultural enterprises, which is a set of perspective plans and tasks that need to be implemented to achieve the goals. Particular attention in such strategy should be paid to the development of rules and behaviour of commodity producers in the foreign market in the role of the exporter and importer of goods and services. The following actions must be taken to expand the markets and successfully promote domestic agricultural products to the world food markets:

- to concentrate efforts on increasing the efficiency of production of traditional export products for Ukraine (grain crops, sunflower, livestock products) and increase the presence in promising sectors of the world food market in areas such as rape, sugar beet, flax, fruits and berries, with their industrial processing for sale abroad;
- to diversify the geographical structure of foreign trade in agricultural products (especially exports), while minimizing the dependence on individual from certain states regarding the import of certain types of agricultural products;
- to ensure, the balance of exports and imports of agricultural products at the state level, to seek increasing the surplus in foreign trade;
- to reorient the development of the agrarian sector economy gradually to increase the export potential with the condition of maintaining the balance between domestic and external demand for agricultural production.

Given the significant contribution of the agrarian sector to the Ukrainian economy, state support should be optimized taking into account macroeconomic indicators of development. This involves the inclusion of new intensely innovative factors of economic growth that meet the challenges of the long-term period, which will ensure the output of the domestic agrarian business on the trajectory of sustainable growth in the range of 6–8% per year. Successful implementation of the set tasks depends on ensuring the sustainable development of the industry on the basis of knowledge-based approaches and innovative solutions.

The conducted studies allowed to identify factors hindering the growth of export of agribusiness products:

- shortage of working capital and high cost of credit resources for agrarian business;

- high cost of technical equipment, fertilizers, fuel, which influences the increase of the share of variable costs in the structure of the cost of production;
- currency risks and the dynamic conditions of the global agro-food market – increased competition and volatility of prices;
- instability of tax legislation, corruption and increase of tax burden, absence of effective state support mechanisms.

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EMPLOYMENT IMPACTS OF RENEWABLE ENERGY IN UE

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ABSTRACT

In the world renewable energy sector, including large hydropower, employed 10.3 million people, directly and indirectly, in 2017. This represents an increase of 5.3% over the number reported the previous year. The aim of the executed research is to determine the influence of harvesting renewable energy on the labour market in EU. Eurostat databases provided a source of empirical data concerning the amount of produced energy. The following sectors were considered: solid biofuels, biogas, liquid biofuels, geothermal, hydropower, municipal waste, solar photovoltaic, solar thermal, wind power and heat pumps. The research concerned 28 Member States of the EU between 2009 and 2016. Panel estimation was used as means of empirical indication of relations between the variables. The obtained models are adjusted to the empirical data, the rectified coefficient of determination equalled, depending on the sector, 0.828 (liquid biofuels) to 0.981 (solid biofuels). The analysed models show that throughout the examined period, the solar and wind power sectors were the ones that consumed the larger amount of work. As it was indicated above, these sectors are considered the most innovative and technologically advanced ones and thus, the employment rates seem to decreased in the shorter time.

Keywords: renewable energy sources, employment, panel estimation
JEL codes: O13, P18, Q42, Q54, Q58

INTRODUCTION

The use of renewable energy provides many benefits on the global, regional and local scale. The improvement of the environment condition and the improvement of energy safety (Janssen, 2002; Li, 2005; Ölz, Sims and Kirchner, 2007; Valentine, 2011) are the most frequently highlighted ones. Distributed power prevents major disturbances in the event of power grid or power providers' failure. Moreover, such strategy minimises costs of constructing and using transmission lines, as well as enhances provision of power, especially to areas with poor power infrastructure. The development of the use of renewable energy sources results in increased employment (Kammen, Kapadia and Fripp, 2004; Moreno and Lopez, 2008; Sidorczyk-Pietraszko, 2015). In the world renewable energy sector, including large hydropower, employed 10.3 million people, directly and indirectly, in 2017. This represents an increase of 5.3% over the number reported the previous year (International Renewable Energy Agency, 2016). This observation provided motivation for increasing funding for renewable energy production time and again. The White Paper entitled 'Energy for the Future: Renewable Sources of Energy' (European Commission, 1997) states that

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doubled share of the renewable energy in the total energy use in the EU may result in creation of 500–900 thousand of job positions. Similar data was presented in such documents as 'Roadmap to a Resource Efficient Europe' (European Commission, 2011b) or 'The Roadmap for Moving to a Competitive Low-carbon Economy in 2050' (European Commission, 2011a). Within the EU, research concerning the evaluation of effects of conducting a support policy in terms of renewable energy and the development of the RES technologies on the labour market has been conducted from the early 1990s in the framework of such projects as: ECOTEC (Research & Consulting Ltd., 1995), ALTENER (European Commission, 2003) or EmployRES (Fraunhofer ISI et al., 2014). The net effect were estimated to amount to 545–656 thousand job positions, which is almost equal to the data included in the White Paper of 1997. According to the report drafted by Greenpeace, the net employment in Poland (considering changes in mining and conventional energy sources) shall increase by 155 thousand until 2020, comparing to 2010 (Greenpeace Polska, 2011). It is significant to mention that such working places are usually created in rural areas characterised by a high unemployment level and may be suitable for candidates with low qualifications. The importance of using RES, primarily bio-mas, for the labour market reflects Schumacher's (1981) views, namely that: 'working places should be created exactly where people currently leave, not in cities so places where people migrate to; the applied methods of creating such places should be simple in order to minimise the demand for high qualifications not only in the sector of direct production bud also in the sector of material supply, organisation system, financing, marketing, etc.; goods should be produced with locally produced materials and they should suit the needs of the local markets'.

MATERIALS AND METHODS

The paper presents results of the research aiming at the analysis of the influence of harvesting renewable energy on the labour market. The number of the working people (directly in the enterprises operating in the field of producing raw energy materials and energy from renewable sources, as well as providing equipment and services within this field) in relation to 1,000 tonnes of oil equivalent of the primary energy obtained in particular sectors of renewable energy sources was used as the performance indicator.

Information of power production were acquired from the Eurostat Database, while the number of the employed and the performance of the installed equipment were determined thanks to reports drafted by EurObserv'ER or International Renewable Energy Agency (2018). The following sectors were considered: solid biofuels, biogas, liquid biofuels, geothermal, hydropower, municipal waste, solar photovoltaic, solar thermal and wind power The research concerned 28 Member States of the EU between 2009 and 2016. Such a scope was established due to significant changes on the renewable energy market triggered by the Climate and Energy Package passed by the European Parliament and the Council of the European Union. In result, the balanced panel of the maximum number of 196 observations was acquired for each sector[3]. In order to empirically identify the relation between the variables, the following fixed specific effects power panel model was constructed:

$$Y_{it} = \alpha_0 \cdot X_{it}^{\alpha 1} e^{\gamma i + \delta_t + \varepsilon it}$$

where:

- Y_{it} – employment measured by the number of people working in i – this country in the year t in the given RES sectors;
- X_{it} – primary energy produced in i – this country in the year t (thous. toe);
- α_1 – flexibility of employment in relation to the primary energy produced in specific res sectors;
- γ_i – cross-sectional individual effect for i – of this country;
- δ_t – temporary individual effect for t – of this year;
- ε_{it} – random element;
- $t = 1, 2, \ldots, n$ – number of years;
- $t = 1, 2, \ldots, m$ – number of countries.

[3] In the case of some sectors, a smaller number of observations was analysed due to the lack of data.

After completing a bilateral logarithm we obtain the fixed specific effects linear panel model:

$$\ln Y_{it} = \alpha_0 + \alpha_1 \ln X_{it} + \gamma_i + \delta_t + \varepsilon_{it}$$

whose parameters were estimated through the panel least squares method.

The obtained economic models were verified. Their quality as well as accuracy of their specification were tested with such tools as the Hausman's test.

The study was a continuation of long-term analyses the preliminary results of which were published in 2017 (Gradziuk and Gradziuk, 2017a). This article provides the latest available estimates and calculations on renewable energy and jobs. New Data are principally for 2015–2016 and employment in the heat pump sector.

DESCRIPTION OF THE RENEWABLE ENERGY SOURCES SECTOR IN THE EU

The increase of share of using the RES in the EU is determined by its policy. The Climate and Energy Package (Directive 2009/28/EC) stipulates that the share of RES in the total gross energy use in 2020 shall reach 20%. However, for the starting point in terms of renewable energy production and the ability to collect it are different among the member states, the EU defined bounding targets for each country – from 10% for Malta to 49% for Sweden. The analysis of the fulfilment of these targets (31 December 2016) suggests that as for Belgium, France, Ireland, Luxembourg, Malta, the Netherlands, the Great Britain and, to a smaller degree, for Cyprus and Spain, the achievement of the established share of the renewable energy is in danger. On the other hand, Austria, Bulgaria, Croatia, the Czech Republic, Denmark, Estonia, Finland, Hungary, Italy, Latvia, Lithuania, Romania and Sweden have already fulfilled targets for 2020 (Fig. 1).

In 2016, Germany, France, Italy, Spain, the Great Britain and Sweden were the largest renewable energy producers (Fig. 2).

The structure of acquiring renewable energy in EU indicates that up until recently, the bio-mass was the most important source. As it is easily available and may be used in such processes as direct combustion (e.g. wood, straw, sewage sludge); transformation into liquid fuel (e.g. rapeseed oil ester, alcohol) or gas fuel (e.g. agricultural biogas, biogas from sewage treatment plants, waste gas). In comparison to photovoltaic power plants and wind farms, biomass is one of the RES which does not require the so-called hot backup in the system of power disposition. Such requirement provokes discussions on power and impedes key legislative processes concerning the development of renewable energy sources. Biomass is mainly used in heat engineering, electrical power engineering, biogas plants and bio-fuel production. The

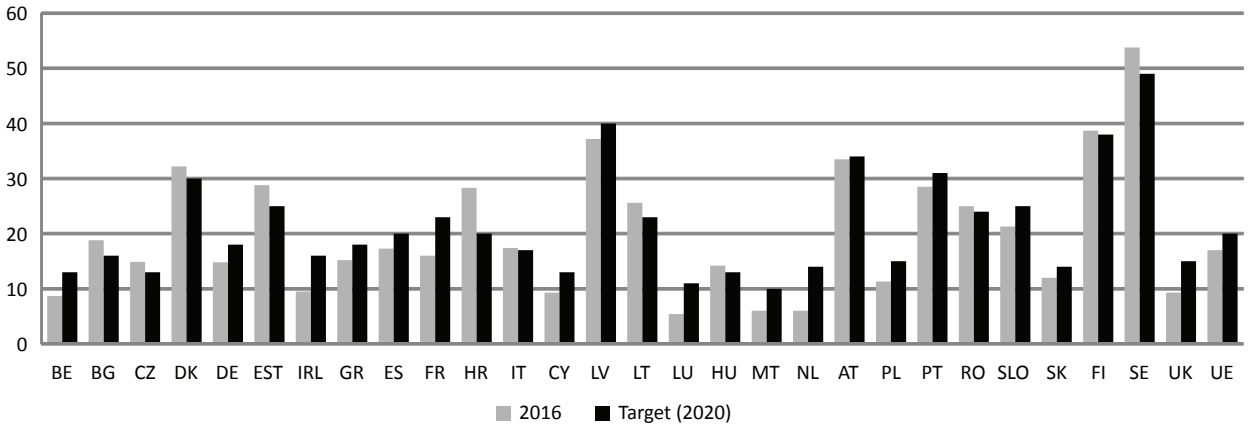

Figure 1. Share of energy from renewable sources in the EU Member States (% of gross final energy consumption)
Source: own study.

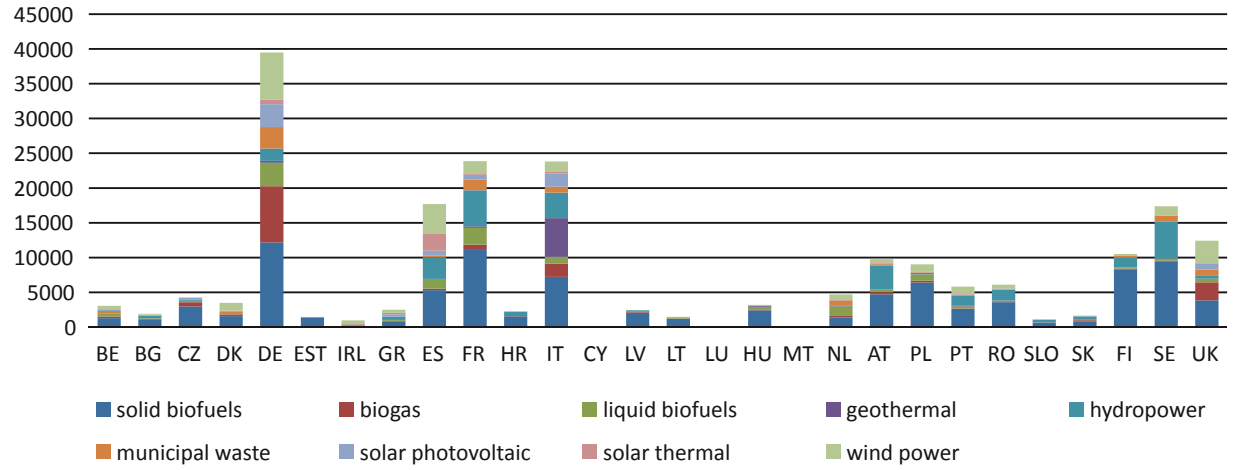

Figure 2. Primary energy production from renewable sources in the EU Member States in 2016 (thous. toe)
Source: own study.

share of biomass in the total RES energy balance varied among the countries – from 14.6% in Malta and 17.6% Cyprus to 96.3% in Estonia, 90.7% Hungary, 90.6% Latvia and 84.7% Poland. However, its share decreased from 67.7% in 2005 to 59.1% in 2016. At the same time, due to subsidies from the funds guaranteed by the countries, wind and solar energy gained importance.

The development of renewable energy sources led to the improved employment – in 2016 it was 1,422.5 thousand of people: 352.3 thousand in solid biomass, 308.7 thousand in the wind power sector, 250 thousand in heat pumps, 203.6 thousand in the production of biofuels 95.6 thousand in photovoltaic energy, 76.1 thousand in the production of biogas and 75.6 thousand in the hydro power (Fig. 3).

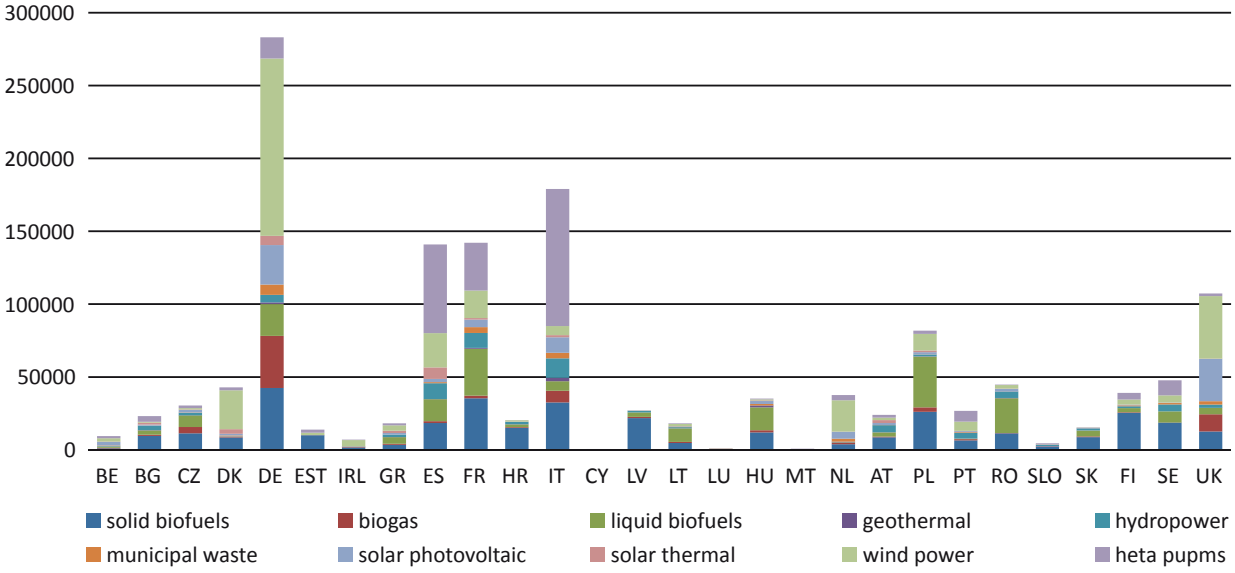

Figure 3. Employment – direct and indirect jobs – by RES sectors in the EU Member States in 2016
Source: own study.

The data include people working directly in the enterprises operating in the field of producing raw energy materials and energy from renewable sources, as well as providing equipment and services within this field. The number of the employed is correlated with the amount of produced power and the value of investments thus, approximately 30% of working people is attributed to Germany (284.1 thousand) mainly in wind, photovoltaic and biomass power. In Poland the number was three times smaller, even despite the similar technical potential of RES.

RESULTS

The conducted research shows that the largest number of working places in relation to generated power appears in the wind, solar and photovoltaic energy sectors (Table 1). A lower amount of produced energy per installed capacity unit in relation to other RES constitutes a key factor influencing such values of employment levels in these sectors. Disproportions are caused by the nature of wind and solar power. In comparison to biogas, these both types of energy may be used only in proper weather conditions, which affects the effective working time of the installed equipment, which is lower than in the case of other renewable energy sources (Gradziuk and Gradziuk, 2017b). Moreover, wind and solar power require the so-called hot backup in the system of power disposition (Żylicz, 2012). Apart from relatively low effective work time, the main reasons for such high employment rates include a dynamic development and innovative character of these sectors. Between 2009 and 2016, the production of energy through photovoltaic systems increased by 750%, through solar systems – by 326%, through wind systems – by 228% and through water systems by 4.2%.

The employment does not only differ in terms of various sectors, but they are also characterised by a large variation in terms of time. The highest such difference was observed in the case of photovoltaic, solar, wind and liquid biofuel energy. These sectors are highly innovative and implement the latest scientific and technological solutions. That is why within the analysed period of time a rapid decrease in the employment rate in these sectors was observed. In photovoltaic sector it amounted to 12 times, in solar energy – to 6 times, in wind, biogas and liquid biofuels – by a half. Gostomczyk (2012) obtained similar results, however, in terms of the installed capacity. Research conducted by Heavner and Churchill (2002) suggests that all these changes characterise the investment stage rather than the organisational

Table 1. Number of employees per 1,000 toe of generated energy in RES sectors in 2009–2016

Specification	2009	2010	2011	2012	2013	2014	2015	2016
Hydro power	0.5*	0.5*	0.8*	0.7*	0.8*	0.8*	3.2	2.5
Wind power	21.5	19.7	17.9	17.2	15.4	14.9	12.2	11.9
Solar thermal	40.9	27.6	22.1	14.4	11.5	9.9	7.1	6.6
Solar photovoltaic	120.8	138.4	84.8	43.6	22.4	14.9	12.9	10.6
Solid biofuels	3.6	3.3	3.4	3.3	3.4	3.6	3.8	3.7
Biogas	7.0	6.6	6.5	5.6	4.9	4.6	4.6	4.6
Liquid biofuels	12.7	13.0	10.7	10.0	8.1	7.8	13.4	14.8
Municipal waste	3.3	3.2	2.9	2.6	2.5	2.4	2.5	2.5
Geothermal	1.8	2.0	1.7	1.9	1.9	1.9	1.7	1.6

*Without large hydro power plants.

Source: own study.

one. Sastresa et al. (2010) explain that these processes are caused by automation of RES equipment production, the scale effect and gaining knowledge – they all contribute to gradual decrease of discrepancies concerning employment between the sectors Gostomczyk (2012, 2015).

The relation between the number of the employed and the quantity of obtained primary energy in the given sectors of RES was also determined with the sue of statistics and econometrics. First of all, the analysed variables were statistically characterised (Table 2).

The logarithmised values of observation of the period between 2009 and 2016 collected from 28 Member States of the EU provided the basis for constructing panel models with fixed effects (Table 3). The obtained models are adjusted to the empirical data, the rectified coefficient of determination equalled, depending on the sector, 0.828 (liquid biofuels) to 0.981 (solid biofuels), while for hydro power, solar thermal, solar photovoltaic, liquid biofuels and geothermal the parameters by the explanatory variables turned out to be invalid and equalled up to 0.05. Presumably, the lack of relevance of these parameters (up to 0.05) was motivated by the fact that the a considerable part of variation Y was caused by the difference between the examined countries – specific fixed effects (see Rho value in Table 3).

Table 2. Basic statistics employees (*Y*) and generated energy (*X*) in RES sectors

RES sectors	Variable	Min	Q1	Q2	Q3	Max	Skewness	Normality test (P)
Hydro power	*Y*	0.0	23.8	331.3	1 341.3	6 791.2	1.813	< 0.000001
	X	0.0	67.3	385.0	1 035.0	5 100.0	1.901	< 0.000001
Wind power	*Y*	0.0	21.4	169.4	679.1	6 823.3	2.699	< 0.000001
	X	0.0	153.7	2 061.0	6 550.0	146 100.0	3.832	< 0.000001
Solar thermal	Y	0.0	4.5	11.9	66.2	2 486.2	5.432	< 0.000001
	X	0.0	55.9	311.0	1 840.0	16 100.0	2.578	< 0.000001
Solar photovoltaic	*Y*	0.0	0.5	7.6	89.7	3 341.2	3.991	< 0.000001
	X	0.0	75.1	760.0	5 100.0	112 600.0	3.862	< 0.000001
Solid biofuels	*Y*	0.0	949.9	1 491.1	4 688.1	12 111.1	1.114	< 0.000001
	X	0.0	2 512.6	4 220.0	13 950.0	69 200.0	2.098	< 0.000001
Biogas	*Y*	0.0	16.9	76.9	229.0	7 873.9	4.432	< 0.000001
	X	0.0	57.1	175.0	685.0	54 000.0	5.111	< 0.000001
Liquid biofuels	*Y*	0.0	24.2	159.2	427.7	3 611.8	2.786	< 0.000001
	X	0.0	309.0	1 240.0	5 288.0	35 900.0	2.567	< 0.000001
Municipal waste	*Y*	0.0	0.0	46.2	471.1	3 055.2	2.936	< 0.000001
	X	0.0	0.0	55.0	620.0	7 500.0	2.514	< 0.000001
Geothermal	*Y*	0.0	0.0	7.1	32.9	5 572.1	4.789	< 0.000001
	X	0.0	0.0	55.0	210.0	6 100.0	4.002	< 0.000001

Source: own study.

Table 3. Estimated fixed specific effects linear panel models employees (ln *Y*) and generated energy (ln *X*) in RES sectors

RES sectors	Variable	Est.	SE	t-Stat.	P	R^2	Rho
Hydro power	ln *X*	–0.27425	0.249821	–1.12	0.261	0.836	0.911
	cons.	7.35712	1.434798	5.61	0.000		
Wind power	ln *X*	0.32345	0.078054	3.52	0.000	0.909	0.849
	cons.	5.97791	0.426581	14.01	0.000		
Solar thermal	ln *X*	0.08342	0.112893	0.85	0.453	0.951	0.947
	cons.	6.03461	0.357169	17.86	0.000		
Solar photovoltaic	ln *X*	0.05769	0.063201	091	0.361	0.848	0.837
	cons.	8.26711	0.290578	29.61	0.000		
Solid biofuels	ln *X*	1.61372	0.198179	8.02	0.000	0.981	0.949
	cons.	–3.31567	1.495604	–2.36	0.022		
Biogas	ln *X*	0.61228	0.087961	7.11	0.000	0.919	0.703
	cons.	2.95871	0.397243	7.69	0.000		
Liquid biofuels	ln *X*	–0.16091	0.139708	–1.17	0.249	0.828	0.865
	cons.	8.51963	0.794561	10.79	0.000		
Municipal waste	ln *X*	0.41988	0.106792	3.88	0.000	0.906	0.901
	cons.	3.67816	0.538124	7.03	0.000		
Geothermal	ln *X*	–0.07456	0.162392	–0.41	0.602	0.869	0.902
	cons.	5.23281	0.517811	10.12	0.000		

Source: own study.

The flexibility of employment estimated in relation to the primary energy varied greatly among the specified sectors. The greater flexibility was observed in the solid biomass sector (1.61%), then the biogas sector (0.61%), the municipal waste sector (0.42%) and the wind power sector (0.32%).

CONCLUSIONS

Currently, the energy-related policies implemented by the developed countries is characterised by a gradual elimination of the share of traditional non-renewable sources of energy. The stage is taken by the renewable ones. Within the European Union, the production of primary energy from the renewable sources increased by 70% between 2005 and 2015, while by 2020 it shall be doubled. The positive impact on the labour market is one of the main arguments for the development of the renewable energy sources. However, the data concerning the number of the employed and the number of working places in these sectors available in the literature on the subject are not coherent. It may be caused by application of various tools of estimation (Henriques, Coelho and Cassidy, 2016), or local and technological factors (Gostomczyk, 2015). The presented results were developed upon the average data concerning the employment and the quantity of produced primary energy. The analysed models show that throughout the examined period, the solar and wind power sectors were the ones that consumed the

larger amount of work. As it was indicated above, these sectors are considered the most innovative and technologically advanced ones and thus, the employment rates seem to decreased in the shorter time. Hence, it shall be advised to continue the conducted research on examining tendencies of the changes with consideration of the scale of production and the division between the directly and indirectly employed. The preliminary assumptions show that for some sectors it shall be better to apply the linear models, however, it shall be subjected to further analysis.

The labour market in the heat pump sector was also preliminarily recognized. A modern, electrically driven heat pump under optimal operating conditions can easily deliver three to five units of energy for every one unit of energy that it consumes. That incremental energy delivered is considered the renewable portion of the heat pump output. The scale of the heat pump market is difficult to assess due to the lack of data and to inconsistencies among existing datasets. The largest markets for heat pumps are the United States, China and Europe as a whole, where France, Germany, Italy and Sweden were the most significant national markets in 2016. Europe's combined heat pump market (for both air and ground source) grew by about 12% in 2015 (the most recent year for which data are available), adding 890,000 units for a total of 8.4 million units installed. By the end of 2016, total European installed heat pump capacity reached about 73.6 GWth, producing an estimated 148 TWh of useful energy, of which about 94.7 TWh, or 64%, was derived from ambient air and the ground, and the rest was derived from input energy. Total heat pump employment in the European Union is estimated at 249,400 FTE in 2016 (240,300 in 2015, +4%). Italy, Spain, France, Germany and Sweden have the highest employment figures resulting from heat pump activities.

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MODERN CHALLENGES IN THE DEVELOPMENT OF TOURISM IN RURAL AREAS

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ABSTRACT

The purpose of the article is to indicate the most important challenges for the development of rural tourism in Poland. Attention is also paid to the research problems in the field of the studied issues identified during the scientific activity of employees of the Division of Tourism and Country Development, Faculty of Economic Sciences at Warsaw University of Life Sciences – SGGW. The research method was the analysis of scientific articles published by the employees of the Department. The complexity of the issue of exploring the demand and supply side of rural tourism was indicated. Also, the most interesting or symptomatic elements for the further development of the scale and character of the described phenomenon were noted. In the forefront are the changes postulated by demand, forcing specific reactions accommodation providers. Therefore, there is a need to adjust supply side support to implement solutions that meet the expectations of tourists.

Keywords: agritourism, rural areas, development
JEL codes: Z32, L83

INTRODUCTION

Rural tourism as a socio-economic category is intensively changing. Modifications can be noticed on both the tourist demand and supply side. The need to improve the tourism offer is affected not only by changes in demand, but also by legal and financial regulations, the profitability of agricultural production, as well as the evolution of human capital in rural areas and many other factors. The diversity of conditions for the development of rural tourism and the multifaceted and multidimensional nature of the effects of this development create a broad and interesting field of scientific inquiry. Research in this area has been carried out by employees of the Division of Tourism and Country Development since 1998 and has resulted in many dissertations and scientific publications. The purpose of the article was to discuss selected challenges for the development of rural tourism in Poland, such as the legal basis and financial issues, changes in the offer of rural tourism and improvement of its quality, as well as advice and information. To fulfill this task, the authors used their own scientific achievements in this area and made

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an attempt to synthetically analyse the main research problems, like changes in tourism offers, consultancy, information, legal bases and finances as important factors for the development of this form of non-agricultural activity and quality improvement, which is an answer to the change of needs of people spending their holidays in the countryside.

ADVISORY AND INFORMATIONAL CONDITIONS FOR THE DEVELOPMENT OF RURAL TOURISM

There are many determinants of the development of rural tourism. Literature of the subject gives, among others, natural and anthropogenic assets, technical, utilitarian and functional qualities, tourist preferences etc. (Sikorska-Wolak, 2008; Zawadka, 2010c). Moreover, two more determinants are worth noting: knowledge necessary to take on new challenges and information affecting economic activities undertaken by owners of agritourism farms. Initiators and pioneers of activities in both information and knowledge in Poland, were agricultural advisory centres (ODR). Regarding agritourism, support provided by advisers included (Parzonko and Sieczko, 2007):

- access to current information and knowledge through participation in various forms of education organized for owners of tourist facilities (trainings, courses, seminars, conferences, study trips),
- adaptation of farms to provide tourist services in accordance with legal requirements (especially agritourism),
- creation of tourist products and offers for spending free time,
- organization of competitions for owners of rural tourism facilities,
- promotion of offers of owners cooperating with ODR (by using the website of the centres, participating in outdoor events, fairs and exhibitions).

Rural tourism facilities are subject to the laws of the market in the same manner as other entities operating in the tourism industry. However, nowadays the matter is all the more complicated because surviving on the market is not enough – enterprises must adapt their offers to the constantly changing needs of customers. In addition to ODRs, market information necessary to conduct tourist activities in the countryside can also be obtained from other sources, i.e. (Balińska, Sieczko and Zawadka, 2014):

- statistical data (statistics of the Institute of Tourism, reports of the Central Statistical Office (CSO), studies of the Ministry of Agriculture and Rural Development and the Ministry of Sport and Tourism),
- analysis of trends in tourism markets,
- forecasts for tourism markets,
- forecasts regarding required qualifications in particular service activities of tourism enterprises.

The employees of the Division of Tourism and Country Development, as part of their scientific research, have often addressed problems related to the broadly understood agritourism information. Publications covering the supply and demand side of the domestic tourism market have allowed to formulate and signal the following issues.

1. Tourists using tourist facilities located in the countryside were looking for the following elements of service: peace and quiet, the possibility of active recreation, nature, affordable prices, learning about rural life, healthy food and cultural events. What is interesting, accommodation providers do not necessarily concentrate their activity near the most valuable and legally protected natural areas (like National Parks or preserves), the presence of which is often referred to as a factor determining the development of rural tourism and tourist preferences (Sikora, 1999; Sikorska-Wolak, 2009). It turns out that farm owners are most likely to operate in the vicinity of areas that are not subject to restrictive regulations and restrictions on the possibility of tourist penetration, such as landscape parks and areas of protected landscape (Gabryjończyk and Kułaga, 2017). From the tourist's point of view, the factor with a significant impact on the choice of a particular agritourism farm was the distance from their place of residence. A private bathroom also had crucial meaning. Furthermore, the recreational space around the house was important, as well as meals based on organic products, access to sports equipment, the possibility of arrival with a pet and opportunity for learn-

ing arts and crafts (Sikorska-Wolak and Zawadka, 2012a; Balińska, 2014; Sieczko, 2016).

2. Tourists consider the Internet to be the most important source of information about the tourist offer. However, information available there was not satisfactory. Access to information was hindered by the necessity of phoning the owner for more details concerning the offer yet relevant to the consumer. It was also indicated that the information presented on national internet portals was too general and did not contain a full database of offers. Although consumers had the possibility to choose offers in terms of region/province or the ability to filter by object, a more advanced search, based on categorized features of tourist propositions, was difficult (e.g. it was not possible to look for an individual bathroom or specific food, like ecological or regional). Difficulties also resulted from the content – descriptions of individual offers were too long and non-distinctive, therefore inconvenient in reception. There were also no tools to facilitate price comparisons or offers in terms of prices (Sikorska-Wolak and Zawadka, 2012b; Sieczko, 2015).

LEGAL AND FINANCIAL ASPECTS OF STARTING AND RUNNING AGRITOURISM ACTIVITY

Reflections on the legal and financial aspects of rural tourism, including agritourism, are hindered by a lack of official definition of these concepts. The definition of agritourism is the most doubtful – by most researchers, it is identified with the form of rural tourism closely related to a functioning farm. Some light on this issue is cast by the CSO, which defines the agritourism lodging, while an agritourism farm is a farm on which tourism activity is conducted next to agricultural activity (Zawadka, 2010b).

One of the most important clauses regulating the conduct of tourist activities by farmers is the 2nd paragraph of the 3rd article of the Act of the 2 July 2004, on the freedom of economic activity, where it was stated that the regulations of this Act do not apply in the case of farmers renting rooms, selling homemade meals or providing other services related to the stay of tourists on farms. According to this clause, farmers hosting tourists are not treated as entrepreneurs, which is of great importance in the case of formalities related to the start-up of this type of non-agricultural activity. The farmer is naturally obliged to maintain several formalities, including the duty to report the place to the record kept by the community mayor, meeting the minimal requirements for equipment, as well as sanitary, fire and other needs set out in separate regulations. What is important, he does not need to register his venture as an enterprise. This fact results, among others, in tax obligations. Under certain conditions, a farmer conducting tourist activity may be relieved from the obligation to pay income tax on this account.

However, many hosts, along with the development of their agritourism activity, decide to register it as a normal business. This allows, among others, for the employment of workers or provision of additional tourist services (e.g. organization of tourist events, rental of bicycles, canoes, boats, etc.) or services based on land and buildings unrelated to the farm (Sztorc, 2009).

An inseparable part of any activity, including tourism, is obtaining and allocating a certain amount of money for start-up. Such financing may have various sources. In the case of agritourism, own savings are most often used, and the amount of money invested in the preparation of the facility for receiving guests usually does not exceed several thousand PLN (Zawadka, 2010a, b; Balińska, 2016). Farmers planning more serious investment in the field of rural tourism, in addition to their own savings, can take advantage of several other options. The most attractive one seems to be funds from the European Union, distributed under the Rural Development Programme for 2014–2020. Funds for starting and developing projects in the field of rural tourism and agritourism can be obtained through Priority 6: 'Promoting social inclusion, poverty reduction and economic development in rural areas'. Activities under this, as well as other priorities, will be implemented (as in RDP 2007–2013) thanks to the European Agricultural Fund for Rural Development (EAFRD). Under the 6th priority of RDP 2014–2020, support for rural tourism can be implemented through three activities: Basic services and village renewal in ru-

ral areas (M07), Support for local development under the LEADER initiative (M19), as well as Farm and business development (M06). In this last one, the sub-measure Aid for starting non-agricultural business activity in rural areas – Bonus for starting non-agricultural activity (6.2) deserves particular attention. As the name suggests, assistance is provided in the form of bonuses (in two installments), not on the principle (often dubious and incomplete) of the reimbursement of costs incurred to start a given activity, as was the case in RDP 2007–2013. The maximum amount of support for a single venture is PLN 100,000, and a farmer, farmer's wife or farmer's household (who, among others, should be subject to social insurance for farmers) can apply for help. It should be emphasized here that the support relates to economic activity – the beneficiary is obliged to set up an enterprise. As part of the discussed activity, projects in the field of craft or handicraft may also be supported.

In addition to funds from the EU, as potential sources of financing the development of economic activity related to tourism in rural areas, SME Loans offered by the European Fund for the Development of Polish Villages, as well as Micro-loans of the Rural Development Foundation should be specified. Their advantage is a relatively low interest rate.

It is worth mentioning here that practically all financial support instruments offered to rural residents and aimed at the development of rural tourism and agritourism are intended for people running a business or for those who will ultimately become entrepreneurs. Currently, there is no support for farmers who want to establish or develop agritourism without transforming it into a business. The exception is preferential loans, however their availability is not constant and conditions of obtaining them are often modified.

It should be emphasized that the research carried out by the employees of the Division of Tourism and Country Development prove that knowledge in the field of legal regulations and economic analysis is desired by rural accommodation providers to a lesser extent than knowledge of a regions' tourist assets. These regulations are perceived as a significant barrier to the development of tourist activities but, at the same time, farmers demonstrate the need for training in this field (Balińska, 2016).

QUALITY IMPROVEMENT AND DIVERSIFICATION OF THE TOURIST OFFER IN RURAL AREAS

Changes in consumer expectations and needs are increasingly related to improving the quality of services. Quality is defined as 'the sum of product or service characteristics crucial for the ability of a given product to meet specific needs' (Kotler, 1994). Such quality can be understood as technical, which in the case of tourism primarily includes the standard of equipment of facilities, their technical condition, or abstract – it contains elements related to the aesthetics of the object, but also the personality traits of the service provider. Elements that create technical quality are subject to standardization through a system of categorizing hotel facilities and, in the case of rural tourism facilities, the system of categorizing rural accommodation base (SCRAB). While the categorization of hotel facilities is obligatory and identified by clients, SCRAB is voluntary and very poorly positioned in the minds of consumers and accommodation providers. This was confirmed by research conducted by employees of the Division of Tourism and Country Development. According to Balińska's research carried out in 2012, among 160 owners of rural tourism facilities located in communities along the eastern Polish border, only 4.4% of accommodation providers subjected their facilities to assessment under this system, and another 11.3% knew it and planned to do so. Almost every fourth (23.1%) respondent did not know this system, which confirms its low positioning not only when it comes to awareness of consumers, but also service providers. Over half (55%) were familiar with the system, however did not plan to use it. Another 3.8% of respondents subjected their facilities to assessment in the past, but failed to notice any benefits and gave up on the system. Only 12.5% of respondents felt that the aforementioned system improves the competitiveness of rural tourism facilities because it guarantees a certain standard and helps in promotion (Balińska, 2016). Zawadka's research conducted among rural accommodation providers in

the Lubelskie province proved that only 29.6% of farms covered by the study were categorized (Zawadka, 2010c). This author's research carried out among tourists presents that the awareness of the existence of categorization is very low (only 8.6% of the total 830 respondents), and only 3.9% of respondents were able to indicate correctly the symbol, which illustrates the category in SCRAB (Zawadka, 2017). Also Balińska's research, conducted among tourists, using agritourism farms, showed that only for 15.5% of respondents, categorization was the leading factor in the selection of the facility (Balińska, 2014)[5].

Improving the quality of services, in this case tourist services, requires cyclical research on customer needs and their level of satisfaction. Differentiation of research methods is beneficial in this case (Balińska, 2015a, b, c).

In addition to improving the quality of tourist services, an important direction of changes is the thematic differentiation of holiday offers in the countryside. The main themes are:

- ecotourism realized on certified organic farms,
- cultural tourism, using cultural assets of the region, forms of which include culinary tourism, based on food raw materials, dishes, preserves or liquors (enotourism, birotourism), and military tourism,
- active tourism, including riding and cycling.

A particularly interesting case in this group is military tourism, which was noted by Sikora, who included historical sites, such as battlefields and military objects, to the elements of the cultural landscape of the countryside (Sikora, 2012). Twentieth-century military constructions, usually located in non-urbanized areas (forest or rural), constitute an original diversity of the traditional heritage of the country. This was confirmed in Gabryjończyk's research, conducted in 2012, in selected post-military objects of Eastern Poland, which proved that the majority (even 90%) of tourists perceive such places as attractive, positively distinguishable among other tourist assets present in communities, and constituting a factor determining a respondent's will to visit a given area in one-third (Gabryjończyk, 2013, 2014). Military facilities can become objects attracting tens of thousands of people per year, spending significant amounts of money during their visits, however only under special circumstances: the preparation of a suitable, rich offer and infrastructure necessary to meet the expectations of visitors (Gabryjończyk, 2012). Unfortunately, the barriers to such activities are often financial and legal issues, effectively discouraging rural residents to take more extensive action in the field of tourist adaptation of post-military constructions.

CONCLUSIONS

The issues presented in the text are only a part of the problem of contemporary tourism development in rural areas. Nevertheless, they were considered by the authors as the most interesting or symptomatic for the further evolution of the scale and nature of this phenomenon. Therefore, on the basis of the presented considerations, several conclusions can be formulated:

- the term 'agritourism' has not been defined in any normative act to this day,
- the legal treatment of farmer activity organizing tourism on own farms as non-economic and tax free is a significant facilitation for accommodation providers,
- starting agritourism activity is not associated with large investment, therefore these expenses are usually covered by a farmer's own savings; potential sources like EU funds are not very popular in this case,
- Agricultural Advisory Centres have significantly contributed to the development of rural tourism in Poland; their support in the area of tourist knowledge and information was especially addressed to owners of agritourism farms,
- tourists using rural tourism facilities are mainly looking for peace and quiet, the possibility of active rest in natural surroundings, affordable prices, an occasion to learn about rural life, healthy food and participation in cultural events,

[5] The research was conducted on a sample of 400 respondents in 2012.

- the most effective information tool is the internet, despite not being very precise, in depth, intuitive or sometimes even difficult to find information published by farm owners,
- leisure offers within rural tourism are characterized by very large diversity; both the owners of service facilities and local authorities are taking action to promote offers that have not yet been exposed, but can potentially attract tourists, such as culinary or military facilities,
- there is a significant disproportion between the expectations of tourists and the image of farm owners in terms of the quality of provided services; the currently functioning system of categorizing rural accommodation base does not fulfil its functions.

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RENEWABLE ENERGY SOURCES AS A DETERMINANT OF THE MODERN ECONOMY – POLISH HOUSEHOLD SECTOR PERSPECTIVE

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ABSTRACT

The main purpose of the article is to present changes in the acquisition and use of energy from renewable sources by households in Poland. The role of this sector in total energy consumption was indicated. Changes in energy expenditure in households were also assessed. Secondary data from public statistics were used. The household sector in Poland is characterized by the highest energy consumption in the structure of final energy consumption in the national economy, and energy expenditure is an important expenditure item in the household budget.. The amount of costs related to RES investment is a significant barrier to household expenditure. However, this investment should be seen as a means of reducing the share of energy costs in the home budget in a long-term perspective.

Keywords: renewable energy sources, economy, households
JEL codes: Q42, Q47, P18, O13

INTRODUCTION

Although the energy intensity of the Polish economy is declining, the demand for energy is still much higher than in countries of the 'old EU'. Assuming an average annual 3% GDP growth by 2030, the demand of the Polish economy for energy may amount to 65.5 Mtoe.

This, in turn, will lead to significant changes in the structure of the energy mix, which results from Poland's commitments to EU climate policy. Among priority projects of energy policy in Poland, an important place is foreseen for the diversification of the energy generation structure through the development of renewable and dispersed energy.

Renewable energy sources should constitute an important element of the electric power system, and increasing their share in final energy consumption will depend, to a great extent, on the progress in achieving economic maturity by individual technologies and the use of national potential (Ministerstwo Gospodarki, 2014).

Renewable energy sources also emphasize the importance of creating conditions for the stable and

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sustainable development of the national economy, meeting the energy needs of enterprises and households, ensuring energy security while, at the same time, respecting the natural environment. It should contribute, among others, to: a reduction in the country's demand for fuel and non-renewable energy, an increase in energy security of the country, an increase in competitiveness and innovativeness of the economy, the development of a market for energy-efficient equipment and services, the creation of new jobs in the green service sector and a reduction in household expenditure for energy purposes, as well as restrictions in the area of energy poverty (European Commission, 2015).

The aim of the article is to emphasize the importance of renewable energy for the economy in rural areas and in the household sector in Poland. In addition, an attempt was made to indicate the importance of using renewable energy sources for the benefit of the modern economy and its rural areas. This is important in the context of the creation of household behaviour by technological factors that set new trends in the socio-economic development of modern economies.

THEORETICAL BACKGROUND

Modernity of the economy is associated with the so-called fourth industrial revolution defined in Poland as Economy 4.0, which relies on the integration of digital and physical systems (PKN Orlen, 2017). It affects all spheres of life, and the technologies leading in it, apart from the entire area of creation and development of virtual reality, it includes innovation in the energy sector, comprising energy and RES storage. Households can use this energy for space and water heating, as well as the use of electrical equipment and lighting, and those related to agriculture, also for production purposes. European economies need new energy sources. Therefore, it is necessary to transform them into a low-carbon and sustainable economy that uses resources more effectively (Trębska, 2018). In many EU documents, it is emphasized, alongside the need to increase energy efficiency, the synergistic development of RES (Skoczkowski and Bielecki, 2016).

The implementation of EU provisions on renewable energy in a modern European economy is to contribute not only to counteracting climate change and reducing dependence on energy imports or enhancing energy security, but also to develop the market, new services and innovative energy technologies, to modernize economies.

The basis for the energy union in Europe is the strategy for research and innovation (European Commission, 2010; Malko, Wilczyński and Wojciechowski, 2015). It is to create a new European approach in the energy field to accelerate the transformation of energy systems.

Another important priority is the development of smart grid and smart home technologies. Poland has large and diversified resources of renewable energy sources, though they are still used to a small extent. This potential results from favourable geographic and climatic conditions as well as the large area of the country, offering the opportunity to obtain scattered energy resources, while existing forms of land development are mostly favourable to agricultural use of RES.

The analyses, carried out at a national level, show that the volume of renewable energy resources is not a barrier for the transition to an energy supply from renewable energy determined until 2020 (Wiśniewski, ed., 2011). The Polish village has enormous potential for the development of renewable energy, the use of which would be an important developmental impulse (FREE, 2013).

The efficiency of energy and agricultural policy in rural areas in the development of renewable energy, however, requires regulatory restrictions, political, technological and investment risks for investors, including rural residents (Księżopolski and Pronińska, 2017).

Sustainable rural development, agriculture and fisheries by 2030 take into account, in addition to structural changes, increasing innovation companies operating in agribusiness, improving the quality of human capital, the development of potential environmental issues to strengthen the development of digital, increasing the availability of transport, and under energy: balancing the energy system, through the diversification of sources of energy production and distribution at a local level and the development of

renewable energy sources in rural areas (Ministerstwo Rolnictwa i Rozwoju Wsi, 2017).

That is why activities in dispersed energy are very important, giving rise to revolutionary changes in the behaviour of farms and households in relation to energy consumption (Popczyk, 2014), but also behaviour resulting from the fact that they will be the main beneficiary of energy balancing areas, i.e. energy clusters (Tokarčík et al., 2017).

MATERIALS AND METHODS

Realizing the adopted goal was based on subject literature and existing data using the method of desk research. The necessary data and information were gathered on the basis of the documentary method, which is related to the consolidation, processing and analysis of data dispersed among various sources. This documentation research covered actual information collected, i.a. for the purposes of economic policy. Part of the information was recorded in relevant existing documents, studies and publications, in the character of secondary sources.

The article uses comparable balance sheet data for the country and the entire economy as well as relevant household sector reports presented by the Central Statistical Office and the Energy Department of the Ministry of the Economy, as well as Eurostat data. Although, in Poland, on an annual basis, information about the production, acquisition and consumption of all energy by businesses is collected regularly, direct research in the area of households is still sporadic. Since 2002, only three studies have been carried out by the Central Statistical Office.

RESULTS AND DISCUSSION

In the Polish economy, the consumption structure of energy used is determined by possessed natural resources. The main sources of primary energy are hard coal and lignite. In the case of final consumption, coal fuels are the second most important type of used carriers (their share decreased from 21% in 2005 to 18% in 2015).

The most important energy carrier in 2015 were petroleum-derived fuels, the share of which amounted to 32% and did not change compared to 2005. Among other carriers, there was a decrease in gas consumption (from 15 to 14%) and heat (from 12 to 9%). An increase in the case of electricity was recorded – from 16 to 18% and other energy carriers (mainly energy from renewable sources) – from 7 to 10% (GUS, 2017d).

In Poland, the share of energy from renewable sources in final gross energy consumption is 12% and is lower in comparison with the EU (17%). However, it should be emphasized that this indicator has significantly increased since 2006 (by 5 p.p.). By 2020, it is expected to increase to 15% in Poland and up to 20% in the EU. From the sectors of the Polish economy, the largest share of energy from RES occurs in power engineering, heating and cooling as well as transport.

In these sectors, this share has been growing steadily since 2006, although, only at present, it is higher than the EU average (GUS, 2017a). In Poland, the structure of obtaining primary energy from renewable sources differs significantly from the European Union economy, which determines the parameters of modernity. Solid fuels (solid biofuels) (44.3%), hydro power (14.4%), wind energy (12.7%) and biogas (biogas) are the most important in the EU (7.7%), while liquid bioflues and solar energy (account for over 6% each), municipal waste (for 4.6%) and geothermal energy (for 3%). In Poland, the largest share in this structure, as in the EU, constitute solid biofuels, and account for as much as 72% in Poland. Liquid biofuels and wind energy are also used, and these sources account for about 11% of the total structure, biogas (2.6%) and water energy (1.8%).The remaining sources of renewable energy: solar energy, heat pumps, municipal waste and geothermal energy in the overall structure are marginal, because their shares constitute less than 1% (GUS, 2017a; Górecka-Zbrońska and Zbroński, 2017). Households in Poland have a significant share in national energy consumption. The household sector is the main recipient of final energy in Poland, as this share amounts to 31%. Subsequently, these sectors are: transport (27%), industry – including construction (23%), services (13%) and agriculture (6%). However, in 2005–2015, the share of industry, households and agriculture in final energy consumption decreased.

Nevertheless, households remained the largest consumer of energy, despite a decline in their share from 35 to 31% (industry share decreased from 26 to 24%, and agriculture from 8 to 5%) (GUS, 2017d). Poland also belongs to those EU countries in which the share of households in the use of domestic energy was relatively high. In Europe has an average of 16%, while only 5 countries, except Poland, have 20% or more of domestic consumption. On average, households consumed approximately 21 GJ of energy per 1 inhabitant.

In the structure of energy consumption in households in Poland the most important are solid fuels, mainly hard coal (at the same time it is an exceptional case in the EU) and wood. Wood was used by about 42% of households and it was the only significant renewable energy carrier massively used by farms. Other types of biomass were also used, but the popularity of their use was much lower than that of wood. Biomass is mainly used by individual households, especially in the countryside – for the production of heat and preparation of hot usable water. Over the period 2005–2015, an upward trend in the level of solid biomass consumption in households in Poland was observed (Mirowski and Orzechowska, 2015). However, only a small part of households install appliances for the production of their own energy. In households, it is possible, in particular, to obtain electricity, either as a direct or indirect conversion of solar radiation energy in solar collectors or photovoltaic cells (Mirowski and Sornek, 2015).

A small number of households, only 2.6%, performs a building / flat energy audit in general, and only 4% install equipment for the production of their own energy. However, they are mainly, however solar collectors and heat pumps. While solar collectors are used by one in 56 households, heat pumps are only used by one in 1,250 (GUS, 2017e).

The diversification of renewable energy use also differs between urban and rural areas. Research of the Central Statistical Office shows that urban households did not use solid fuels, heating oil or any form of energy from renewable sources. Increasing the share of renewable energy is only possible in an indirect way, by supplying electricity and heat produced partly or completely from renewable sources.

In turn, among rural households related to agricultural activity, the majority, 89.5%, used fuel wood, and 6.7% also other fuels from biomass. In such farms, agricultural activity has an impact on the consumption of energy carriers, because it serves both home and production needs, and the distribution of consumption is usually impossible. It is predicted that in the perspective of 2050, in Poland, a significant part of households primarily living in rural areas will have their own sources of energy (microinstallations) enabling at least partial coverage of their current demand for electricity and heat (Ministerstwo Energii, 2015).

Similarly, the structure of energy consumption in Polish households per capita, in conversion to individual energy carriers, indicates the marginal importance of renewable energy sources. In the EU they constitute 2.5% in the overall structure of energy consumption, while in Poland it is only 1.2%.

The share of electricity from renewable sources in final gross electricity consumption in Poland was only 12.4%, but it increased since 2013 by over 4 p.p. This may be evidence of an increase in ecological awareness of households (GUS, 2016; Trębska, 2018). Expectations of households (approx. 13.5 million in Poland) concern the improvement of living conditions, which requires the provision of certain, but also low-cost energy carriers.

The situation is changing rapidly. In 2012, households acquired 456 TJ of solar energy, compared to 1,943 TJ in 2016 (cf: GUS, 2017a). Currently, however, households are not able to order energy from renewable sources. What is more, the energy obtained from such sources is still more expensive than conventional energy.

In 2002–2015, real electricity prices for households increased by 32% (GUS, 2017e). According to the Energy Regulatory Office, the price of electricity for a household in 2017 was PLN 0.50/kWh and was higher than in previous years. On the other hand, the share of expenditure per 1 person on all energy carriers in total expenditure increased from 10.5 to 11.4%, and average annual expenses on all energy carriers amounted to over PLN 4,100 (GUS, 2017b, e). It is worth noting that expenses on energy carriers, along with the use of housing and food expenses, constitute

the largest financial burden on household budgets, as together they absorb half of all expenditure. With the forecast increase in prices for electricity in following years, in Poland, however, interest in reducing expenditure on such energy will increase (Ministerstwo Gospodarki, 2014). Therefore, from a future perspective, it can be expected that households will use the opportunities offered by renewable carriers in a wider scope.

CONCLUSIONS

The development of renewable energy sources (RES) is a factor affecting the entire economy and the household sector. It is difficult to increase the use of renewable energy in a large sector of households, where each consumer consumes approximately 2,150 kWh annually. Despite the fact that households have a significant share in national energy consumption in Poland, renewable energy is still used in this sector to a small extent. In Poland, this is a factor slowing down the processes of modernization of the economy, encompassing rural areas. Changes in the area of RES reflect very slow structural transformations in relation to the EU. The potential for growth in the use of renewable energy depends not only on technological progress, but also on the dynamics of energy prices. In households, in particular, such renewable energy carriers as: water, wind or geothermal energy are utilized insufficiently. What is important in achieving a modern economy using RES, is not only the proper implementation of EU provisions to Polish law, but the implementation of effective mechanisms that enforce specific practices.

It is important to also introduce changes in the scope of statistical data collection connected with the necessity of regular and extended, regarding the subjective and objective scope, public statistics and the use of administrative data. The shortages of regularly collected data concern households in rural areas and agriculture-related areas. It also seems important to mitigate the social consequences of switching to clean energy while implementing appropriate support policies. In order for the potential offered by RES to be fully utilized, it is necessary to implement many instruments addressed to the household sector. These tools can be informative, educational, regulatory, financial and institutional. An appropriate direction here seems to be the promotion of the idea of prosumption, which will enable the modernization of this sector. This will become possible when the household is not only a consumer of energy, but also becomes its producer. Improvement in the use of renewable energy in the household sector will also be conducive to the construction of a modern and innovative economy and have a positive impact on improving the country's energy security.

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INTELLECTUAL PROPERTY PROTECTION TOOLS IN THE ACTIVITIES OF INNOVATIVE GASTRONOMIC ENTERPRISES OF THE MAZOWIECKIE VOIVODESHIP

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ABSTRACT

The aim of the article is to evaluate the use of intellectual property protection tools to secure innovations in catering companies. The first part of the work presents the analysis of selected scientific publications that characterize innovations and tools for intellectual property protection. The second part of the article presents the results of qualitative research, which was obtained from 50 individual in-depth interviews conducted among representatives of gastronomic companies from Mazovian Voivodeship. The research was conducted between April and July 2017. The analysis of the collected research material indicates that catering companies have the potential to create innovations that could be protected by intellectual property tools. Unfortunately the scale of practical use of this tool is small.

Keywords: intellectual property, intellectual property protection tools, innovations, catering company
JEL codes: O34, L66, M2

INTRODUCTION

The market of gastronomic services in Poland is developing dynamically. The estimated value was approximately 36,12 billion PLN in 2017 and increased by more than 10.5% compared to 2016 year (GfK, 2017).

Market conditions and competitiveness requirements determine enterprises to properly use of intellectual capital as unique intangible resources (Nemec Rudez and Mihalic, 2007). In order to obtain competitive advantage companies need to pay attention not only to the material components, but also on those elements that are dependent on the intellectual potential of the individuals.

The customer choice of a particular gastronomic place is determined by many different factors which include quality of dishes, prices and location, service

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level, varied menu, interior décor/atmosphere of the premises, promotions or recommendations of other customers (IQS, 2017). In order to meet these different requirements, the owners introduce various innovations, which in most cases may be secured by intellectual property protection tools such as trade secret, industrial property rights or copyright laws/related rights.

The purpose of this article is to assess the use of intellectual property protection tools to secure innovation in catering companies.

Innovations and tools for intellectual property protection from theoretical perspective

The term 'innovation' comes from the Latin words innovatio or innovare, which means 'renew, refresh or change' (Kopaliński, 2006). The literature indicates a number of different approaches and interpretations to characterize the essence of innovation (Montoya-Weiss and Calantone, 1994). For this reason, there is a lack of a definition on this concept (Kuznets, 1959; Schumpeter, 1960; Whitfield, 1979; Freemen and Soete, 1997; Hargadon and Sutton, 2000; Janasz, 2003; Hildreth and Kimble, 2004; Drucker, 2004; Oslo Manual, 2005; Simpson, Siguaw i Enz, 2006).

The wide variation in the definitions relating to innovation led the creation of multiple classifications which have been divided due to the subject of innovations, effects of innovations, originality of changes or the nature of innovations and their importance from the point of view of the changes they cause in company (Sławińska, 2015). The most basic and most frequently used classification is the division of innovations due to the subject of innovation which has a technological and non-technological character. According to this division, technological innovations are connected with product and process and non-technological are related to organizational and marketing innovations. Product innovations are concerning products or services that could be refined in terms of usability and functionality or could be new as well as significantly improved. In turn, process innovations concern the implementation of a new or significantly improved method of production or provision of services. Organizational innovations include the implementation of advanced management techniques, new or significantly changed business strategies, and the introduction of significantly changed organizational structure. Marketing innovations refer to individual elements of the marketing mix concept (Oslo Manual, 2005).

In the context of considerations, it is worth to mention that innovative solutions that are created and used by companies in most cases can be protected on the basis of copyright and related rights (Act of 4 February 1994 on Copyright and Related Rights), industrial property rights (Act of 30 June 2000 on Industrial Property) or regulations on combating unfair competition (Act of 16 April 1993 on Combating Unfair Competition). Especially if the entrepreneur intends to treat such solutions as elements of property within the meaning of the Civil Code (Act of 23 April 1964 Civil Code) and property components in relation to the Accounting Act (Act of 29 September 1994 on Accounting).

According to the Article 55 of the Civil Code, the enterprise is an organized set of tangible and intangible elements intended for conducted business activity, including in particular:

- a designation distinguishing the enterprise or its separated parts;
- the ownership of immovable and movable, including equipment, materials, goods and products, and other real rights to immovable and movable;
- rights under contracts for the tenancy and lease of immovable or movable and rights to use immovable or movable under other legal relationships;
- receivables, rights attached to securities, and cash;
- concessions, licenses and permits;
- patents and other industrial property rights;
- copyright and neighbouring rights;
- secrets of the enterprise;
- books and documents related to the business activity.

This regulation is the basis for effective protection in the event of abuse by third-parties among intangible assets owned by the enterprise. The tools that protect them are listed in the Civil Code, and include industrial property rights, copyrights and related rights, trade secrets.

MATERIALS AND METHODS

The conducted study was based on the interview technique that belongs to the diagnostic survey methods. The tool was the author's questionnaire, which contained ten issues related to intellectual property management in the company and six questions related to metrics.

The research was conducted between April and July 2017. The study was extensive and involved 134 business entities operating in food industry. The article presents the partial results of about 50 companies from catering sector operated in the Mazovian Voivodeship (Table 1).

A significant group was entities of sole proprietorship (48%) and limited liability companies (32%) employing from 4 to 10 persons (38%). Assessing own financial situation, in most cases respondents stated that it is good or very good. A representative of only one company assessed the financial situation of his company as unsatisfactory.

RESULTS AND DISCUSSION

Over 2/3 of surveyed companies' representatives questioned about the tools of intellectual property protection that are used in their gastronomic companies indicated the trademark and the trades secret (Fig. 1).

Respondents declared as the trade secret protection for recipes and procedures as well as databases regarding suppliers and customers. However, atten-

Table 1. Characteristics of surveyed gastronomic companies ($N = 50$)

Criteria	Variants	Number	Structure (%)
Organizational and legal form	sole proprietorship	24	48
	limited liability company	16	32
	joint-stock company	5	10
	partnership	2	4
	limited partnership	2	4
	general partnership	1	2
Number of persons employed in the company	up to 3 persons	8	16
	4–10 persons	19	38
	11–50 persons	14	28
	51 and more persons	9	18
Subjective assessment of the financial situation of the company	it's not enough for us to cover the monthly costs associated with the functioning of the company and we have to pay extra for this business from our own pocket	1	2
	we have a lot of financial freedom, we achieve satisfactory financial results from our business	8	16
	we systematically invest in the development of our company, we regulate current expenses on time	15	32
	it is enough for us to cover current expenses, but we need to save money for major investments	25	50

Source: own study.

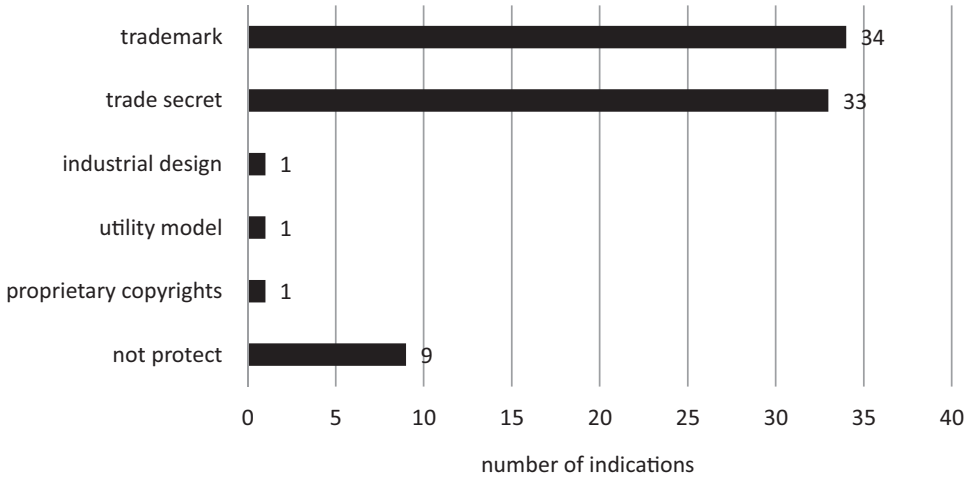

Figure 1. Tools for protection of intellectual property in the surveyed gastronomic companies
Source: own study, respondents could indicate more than one answer.

tion should be paid that not all surveyed companies properly implemented security for the declared trade secrets. In 36 enterprises there were no regulations regarding the secrecy of confidentiality. Some of the respondents emphasized that 'employees should not reveal recipes, but we do not have such records in the contract', 'once there was a disclosure of the recipe, so we are planning to create some riles'. A condition that must be met in order for the entity to use benefit from the protection of trade secret is to take the necessary measures to preserve confidentiality enshrined in the Act on Combating Unfair Competition. Only 14 surveyed enterprises had implemented regulations regarding intellectual property.

The respondents were asked about whom responsible is for intellectual property management in the company indicated the owners of enterprises, presidents, board members, place managers, the marketing department, and the kitchen chef or in individual cases people specially employed for this purpose. In two of the surveyed enterprises such activities were commissioned by a law company.

In thirty-two entities, no activities related to the development of intellectual property are foreseen in the near future. The trademark intends to submit 8 entrepreneurs, 10 companies declared willingness to benefit from training on how to protect and manage intellectual property and the possibility of obtaining EU funding for the protection of industrial property. About 11 companies also indicated the willingness to use the services of consulting firms in the scope of the possibility of obtaining protection for intellectual property. A representative of one company pointed to the desire to purchase a license for industrial property rights and one of the respondents enigmatically answered that 'perhaps yes'.

This situation was undoubtedly influenced by barriers identified by 48 respondents regarding the possibility of using intellectual property tools to protect innovative solutions. These include, among others:

- low level of knowledge – 33,
- not enough training, information and advice (especially unpaid) – training – 24, information – 22, consulting – 13,
- underestimation of intellectual property in company – 20,
- difficulties in dealing with offices granting industrial property rights – 16,
- lack of strategy regulating the intellectual property area in the enterprise – 15,
- small internal promotion of intellectual property – 13,
- lack of employee involvement – 10,
- misappropriation of intellectual property – 9,
- lack of funds and high costs of obtaining protection – 4,
- difficulties in monitoring and enforcing fraud – 4.

The confrontation of barriers identified by respondents with the results of a study carried out in 2009 and 2010 by the Polish Chamber of Commerce (KIG, n.d.) on a group of 720 companies showing barriers related to intellectual property management shows that despite the passage of time, the most important limitations are still a small number of trainings (55% indications in the KIG study, 24 indications in the own study) and consultancy (37% indications in the KIG study, 13 indications in the own study), low level of knowledge (43% – sufficient knowledge of employees about intellectual property management and 37% – insufficient knowledge of the management on the subject of intellectual property management in the indications of KIG study, 33 indications in the own study) and lack of importance to intellectual property in the enterprise (33% indications in the KIG study, 20 indications in the own study).

CONCLUSIONS

Intellectual property plays an increasingly important role in the modern world. All innovations implemented into enterprises are the result of the work of human mind and obtained results should be protected.

On the basis of the results it can be concluded:

1. The most frequently used tools to protect intellectual property in catering enterprises were trademarks and trade secrets.
2. Most of the surveyed enterprises do not sufficiently secure their intellectual property (e.g. lack of regulations).
3. The biggest barriers hindering the use of intellectual property protection tools according to the respondents were: low level of knowledge, lack of training and consultancy (especially free of charge) and the lack of importance to protect intellectual property of enterprise. This state of affairs probably was, for most of the surveyed companies, reflected in the lack of interest in the development of this area.

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ENVIRONMENTAL POLICY IMPLEMENTATION BASED ON INNOVATIVE COMPONENT – EXPERIENCE OF UKRAINE

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ABSTRACT

The article presents the principles of environmental policy implementation in Ukraine and its social, economic and ecological impact in accordance with objectives of the Environmental Strategy of Ukraine for 2020. It is stated that activities of industrial enterprises lead to the most significant negative influence on the environment. The relation between environmental policy and atmospheric air emissions is determined using regression analysis. It is also proved that innovations can be viewed as a driver for realization of environmental policy. Measures for the environmental policy improvement in Ukraine refer to state and local control and imply a set of innovative actions in industrial production.

Keywords: environmental policy, sustainability, innovation, effect
JEL codes: O31, O44, Q55

INTRODUCTION

Principles of environmental policy of Ukraine are stated in the Law of Ukraine on the Basic Principles of the National Environmental Policy of Ukraine for 2020 which was adopted in 2010. After seven years social and environmental aspects were ousted by urgent matters of a lasting profound economic transformation. According to the State Statistics Service of Ukraine, the population of the country decreased by 7% in 2016 against 2011 and came to 42.6 million people by 1 January 2017. In 2016 the number of deaths per 1,000 people exceeded births 1.4 times. The average air temperature in Ukraine increased in all regions from 0.5°C to 1.7°C in 2016, compared with the average for 2001–2005 (State Statistics Service of Ukraine database). In these circumstances achieving objectives of the environmental strategy based on scientific and technological progress and best practices, i.e., innovations, is to be considered as a national priority. This strategy addresses 'weaknesses' of the national environmental policy and allows to concentrate on efficient measures to eliminate the negative impact of business operations on the environment and society.

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THEORETICAL BACKGROUND

Issues of environmental policy and its implementation at different levels were studied by Karaczun (2005), Kravets (2006), Zharova (2008), and others. Besides the ecological component of sustainable development was discussed by Hens and Melyk (2008), Kuchkova (2008), Hełdak and Raszka (2011). The role of innovations in economics is presented in works of Ilyashenko (2011), Przychodzen and Przychodzen (2015), Hojnik and Ruzzier (2016). The literature review demonstrates a limited attention to the problem of innovations as an instrument of environmental policy implementation in Ukraine.

MATERIALS AND METHODS

The goal of the research is to evaluate the progress on environmental policy implementation in Ukraine with reference to its innovation component in 2011––2016. To achieve the objective authors have analysed a national environmental policy, including factors influencing emissions of carbon dioxide (CO_2) into atmosphere, and presented measures for its improvement. Indicators of innovations of industrial companies in Ukraine have also been studied. The research is based on the data of the State Statistics Service of Ukraine devoted to emissions of pollutants and degree of innovations of industrial enterprises. Regression analysis was used to determine relations between the volume of emissions of air pollutants and indicators of industrial innovations.

RESULTS AND DISCUSSION

Environmental policy is usually defined as a set of public activities aimed at preserving the environment, which simultaneously ensures harmonic development of society and economic efficiency (Zharova, 2008). In our opinion, the implementation of environmental policy should be consistent with demand, production and technological capacity of the economy. The concept of innovation considers these facets since it must meet requirements of consumers and give profit to all subjects of the innovation process – both developers and manufacturers. In this regard, innovation activities should primarily target the use and commercialization of the research and development results to provide new competitive goods and services (Illyashenko, 2011). The innovative component of environmental policy refers to the development and implementation of innovations in order to maintain business efficiency in accordance with principles of environmental protection (Hojnik and Ruzzier, 2016).

The implementation of a national environmental policy can be evaluated on the basis of efficiency measures, which according to Environmental Strategy of Ukraine for 2020 are divided into several groups, covering such aspects as level of ecological consciousness in society, environmental pollution and protection, integration of environmental policy; biodiversity, renewable and innovative energy sources and regional environmental policy (Parliament of Ukraine, 2010). Aforementioned aspects can be illustrated by a set of indicators (Table 1).

According to the Ministry of Ecology and Natural Resources of Ukraine for 2011–2016 only 32 indicators of the Strategy out of 76 were achieved. At the same time, some ecological effect was gained due to reduction of air pollutant emissions produced by stationary sources of pollution, with the largest share of carbon dioxide emissions. However, it is the crisis in the Ukrainian economy rather than environmental measures that caused emission reductions. Besides real GDP per capita decreased from EUR 2.2 thousand in 2011 to EUR 1.7 thousand in 2016. The average life expectancy at birth for both men and women in Ukraine is the lowest compared to the countries of the European Union. Besides against a reduction in budget for environmental measures, the share of expenditures on environmental protection in budget expenditures decreased from 1.1% in 2013 to 0.7% in 2016 (State Statistics Service of Ukraine database).

The issue of wastes and their processing remains quite topical in Ukraine since the process of implementing innovative methods of utilization has intensified in recent years. Waste in Ukraine is utilized in two ways – by burning and burial. There are 4 incinerator plants located in Kyiv, Dnipropetrovsk, Kharkiv and Sevastopol, and only Kyiv plant 'Energia' oper-

Table 1. Indicators of environmental policy of Ukraine in 2011–2016

Indicator	2011	2012	2013	2014	2015	2016	2016 against 2011	
							+, –	%
Total emissions of air pollutants (thous. tonnes), incl.:	4 374.6	4 335.3	0	0	2 857.4	3 078.5	–1 296.1	70.4
Industrial enterprises	39 37.1	4 031.8	3 736.7	3 048.5	2 571.7	2 739.9	–1 197.3	69.6
Per capita in Ukraine (kg)	150.5	149.6	147.7	124.3	105.5	72.1	–78.4	0
Total CO_2 emissions (million tonnes), incl.:	236.0	232.0	230.7	194.7	162.1	150.6	–85.4	63.8
CO_2 emissions of industrial enterprises	202.2	198.2	197.6	166.9	138.9	150.6	–51.6	74.5
Total volume of wastes (million tonnes)	447.6	450.7	448.1	355.0	312.3	295.9	–151.7	0
Dumping of contaminated water (million m^3)	7 725	7 788	7 440	6 354	5 343	5 399	–2 326.0	69.9
Lands violated (thous. ha)	1.2	1.2	1.0	0.9	0.9	1.0	–0.2	83.3
Utilized waste of I–IV classes of danger (thous. tonnes)	153.7	143.5	147.2	109.3	92.5	84.6	–69.1	55.0
Reforestation (thous. ha)	71.0	69.0	66.7	58.0	60.4	63.2	–2 326.0	69.9
Total budget expenditures on environmental measures (EUR million), incl.:	350.8	515.8	527.2	221.5	228.2	222.1	–128.7	63.3
Share of total budget expenditures on environmental measures in total budget expenditures (%)	0.9	1.1	1.1	0.7	0.8	0.7	–0.2	0
Environmental tax paid (EUR thous.)	0	0	0	0	0	0	–90.5	0
Mortality rate (thous. people)	664.6	663.1	662.4	632.3	594.8	583.6	–81.0	87.8
Average life expectancy at birth (years)	71.02	71.15	71.37	71.37	71.38	71.68	0.65	100.9

Source: own research based on materials of State Statistics Service of Ukraine.

ates. This plant processes up to 28% of all rubbish in Ukraine, while plants in Sweden process up to 99%, and produce energy from the secondary raw materials. Moreover, in Ukraine up to 30 thousand unauthorized landfills appear each year (Ivanova, 2015). Countries of the European Union have eliminated illegal landfills, and sorting wastes has become a common practice for the population (Hełdak and Raszka, 2011).

The 'leader' in environmental pollution is industry (in particular processing and mining sectors) as well as electric, gas and steam supply companies, while the largest amount of pollutants emitted into the air and water basins comes from powerful industrial regions of Ukraine – Donetsk, Lugansk, Dnipro, Kyiv, Sumy (State Statistics Service of Ukraine database). Hence, the efforts of national policy should be directed to the introduction of innovative measures

to reduce the negative influence of industry on environment. Innovations' implementation should lead to the reduction of energy and material consumption, increase of recycled production use, lowering of emissions and dumping into air and water basins and intensification of new technological processes (Table 2). Nowadays, managers of business units by pursuing a profit maximization strategy, often neglect the resource potential reproduction, and, moreover, do not consider harmful effect of business on environment. The increase in the number of low-waste and resource-saving technologies (+231 units) is a vector for further balanced development not only for the industry, but also for the economy of the country. Of course, innovative actions require additional investment, and the payback period of innovative projects often takes more than a year. As we can see the revenue from selling of innovative products dropped by 58.4%. Regarding this fact it should be mentioned that the share of expenditures on research and development in Ukrainian GDP is 5–7 times lower than in countries of Central Europe, in particular in Poland, Slovakia, Bulgaria and Romania, and 20 times lower than the average for the European Union (Karaczun, 2005).

Taking into account that innovative development is the driver for the achievement of the national environmental strategy objectives, we assume that the human factor as well as the capacity of business innovations can significantly impact the environment, including the rate of CO_2 emissions into atmosphere (Table 3).

Thus, according to Table 3, we obtained an equation which describes the dependence of carbon dioxide emission into atmospheric air on innovative factors: $Y = 344{,}127.7 - 5{,}248.0x_1 - 6{,}966.9x_2$, $R^2 = 0.37$.

The model shows a moderate linear dependence between CO_2 emissions into air, number of employees engaged in innovative projects and share of innovative enterprises. In particular, an increase in the number of workers by 1,000 people and an increase in the level of innovative activity of industrial enterprises by 1% will allow to reduce the amount of carbon dioxide emissions by 5,248 and 6,966.9 thousand tonnes, respectively.

Table 2. Innovative actions of industrial enterprises in the context of environmental policy implementation for 2011–2016

Specification	2011	2012	2013	2014	2015	2016	2016 against 2011	
							+, –	%
Share of enterprises that carried out innovations in the total amount of industrial enterprises (%)	16.2	17.4	16.8	16.1	17.3	18.9	2.7	0
Number of employees involved in the development (implementation) of innovations (thous. people)	7.4	8.8	8.9	11.2	9.4	10.5	3.1	0
Volume of revenue from selling of innovative products (EUR million)	0.74	0.91	1.08	0.87	0.37	0.31	–0.43	0
The volume of innovations financing by the enterprises of the industry (EUR million)	0.25	0.29	0.29	0.26	0.22	0.18	–0.07	0
Total number of implemented new technological processes, incl.:	2 510	2 188	1 576	1743	1 217	3 489	979	0
Low-waste and resource-saving	517	554	502	447	458	748	231	0

Source: own research based on materials of State Statistics Service of Ukraine.

Table 3. Data for determining the dependence between carbon dioxide emissions by industrial enterprises of Ukraine, the number of employees involved in the development (implementation) of innovations, and the level of innovation activity of industrial enterprises, 2004–2016

Year	CO_2 emissions into air, Y_1 (thous. tonnes)	Number of employees involved in the development (implementation) of innovations, X_1* (thous. people)	Share of innovative industrial enterprises, X_2 (%)
2004	126 882.2	43 331	14.9
2005	152 008.1	43 238	11.9
2006	178 760.5	43 268	11.2
2007	183 962.9	43 118	14.2
2008	174234.0	43 237	13.0
2009	152 809.1	43 147	12.8
2010	165 000.0	43 203	13.8
2011	202 222.0	43 197	16.2
2012	198 175.1	43 320	17.4
2013	197 618.0	43 351	16.8
2014	166 936.7	43 142	16.1
2015	138 932.1	43 199	17.3
2016	150 581.0	43 230	18.9

*Including employees from other sectors (education, scientific institutes, etc.) engaged in elaboration of innovations for industrial enterprises.

Source: own research based on data from State Statistics Service of Ukraine.

Undoubtedly, some attempts to improve the ecological situation in Ukraine have already been made. For example a construction of a protective arch, built over the old sarcophagus of the fourth power unit of the Chernobyl nuclear power plant in November 2016 should be mentioned in this regard. The Ministry of Ecology and Natural Resources of Ukraine has developed the National Strategy for Waste Management for 2030. Here attention is drawn to the expected results of stimulating business entities to operate using non-waste and innovative and environmentally safe technologies. However, the mechanism of implementation of this principle is not explained in the new strategy (Regulation of Cabinet of Ministers No 820-r 2017).

CONCLUSIONS

The results of the study showed that, despite the elaboration of the National Environmental Strategy of Ukraine for 2020, its implementation status cannot be considered as satisfactory. Some figures of the strategy remain uncontrolled or not accounted by State Statistics Service of Ukraine. This calls into question the real status of the implementation of the Strategy.

Anthropogenic and technogenic impact on the environment in Ukraine is several times higher than in the developed countries of the world. According to the World Bank and the International Institute for Sustainable Development, Ukraine is ranked as 153rd

in the world according to the level of the indicator of sustainable development. Finland, Sweden, Norway, Switzerland, Luxembourg, Denmark, Canada, Ireland and Australia were ranked as ten most progressive countries in terms of economic and social development and environmental protection measures in 2016.

The process of implementation of environmental policy considering innovative approaches in Ukraine is rather slow. The dynamics of innovative activity of industrial enterprises – the largest polluters of the environment – demonstrates, on the one hand, the achievement of a certain ecological effect, and, on the other hand, decrease in operations. Therefore, it is necessary to eliminate the disparities between the economic development of industrial enterprises and their impact on environment, which ultimately affect the health of the nation. Motivational factors for the introduction and implementation of innovations by industrial enterprises, i.e. tax breaks, special conditions for obtaining credits with partial reimbursement of interest from the state, material incentives for employees involved in innovative activities, increase of direct state financial support for innovations can be viewed as a necessary condition for meeting the principles of environmental strategy. In other words, it is the state that must create the demand for innovation in business.

The direct inverse relationship between the level of innovation activity of industrial enterprises, the number of employees involved in the development and implementation of innovations, and the amount of carbon dioxide emissions into the atmosphere confirms that innovations can be viewed as a driver for realization of the environmental policy in Ukraine. We believe that the priority measures to improve the environmental policy should include, first of all, strengthening the state control in pursuing the goals of environmental strategy both among enterprises and population in order to create environmental awareness and responsibility. Regarding this directions of further research are seen in the development of measures to integrate environmental policy of Ukraine into the European vector in order to improve the living standards of the population and attract investments. Such measures will enable to achieve the main principle of sustainable development aiming at preserving the environment and not depriving future generations of the possibility to meet their natural needs.

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PART 4

IMPACT OF THE FINANCIAL SECTOR ON AGRICULTURE, FOOD INDUSTRY AND RURAL AREAS

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THE IMPORTANCE OF CREDITS FOR AGRICULTURE IN GENERATING NET PROFIT OF COOPERATIVE BANKS IN 2015–2017

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ABSTRACT

The aim of the research was to determine whether and to what extent credits for agriculture, that is credits granted to individual farmers and preferential credit for agriculture, affected the level of net profit of cooperative banks in Poland in 2015–2017. Among others, it was established that credits granted to individual farmers are important for generating net profit for both small, medium and large cooperative banks. However, the values of the regression coefficient for this variable were low, with a slight increasing tendency. The variable, however, defining preferential credits for agriculture appeared only in two out of nine models constructed and with a negative sign. This concerned small and medium-sized cooperative banks. For large cooperative banks, preferential credit for agriculture were not of key importance in generating net profit. One can conclude that preferential credit does not bring financial benefits to cooperative banks. It is necessary to make financial revenues reliable, taking into account the costs of servicing preferential credits.

Keywords: credits granted to individual farmers, preferential credits for agriculture, net profit, cooperative banks
JEL codes: G210, G290

INTRODUCTION

The development of agriculture and the food economy as well as small and medium-sized enterprises, especially in rural areas, is influenced by cooperative banks, which are Polish in terms of capital and ownership. They are located evenly throughout the country and specialize in servicing agriculture, small and medium enterprises, local self-governments as well as the rural and urban population. There are also cooperative banks in provincial cities and even in the capital, however, these are clearly banks which are larger than other cooperative banks and usually serve suburban fruit and vegetable producers as well as workshops.

It is worth noting that cooperative banks in Poland have been operating for over 150 years and are mainly associated with rural areas and small towns. Compared to commercial banks, they are smaller, but generally more strongly rooted in the local environment, which they support in different ways.

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THEORETICAL BACKGROUND, MATERIALS AND METHODS

The purpose of the conducted research was to determine whether and to what extent credits for farms and preferential credits for these farms affect the level of net profit of cooperative banks in Poland and determine the answer to the question whether the importance of these credits in 2015, 2016 and 2017 increased or decreased. The implementation of the research objective required literature studies and empirical research.

One of the important problems in economic research is the selection of the sample. It is possible to include all objects in the study, that is comprehensive research, as well as the selection of only certain population units (Klepacki, 1984). Initially, the research was intended to cover all cooperative banks operating in Poland as of 31 December 2017, i.e. 553 banks. However, during the research period, 91 banks were subject to merger processes or significant organizational changes, which is why they were omitted. The remaining 462 banks, i.e. 83.5%, were ranked in ascending order of total assets and were drawn, every fourth bank starting from a bank ranked second. The research, therefore, covered 115 banks, i.e. nearly 20.8% of the total, as of the end of 2017. The source material was:

- statistical data of the Polish Financial Supervision Authority,
- statistical data of the Bank Guarantee Fund,
- statistical data of associating banks,
- publications of the National Bank of Poland,
- mass statistics data on the European Union and Poland,
- statistical data of individual cooperative banks.

The key measure of an entity's growth and assessment of financial effectiveness constitutes the net profit. amount One can even say that this is the most important measure. Szustak believes that achieved profit results in an increase in market value, the payment of dividends to owners, an increase in bank credibility on the market and also determines the degree of self-financing of a bank's development. What is more, net profit is also an important source of financing of own funds (Szustak, 2009). Analysis was carried out within separate groups of banks according to own funds (Różyński, 2014). Group 1 constituted the smallest banks, characterized by the lowest level of own funds, i.e. up to PLN 5 million. Group II included medium-sized banks with own funds of over PLN 5 million to 15 million. The last group, the third one, consisted of the largest banks, i.e. with a level of own funds over PLN 15 million. These groups were homoscedastic.

In the next stage of the research, an estimation of regression models explaining the level of net profit in the above mentioned groups of cooperative banks was made separately for the years 2015, 2016 and 2017. In total, 9 econometric models were constructed. Research in this area conducted according to the following scheme (Welfe, 2003):

1. Preparation of model specification:
   - determination of the purpose and scope of the dependent variable study,
   - determination of potential independent variables,
   - initial reduction of potential independent variables,
   - construction of the analytical form of the model.
2. Estimation of the structural parameters of the model.
3. Statistical verification of the constructed model, during which the following was assessed:
   - the level of the determination coefficient,
   - the normality of the residual component distribution using the Jarque–Bera compliance test,
   - the heteroscedasticity of distribution using White test (Ramanathan, 1995); after calculating the White statistic, it was compared to the critical value Chi-square test (χ^2) to determine significance level α and p degrees of freedom,
   - the collinearity of explanatory variables using the inflation factor VIF – variance inflation factors (Madala, 2006), which was determined according to the equation:

$$VIF_j = \frac{1}{1 - R_j^2}$$

where:

R_j^2 – the coefficient of multiple correlation between variable x_j and other variables.

If the value of VIF_j was equal to 1, it meant that the analysed variable was uncorrelated with the remaining explanatory variables (Gruszczyński and Podgórska, 2000).

RESULTS AND DISCUSSION

Small cooperative banks (group I)

Using the scheme of selecting indicators for the model, potential variables that could influence net profit generated by cooperative banks in 2015 were determined. In the first step, a correlation matrix was determined between the explained variable and nineteen potential explanatory variables considered in the study and between all explanatory variables.

Taking into account the adopted critical value of the correlation coefficient, explanatory variables strongly correlated with each other were eliminated until the set of explanatory variables strongly correlated with the explained variable and weakly correlated with each other (Dziechciarz, 2003). The analysis of correlation coefficients between the analysed variables, taking into account the above assumptions, showed that in 2015–2017 there were 13 variables which were significant and fulfilling:

- X_3 – share fund (PLN thous.),
- X_4 – resource fund (PLN thous.),
- X_5 – reserve fund (PLN thous.),
- X_6 – general risk fund (PLN thous.),
- X_7 – supplementary fund (PLN thous.),
- X_{12} – credits granted to enterprises and private companies (PLN thous.),
- X_{13} – credits granted to individual entrepreneurs (PLN thous.),
- X_{16} – credits granted to non-commercial institutions operating for the benefit of households (PLN thous.),
- X_{15} – credits granted to individual farmers (PLN thous.),
- X_{16} – credits granted to non-profit institutions conducting activities for the benefit of households (PLN thous.),
- X_{17} – preferential credits for agriculture (PLN thous.),
- X_{18} – number of people employed in the bank (pcs.),
- X_{19} – net assets (PLN thous.).

After determining key variables explaining the net profit of cooperative banks with own funds below PLN 5 million, parameters of the regression function were estimated. The final net profit models for small banks are as follows:

a) for 2015

$$ZN_{\text{I }2015} = 273.694 + 0.15446\, X_4 - 0.00346682\, X_{17}$$

where:

$ZN_{\text{I }2015}$ – net profit of the bank from group I, in 2015 (PLN thous.),
X_4 – resource fund (PLN thous.),
X_{17} – preferential credits for agriculture (PLN thous.).

Among the variables significant for the level of net profit obtained by banks with funds below PLN 5 million, in 2015, there were two explanatory variables, one variable positively affecting the net profit of cooperative banks. This variable was a resource fund, which increased by PLN 100 thousand, increasing net profit by PLN 15.44 thousand. Interestingly, preferential credits for agriculture had a negative impact on the level of net profit, as their increase by PLN 100 thousand resulted in a drop of net profit on average by nearly PLN 350.

b) for 2016

$$ZN_{\text{I }2016} = 233.51 + 0.187878\, X_4 + 0.00214498\, X_{15} + \\ + 0.009559886\, X_{19}$$

where:

$ZN_{\text{I }2016}$ – net profit of the bank from group I, in 2016 (PLN thous.),
X_4 – resource fund (PLN thous.),
X_{15} – credits granted to individual farmers (PLN thous.),
X_{19} – net assets (PLN thous.).

In the case of the $ZN_{I\,2016}$ model, three variables were of key importance, the increase of which positively influenced net profit level. The first variable was the level of the resource fund, which increase by PLN 100 thousand, increasing net profit by PLN

18.8 thousand. The second variable was the sum of credits granted to individual farmers, whose increase by PLN 100 thousand increased net profit by PLN 0.21 thousand. The third variable was the net asset value, whereby an increase of PLN 100 thousand increased the cooperative bank's profit from this group in 2016 by PLN 0.95 thousand.

c) for 2017

$$ZN_{\text{I }2017} = 2{,}363.556 + 0.188221\, X_4 + 0.0112136\, X_{10} + \\ + 0.0953343\, X_{16}$$

where:

$ZN_{\text{I }2017}$ – net profit of the bank from group I, in 2017 (PLN thous.),
X_4 – resource fund (PLN thous.),
X_{10} – total bank credit exposure (PLN thous.),
X_{16} – credits granted to non-commercial institutions operating for the benefit of households (PLN thous.).

The estimated $ZN_{\text{I }2017}$ regression function for small cooperative banks shows that both credits granted to individual farmers and preferential credits were not decisive factors for the net profit level of these banks in 2017.

Medium cooperative banks (group II)

Using the adopted scheme of conduct, in order to determine the function explaining the cooperative bank's net profit with own funds of more than PLN 5 million to 15 million, for the years 2015–2017, 10 following variables were defined that met the assumptions concerning the value of correlation coefficients, i.e.:

- X_3 – share fund (PLN thous.),
- X_4 – resource fund (PLN thous.),
- X_5 – reserve fund (PLN thous.),
- X_6 – general risk fund (PLN thous.),
- X_7 – supplementary fund (PLN thous.),
- X_{14} – credits granted to individuals (PLN thous.),
- X_{15} – credits granted to individual farmers (PLN thous.),
- X_{16} – credits granted to non-commercial institutions operating for the benefit of households (PLN thous.),
- X_{17} – preferential credits for agriculture (PLN thous.),
- X_{18} – number of people employed in the bank (pcs.).

These variables were used to estimate the regression model explaining the level of net profit for entities from the analysed group. The final net profit models for medium-sized cooperative banks are as follows:

a) for 2015

$$ZN_{\text{II }2015} = 97.8303 + 0.14332\, X_4 + 0.00659062\, X_{15}$$

where:

$ZN_{\text{II }2015}$ – net profit of the bank from group II, in 2015 (PLN thous.),
X_4 – resource fund (PLN thous.),
X_{15} – credits granted to individual farmers (PLN thous.).

In the regression model of net profit for cooperative banks with own funds of more than PLN 5 to 15 million, for 2015, there were two variables – for the resource fund and credits granted to individual farmers. They were stimulants, because they increased by PLN 100 thousand resulting in an increase in net profit respectively by PLN 14.33 thousand and nearly PLN 0.66 thousand.

b) for 2016

$$ZN_{\text{II }2016} = 43.3678 + 0.14966\, X_4 + 0{,}144729\, X_6 + \\ + 0.0289991\, X_{15}$$

where:

$ZN_{\text{II }2016}$ – net profit of the bank from group II, in 2016 (PLN thous.),
X_4 – resource fund (PLN thous.),
X_6 – general risk fund (PLN thous.),
X_{15} – credits granted to individual farmers (PLN thous.).

The analysis shows that in cooperative banks with own funds over PLN 5 to 15 million, in 2016, a significant but slight increase in net profit was generated by the change in the level of credits granted to individual farmers, whereby an increase of PLN

100 thousand was connected with an increase of net profit of nearly PLN 2.9 thousand.

c) for 2017

$$ZN_{\text{II }2017} = 69.1455 + 0.015924\,X_3 + 0.118814\,X_4 + 0.153184\,X_6 + 0.017412\,X_{14} - 0.00806114\,X_{17}$$

where:
$ZN_{\text{II }2017}$ – net profit of the bank from group II, in 2017 (PLN thous.),
X_3 – share fund (PLN thous.),
X_4 – resource fund (PLN thous.)
X_6 – general risk fund (PLN thous.),
X_{14} – credits granted to individuals (PLN thous.),
X_{17} – preferential credits for agriculture (PLN thous.).

There are five explanatory variables in the $ZN_{\text{II }2017}$ model. Three of them pertained to the level of own funds of cooperative banks and the other two – credits. However, the increase in preferential credits for agriculture of PLN 100 thousand resulted in a net profit decrease by PLN 806 on average.

In 2015 and 2016, the level of net profit of medium-sized cooperative banks was significantly and positively affected by credits granted to individual farmers. Moreover, in 2016, the importance of these credits was higher than in 2015. Preferential credits for agriculture, reduced the profit of this group of banks in 2017. Furthermore, they were granted due to social reasons and should therefore be assessed positively. However, this situation requires a change and realignment of costs related to servicing these credits.

Large cooperative banks (group III)

In the course of the conducted research, a correlation matrix between the analysed variables was determined for banks with own funds over PLN 15 million. The analogous procedure was used as before and 5 variables, which best described the volatility of net profit in the studied group were determined. These variables are:
- X_3 – share fund (PLN thous.),
- X_4 – resource fund (PLN thous.),
- X_6 – general risk fund (PLN thous.),
- X_{14} – credits granted to individuals (PLN thous.),
- X_{15} – credits granted to individual farmers (PLN thous.).

The final net profit models for large cooperative banks are as follows:

a) for 2015

$$ZN_{\text{III }2015} = 1{,}745.26 + 0.001234\,X_3 + 0.146833\,X_4 + 0.0280734\,X_{14} + 0.0116223\,X_{15}$$

where:
$ZN_{\text{III }2015}$ – net profit of the bank from group III, in 2015 (PLN thous.),
X_3 – share fund (PLN thous.),
X_4 – resource fund (PLN thous.),
X_{15} – credits granted to individual farmers (PLN thous.).

b) for 2016

$$ZN_{\text{III }2016} = 46.2223 + 0.0097695\,X_3 + 0.150422\,X_4 + 0.304948\,X_6$$

where:
$ZN_{\text{III }2016}$ – net profit of the bank from group III, in 2016 (PLN thous.),
X_3 – share fund (PLN thous.),
X_4 – resource fund (PLN thous.),
X_6 – general risk fund (PLN thous.).

c) for 2017

$$ZN_{\text{III }2017} = 1{,}540.15 + 0.0732446\,X_3 + 0.1714456\,X_4 + 0.0776673\,X_6 + 0.0144878\,X_{15}$$

where:
$ZN_{\text{III }2017}$ – net profit of the bank from group III, in 2017 (PLN thous.),
X_3 – share fund (PLN thous.),
X_4 – resource fund (PLN thous.)
X_6 – general risk fund (PLN thous.).
X_{15} – credits granted to individual farmers (PLN thous.).

For large cooperative banks, the importance of preferential credits for agriculture in 2015–2017 was not a decisive factor in shaping net profit. In 2015 and 2017 credits granted to individual farmers were significant for large cooperative banks. It is also worth noting that the significance of these credits in 2017

was higher than in 2015. Statistical calculations indicate that credits granted to individual farmers even by large cooperative banks, often having their headquarters in cities, is still an important factor positively affecting the increase of net profit.

The coefficient of determination of individual models was between 0.76020 for the small bank model for 2015 and 0.92698 for the medium bank model for 2016. This means that models constructed for a group of cooperative banks explained the volatility of net profit, over 76%, which was considered to be a satisfactory level.

CONCLUSIONS

The conducted research showed that, in the years 2015–2017, the number of variables changed, which, due to statistical reasons, had a key impact on the level of net profit of cooperative banks in Poland. In the net profit models for large cooperative banks in the individual study years, the number of variables was the smallest. This may indirectly indicate that the management of large cooperative banks may be organizationally easier than smaller ones.

The variable X_{15} defining the level of credits granted to individual farmers was included in 5 models out of 9 constructed. What is more, this variable was important for generating net profit for both small, medium and large cooperative banks. However, it should be emphasized that the values of the regression coefficient for this variable were relatively low, but with a tendency to slightly increase.

A separate issue is preferential credits for agriculture. In 9 models explaining the level of generated net profit of cooperative banks, the variable X_{17}, relating to these credits, only appeared twice with a negative sign. This concerned small and medium-sized cooperative banks. For large cooperative banks, preferential credits for agriculture are not a key factor in generating net profit. Therefore, it can be concluded that these credits do not bring financial benefits to cooperative banks and may even be associated with the situation that costs may be higher than financial benefits achieved. Nevertheless, what deserves recognition is the fact that cooperative banks, especially small and medium-sized banks, service these credits because of their missionary and subsidiarity towards members and the entire environment related to the development of agriculture and rural areas. Regardless of this, it is necessary to make the financial revenues resulting from the costs of servicing these credits real.

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ECONOMIC EVALUATION OF INVESTMENT ACTIVITY OF AGRICULTURAL ENTERPRISES IN THE UKRAINE

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ABSTRACT

The article specifies that intensive development of the economy can be achieved by attracting and effectively using investment resources. Based on the indicator of the level of investment sufficiency, it was established that, in the period under review, the level of investment adequacy in the country is less than the established 'threshold' value, which indicates a shortage of investment funds. The study analysed the dynamics of investment attraction in agriculture. It was found that the main source of financing for investment is own funds of enterprises and organizations. However, they are too insufficient to ensure the intensive development of the economy. An analysis of growth dynamics of the total volume of investment in agricultural enterprises per 100 ha of agricultural land and their financial provision was carried out. Research showed that the increase in the value of fixed assets is more intensive than the increase in the inflow of investment in fixed assets, which indicates additional sources of growth in the value of fixed assets. It was noted that the potential sources of investment resources should be the funds of foreign investors, which currently stand at an extremely low growth level. A number of negative factors influencing the process of attracting foreign direct investment were identified. The main current requirements of the Ukraine in the process of integration into the world economic space, is the formation of a mechanism of investment activity, an important component of which is the mechanism of investment provision.

Keywords: investment, investment activity, agricultural enterprises
JEL codes: E22, Q14

INTRODUCTION

The period 1991–2000, which was characterized by an almost complete cessation of investment activity in agriculture, led to destructive processes: a decrease in the productivity of the industry, deterioration of the material and technical base, deterioration of the state of land resources, deterioration of the financial and production indicators of agricultural enterprises, etc. Lack of financial resources is a major problem in the reform of agriculture. Therefore, the establishment of a stable investment process is becoming significant.

THEORETICAL BACKGROUND

Issues of investment development are extremely relevant today, which is why they are at the centre of attention of scientists and economists, in particular M. Odnoroh, O. Feier, N. Patyka, R. Chornyi, V. Klochan, I. Bezpiata. The analysis of available research

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makes it possible to assert the relevance of this problem, and therefore requires further consideration.

MATERIALS AND METHODS

In the process of research a set of general scientific and special methods of scientific knowledge was used, namely: abstract-logical and dialectical – for theoretical generalization and formulation of conclusions as well as monographic and statistical – in analysing the current state of investment activity of agricultural enterprises. The information base of the study consisted of the reporting data of the State Statistics Service of the Ukraine, publications on the topic of research by leading national and foreign scientists, Internet resources and results of own research.

RESULTS AND DISCUSSION

The economy status of the agricultural sector can be evaluated by the nature of processes taking place in the investment sphere. It is a definite indicator pointing to the general situation within the country (Odnoroh, 2015). The level of investment adequacy to ensure economic development is determined by compliance with the rate of investment in fixed assets in relation to GDP, a satisfactory value of which should be 25% (Feier, 2016) For the analysed period 2013–2017, the level of investment in the Ukrainian economy is considerably less than a certain value, and amounted to 14% in 2014, 13.8% in 2015 and 12.2% of GDP in 2016. This indicates a significant shortage of investment resources in fixed assets and an inability to provide the necessary material and technical basis for the needs of the economy and can be interpreted as a low interest of investors in investing in the Ukrainian economy.

Let us analyse the investment activity of Ukrainian enterprises in 2013–2017 (Table 1). Thus, in 2014, the lowest activity of investors was observed, attracting only UAH 219.4 billion in agriculture. However, in the following years, the volume of investment dynamically increased and, in 2017, amounted to UAH 448.5 billion. Due to types of assets, most investment is made in tangible assets: 2013 – 96.0%, 2014 – 96.6%, 2015 – 93.3%, 2016 – 96.7%, 2017 – 96.3% of total volume. In 2017, of the total volume of investment in tangible assets, an enormous part was accounted for by machinery, equipment and inventory – UAH 154,721.7 million (34.5%). For engineering facilities – UAH 78,563.5 million (17.5%), for non-residential buildings – UAH 65,605.2 million (14.6%). The least investment resources were allocated to land – UAH 1,994.0 million (0.5%) (State Statistics Service of Ukraine, 2017b).

The main source of financing capital investment is own funds of enterprises and organizations, due to which 68.04% of the total volume was disbursed. At the same time, the dynamics of changes in the structure of the sources indicate an increase in this share, in recent years. And this, in turn, actually testifies to the closed nature of economic recovery and the strong dependence of the state of investment in the country on the profits of enterprises and organizations, which is hardly supported by state or credit resources. The share of loans from banks and other loans in the total volume of investment is insignificant, reaching 15.3% in 2013, 10% in 2014, 7.6% in 2015, and 8% in 2017, respectively. The great share of loans was used to ensure the current activity of business entities, and not investment activities. This means that, in the Ukraine, banks fail to act as the driving force in the redistribution of financial resources for investment purposes. Since 2014, there was a slight upward trend in the share of state budget expenditure for financing of capital investments as a whole, from 1.2% in 2014 to 3.4% in 2017. At the same time, the share from local budgets grew from 2.7% in 2013 up to 9.3% in 2017, which correlates with national decentralization policy, during which, among others, financial resources were transferred. The share of foreign investor funds is rather low (on average 2.5%) and there is no significant impact on the overall state of investment activity in the Ukraine (State Statistics Service of Ukraine, 2017b).

In 2017, enterprises and organizations absorbed UAH 448.5 billion at the expense of all sources of financing of capital investment, which is 25% more than the volume of capital investment for the corresponding period 2016. A significant share of capital investment was absorbed by machinery, equipment and inventory and vehicles – accounting for 47.9%

Table 1. Indicators of investment dynamics in the Ukraine

Specification	2013		2014		2015		2016		2017	
	UAH billion	%	UAH billion	%	UAH billion	%	UAH billion	%	UAH billion	%
Capital investments total	267.7	100	219.4	100	273.1	100	359.2	100	448.5	100
Capital investment in tangible assets	257.1	96.0	212.0	96.6	254.7	93.3	347.4	96.7	432.1	96.3
Capital investment in intangible assets	10.6	4.0	7.4	3.4	18.4	6.7	11.8	3.3	16.4	3.7
Capital investment by sources of financing										
State budget funds	6.5	2.4	2.7	1.2	6.9	2.5	9.3	2.6	15.3	3.4
Local budget funds	7.2	2.7	5.9	2.7	14.3	5.2	26.8	7.5	41.6	9.3
Own funds of enterprises and organizations	170.7	63.8	154.6	70.5	184.4	67.5	248.8	69.3	310.1	69.1
Bank loans and other loans	40.9	15.3	21.7	9.9	20.7	7.6	27.1	7.5	29.6	6.6
Foreign investors funds	4.8	1.8	5.6	2.6	8.2	3.0	9.9	2.7	10.8	2.4
Funds for housing construction	28.3	10.6	22.1	10.0	32.0	11.7	30.0	8.3	32.8	7.3
Other sources of funding	9.2	3.4	5.2	2.4	5.6	2.1	5.1	1.4	12.9	1.9

Source: State Statistics Service of Ukraine (2017b).

of all investment. UAH 41.4 billion of capital investment was directed at capital repairs of assets (9.2% of the total volume).

The volume of investment in fixed capital of agriculture in 2017 became a record for the entire history of Ukrainian independence (UAH 63.4 billion), that is 1.3 times higher than the indicator for 2016 (UAH 49.66 billion) and 3–4 times – in 2013 (UAH 18.64 billion) (Table 2). It is believed that such a positive trend is due to the fact that investors positively assess

Table 2. Dynamics of capital investment in agriculture in the Ukraine

Indicators	2013	2014	2015	2016	2017	Deviation
Investment in fixed capital of agriculture, hunting and related services (million UAH)	18 639.7	18 388.1	29 309.7	49 660.0	63 400.7	+4 476.1
Indices of increase of investment into fixed capital of agriculture, hunting and related services (%)	99.6	98.6	159.4	169.4	127.6	+28
Share of investment in fixed capital of agriculture, hunting and related services from the total volume (%)	7.0	8.4	10.7	13.9	14.1	+7.1
Investment in fixed assets of agriculture, hunting and related services per capita of rural population (UAH)	1 308.1	1 305.1	2 211.0	3 769.1	4 838.9	+3 530.8

Source: compiled by the authors on the basis State Statistics Service of Ukraine (2017b).

the level of profitability of their investment in the future. Positive dynamics of investment growth indices throughout the study period are also observed.

Investment in agriculture, in the Ukraine, are mainly directed to increase fixed capital (in construction, purchase of equipment, etc.), which is reflected in the growth of indices of stock protection. In Figure 1, the growth dynamics of total investment in agricultural enterprises per 100 ha of agricultural land and their financial provision can be seen.

From Figure 1, it is clearly visible that the increase in the value of fixed assets was more intensive than the increase in the inflow of investment in fixed assets, which indicates additional sources of growth in the value of fixed assets, including the influence of inflation processes, which significantly devalues money investment receipts and facilities.

In addition, one cannot ignore the accumulative nature of direct investment, which, before reaching a certain critical volume, is characterized by increasing returns.

An important aspect of the dynamics in Figure 1 is also an opportunity to identify the time lag of investment impact in fixed assets on value (often investment that comes in the base year, due to a long period of development, increase the value of fixed assets in the year following the base one) (Chornyi, 2013). Most clearly, such a lag can be traced back to 2015–2016, when a sharp increase in the inflow of investment in fixed assets of agricultural enterprises in 2015 led to an increase in the value of fixed assets of research facilities in 2016.

The attraction of financial resources of foreign investors is important for the development of a country's economy and agriculture, in particular (Table 3) In general, a positive trend in attracting foreign direct investment (FDI) is observed, though its growth is very low. Thus, the growth of FDI (from countries of the world in the Ukraine) to GDP in 2015 was –1.6%, in 2017 the figure rose to 0.7% at a threshold of 5%. Such results are due to the fact that GDP grows faster than FDI volume. Along with a lack of activity of domestic investors, a significant threat to the economic security of the Ukraine is the monopolization of foreign capital of strategic sectors of the economy, as can be seen indirectly by an increase in the share of FDI (from the countries of the world) in GDP from 31.1 in 2013 to 51.9 in 2015.

In 2017, the share of FDI decreased to 33.7%, which is 5 times higher than the threshold. The share of FDI in GDP per capita in 2017 was 5.1% (State Statistics Service of Ukraine, 2017a). This means that for the time being, agricultural production remains an insufficiently attractive industry for a foreign investor seeking to get a return on investment in the shortest possible time. Therefore, what is more promising for them is not the production of agricultural products, but their processing.

The unfavourable investment climate in the Ukraine is the main reason for a lack of strategic foreign investment. It determines the expectations of strategic investors, especially in terms of attracting medium and large capital. What is more, there is an uncertainty about further cooperation from inves-

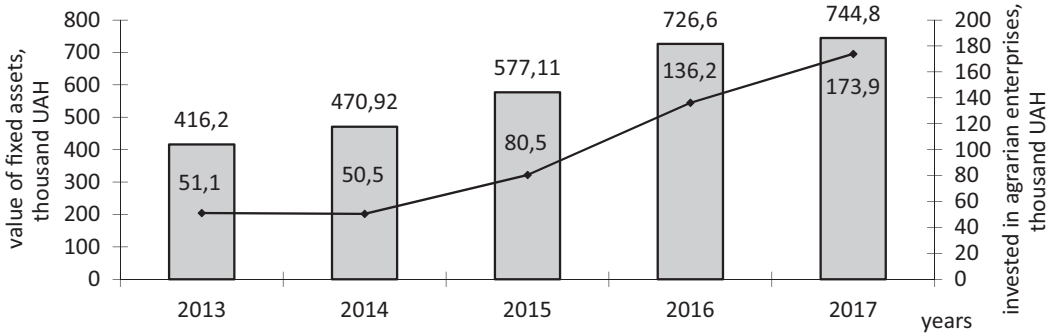

Figure 1. The ratio of investment in fixed assets to the value of fixed assets per 100 ha of agricultural land
Source: compiled by the authors on the basis of State Statistics Service of Ukraine (2016).

Table 3. The dynamics of attracting foreign direct investment in the Ukraine

Specification	Investment volume (USD million)					FDI in GDP (%) GDP growth in FDI (%)				
	2013	2014	2015	2016	2017	2013	2014	2015	2016	2017
FDI from the world in the economy of Ukraine	51 705.3	53 704.0	40 725.4	36 154.5	37 513.6	31.1 1.6	44.7 2.0	51.9 –15.6	40.4 –5.1	33.7 1.2
including agriculture	717.8	776.9	617.0	502.2	586.2	4.4 0.4	7.4 0.6	6.1 –1.6	4.7 –1.1	5.1 0.7
FDI from the EU countries in the economy of Ukraine	41 132.3	41 032.8	31 046.9	26 405.6	26 203.6	22.9 1.2	40.2 –0.1	37.2 –12.0	29.6 –5.2	23.5 –0.2
including agriculture	505.8	552.9	431.7	336.8	402.4	3.2 0.1	5.3 0.6	4.3 –1.2	3.2 –0.9	3.5 0.6

Source: compiled by the authors on the basis of State Statistics Service of Ukraine (2017a).

tors who have already invested in agriculture in the Ukraine (Patyka, 2018).

For most domestic agricultural enterprises, the source of investment is own funds (depreciation charges, profits), but for a more effective financial provision, it is necessary to apply raised funds as well as state and local budgets. After all, in conditions of proper state support, agrarian production has all the real opportunities to form sufficiently high macroeconomic indicators. What is important is the regulation of financial relations both at macro- and micro-levels. This problem is especially acute in the agrarian sector of the economy, since the corresponding conditions for its proper financing have not been created at a macro level. Tax and credit policy of the state undermine the opportunities for market development of agriculture, since tax burdens, lack of credit resources and lack of necessary subsidies do not allow it to develop effectively (Klochan and Bezpiata, 2016).

To accelerate the process of modernization of agriculture and the production of competitive products, governments of countries with developed market economies provide special preferential terms for investment lending. In particular, the interest rate of soft loans, depending on the conditions of agricultural production, is from 3.1 to 8.9%. Privileged borrowers (cooperatives on the use of technology) enjoy a soft loan with an interest rate from 4.1 to 4.35%.

One of the directions of activation of investment activity in agriculture abroad is the taxation mechanism, which includes: taxes on profits (net income) of companies; real estate, in particular land; invested capital, or an increase in fixed capital; additional costs; social insurance of hired labour; excises. In total, these taxes amount to 2.5–6% of all farm expenditures, of which about half are for two taxes: profits and real estate. Reforms of the tax system that provide incentives in developed countries promote active tax incentives for STPs requiring additional capital investment (Romanchuk, 2016).

As for the Ukraine, in order to improve environmental attractiveness for foreign investors, it is necessary to use world experience and gradually reduce the tax burden, adapting it to its specifics and development conditions. It is important to create such conditions that will make tax evasion impossible, and as a result, revenues to the state budget will increase.

For further improvement of investment activity in the Ukraine, the current issue requiring attention is the improvement of the legal and organizational framework in order to increase the capacity of mechanisms to ensure a favourable investment climate and the formation of a basis for the preservation and improvement of national economy competitiveness.

CONCLUSIONS

An important condition for ensuring the effective development of agricultural enterprises is the availability of sufficient investment. As shown by the analysis for 2013–2017, the total volume of investment in agriculture is steadily growing. However, its growth is very low and does not even provide a simple reproduction of fixed assets. It is known that for macroeconomic stabilization, the country requires capital investment in the country's economy at a level of 19–25% of GDP, while in 2017, it was 15%. Therefore, agricultural enterprises are acutely lacking financial resources and are constantly searching for both internal and external sources of investment. Due to the lack of funds in the budgets of central and regional authorities, the state virtually stands aside from investment processes. The share of foreign direct investment in agrarian production is extremely small and there is no significant impact on the state of its functioning and it does not contribute to the solution of development priorities. A significant threat to the economic security of the Ukraine is the monopolization of foreign capital by strategic sectors of the economy, which may be indirectly indicated by the growth in the share of FDI in 2017, which was up to 33.7%. To attract investment, first of all, it is necessary to solve the problems of macroeconomic stabilization and activate all the levers of economic regulation of investment activity. Therefore, one of the necessary areas of action concerns an effective investment policy, aimed at large-scale attraction of external sources of investment, a balanced state investment policy in agriculture and an increase in investment attractiveness as the main tasks of the Ukrainian government, with the aim of bringing the agrarian sector out of financial, material and technical crisis.

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CROSS BORDER LISTING AS MEANS OF AGRICULTURAL ENTERPRISE FINANCING

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ABSTRACT

The international shares placement via IPO on the WSE by several Ukrainian companies, mainly from the sector of agricultural production and processing, makes an appealing case of relatively quick and inexpensive access to foreign borrowing markets. The WIG Ukraine index shows optimistic start, period of positive gains, dramatic fall at one point and significant volatility afterwards due to both the political and macroeconomic upheavals in the home country as well as internal problems of emitents. The comparison with other indexes of WSE and other exchanges reasonably suggests that the latter reason was the main cause of the deterioration of the indicator. The investigation on the parameters of the regression model that describe time series of WIG-Ukraine index with the help of the ARIMA model reveals that short-time predictions dominate investors decisions.

Keywords: agriculture holding, international IPO, ARIMA model
JEL codes: G15, F37, Q14

INTRODUCTION

Over the past decade, several major trends have been observed in the strategy of Ukrainian agricultural enterprises such as expansion of land bank, increasing storing capacity and introduction of modern technologies which require significant investments. This entails the access to the international capital market, including mergers and acquisitions. It is the aspiration of middle-level agricultural companies to grow into the agricultural holding through the accumulation of land and attracting international investment (Stecjuk, 2010).

To further develop agro-holdings are considering various methods of financing, one of which is an IPO on global stock exchanges. While in Ukraine the stock market never passed the stage of formation Ukrainian companies in the agrarian and food sector have already placed an IPO on stock exchanges in other countries. About a dozen Ukrainian agro-holdings went to the Warsaw Stock Exchange (WSE), the London Stock Exchange and Deutsche Börse.

The numerous international IPO's of Ukrainian agricultural companies during the short period make a very interesting case of cross-border listing which has not yet been reflected in academic literature. This study aims to fill this gap by qualitatively and quantitatively analysing the performance of Ukrainian agro-holdings' stocks on WSE. Additional task is to develop an instrument for analysing the behaviour of investors and movements of stocks prices of WSE emitents from Ukraine.

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THEORETICAL BACKGROUND

Maximizing the value of shareholders' shares is the most important reason why a company may seek to become public one. If the company's management is confident in its good prospects in the market, then the IPO can be more profitable for shareholders than selling the business of another company. The price of shares after the start of trading may grow, and the cost of shares in the company of its original shareholders will increase (Gutorov, 2012). Business valuation of a listed company is usually higher because the liquidity of publicly traded shares is higher.

The IPO allows attracting money on more favourable terms attracting large amounts from private investors. The IPO allows attracting significant financial resources to improve business efficiency – modernization and renovation of the fleet of vehicles, expansion of the land bank, development of infrastructure, etc. without increasing the debt burden (Gutorov, 2012). Such a new status allows the company to speed up the pace of development, and also to start cooperation with the best international and European banks. Another reason is obtaining an acquisition tool to pay for merged companies in case of growth by buying competitors and suppliers and sellers not only with money, but also with shares of the 'parent' company. The same reason applies to hiring qualified employees with offer not only money but also shares as compensation. The additional gain is raising public awareness of company, products and services because an IPO is an event that draws the attention of the press and the public.

But all this, in turn, requires high transparency of doing business and obliges the company to publication of quarterly and annual reports, regular audits. Transparency of the enterprise is not limited to covering financial and operational information. The company should also fully disclose both the structure of owners and the remuneration of top management. Moreover, such companies are constantly in the field of vision of the state and inspection bodies, which cannot always have a positive effect on their activities (Ghosh and Lee, 2013).

The public placement on international stock exchanges has gained popularity among Ukrainian agricultural producers about a decade ago, in the middle of 2000s. Due to the fact that the IPO require the companies to be ready for a long and extensive work on preparation only leaders in the domestic and foreign agricultural markets could successfully increase capitalisation in after IPO period (Gudz', 2009).

MATERIALS AND METHODS

Warsaw Stock Exchange plays the role of main financial hub for Ukrainian companies allowing quickly and inexpensively to reach foreign investors. The main advantage of WSE is that Polish investors are more tolerant to medium-sized companies from Ukraine than investors on other international stock platforms. This exchange is most suitable for companies with a capitalization of USD 100–150 million.

The choice of Ukrainian agricultural companies to enter the WSE as issuers was driven by the following factors: a relatively smaller amount of accommodation costs, minimum requirements for listing, territorial proximity of the markets of Ukraine and Poland. Moreover, Polish investors better than others understand the specifics of Ukrainian business environment, pricing system, legal structure. In addition, the WSE requirements for the issue of prospectus are close to Ukrainian regulations (Zelisko, 2011).

The most active Ukrainian issuers on the Warsaw Stock Exchange were agricultural companies. By the end of 2013, the last time IPO-activity of Ukrainian companies on WSE was observed, they attracted almost USD 500 million on this exchange, which is about 6% of the capital attracted by all Ukrainian companies through IPO. The best results on the IPO among Ukrainian companies can be observed in cases of placements of Astarta, Kernel and Ovostar.

The trend line of capitalization of Ukrainian agribusinesses on WSE shows that loses in market value of agricultural holdings started from the very beginning of the current decade, reached the trough in middle and followed by steeper growth afterwards. If in early years investors were ready to buy shares of companies in the agricultural sector of Ukraine by the middle of the decade the demand for them declined. Ukraine agro-industrial complex have ceased to be attractive to investors due to changes in the Polish

legislation related to pension reform and following reduction of assets of pension funds.

The main threat for Ukrainian companies is that the Polish investors are losing confidence in Ukrainian issuers because of the failure of them to report properly and timely. Most Ukrainian emitents most often do not attach due importance to communication of information on all aspects of company's activity to investors, limiting it to the minimum required by the exchange. Thus, in case of unforeseen situations such as a decline in product prices, freezing of a bank account, closure of trade routes, etc., accompanied by silence from companies, portfolio managers are pressured to sell such securities.

RESULTS AND DISCUSSION

The WIG-Ukraine index includes shares of Ukrainian companies listed on the WSE Main Market which at present happens to be only representatives of agriculture and food sector. WIG-Ukraine is an income index and it includes both the prices of the shares it contains and the income from dividends and preemptive rights. The WIG-Ukraine index is calculated from 31 December 2010 and follows the principle of diversification aimed at limiting the share of a single company. However due to the short list the structure of WIG-Ukraine is dominated by the aggregate share of agricultural holdings of Kernel and Astarta which is more than 70% and which makes the index extremely dependent on the situation in these companies.

The index of shares of Ukrainian companies at present continues to restore lost points after a major fall in 2014–2015 but the trading volume of the remaining Ukrainian companies included in WIG-Ukraine is still quite low. The dynamics of quotations of Ukrainian agro-corporations on the WSE since August 2015 was positive for 8 out of 9 whose securities added in price from 35 to 135%. But at the same time, the excess of the current price over the face value of shares is observed only in four companies whose securities are quoted on the WSE. Moreover, the rating of Ukrainian companies was negatively affected by the delisting of several companies such as KSG AGRO, Sadovaya Group SA and Westa.

At the beginning and end of 2017, capitalization of companies in WIG-Ukraine index was in the range of EUR 2.6–2.7 billion which indicates certain stability in the value of Ukrainian agro-holdings in the world market. This supports the view that agricultural sector of Ukraine is traditionally the strongest part of national economy, showing a high level of profitability and growth potential. Although with eight issuers representing this segment of the Ukrainian economy on the WSE, its attractiveness in the eyes investors is no longer so obvious, belonging to the agricultural sector is still a fundamental factor for investors.

The growth of WIG-Ukraine is supported by the process of resolving the political and military crisis in the country, the image component of the Ukrainian revolution and relative calm in the east of Ukraine. The further behaviour of the index will in the main depend on the direction of developments in the country and in agricultural sector. In the case of a positive resolution of the crisis in eastern Ukraine, the shares of Ukrainian companies should show the significant growth. The latest financial reports from Ukrainian agricultural holdings on WSE shows significant improvements the bottom lines which suggests the growth in the value of the shares and the volume of trading of the largest Ukrainian companies placed on the WSE and make it possible to predict the further growth of the WIG-Ukraine index.

The WIG-Ukraine can be compared to other WSE country or regional indexes such as WIG-CEE and WIG-Poland. The WIG-CEE index includes only shares of companies listed on the WSE from Central and East European countries while WIG-Poland index includes only shares of domestic companies listed on the WSE Main Market. The WIG-Ukraine index is showing the similar pattern to WIG-CEE index although latter is more flat while the behaviour of WIG-Poland index demonstrates quite different dynamics.

The data are from Warsaw Stock Exchange[2] consist of time series on WIG-Ukraine, WIG-Poland and

[2] Warsaw Stock Exchange webpage https://www.gpw.pl/Indeks.

WIG-CEE indexes from the dates of their initiation until 21 May 2018. The closing value is chosen to represent the index as it reflects all the activities of the index. Main parameters of the data are presented in Table 1.

The absolute value of the Pearson correlation coefficient of 0.16 corresponds to a very low cross-over between the WIG-Ukraine and WIG-Poland while between WIG-Ukraine and WIG-CEE it was 0.78 which indicates strong connection. The latter is explained by the fact that the stocks of Ukrainian companies on WSE are included in the index of WIG-CEE. The correlation coefficient between WIG-Poland and WIG-CEE at the level of –0.4 is a sign of connection of medium tightness. These correlations are statistically significant ($p < 0.01$). The results of correlation analysis are presented in Table 2.

Table 1. Data description

Index	N	$\bar{x}$	SD	Skewness	Kurtosis	Jarque–Bera test	Low	High
WIG-Ukraine	1 844	553.85	196.0295	–0.44025	7.4651	1 590.533	216.73	1 089.8
WIG-Poland	1 760	51 024.57	7 672.976	–0.57509	6.0683	787.404	36 088.06	69 047.45
WIG-CEE	1 844	855.41	114.8457	0.15179	7.8473	1 812.350	643.63	1 117.48

Source: WSE.

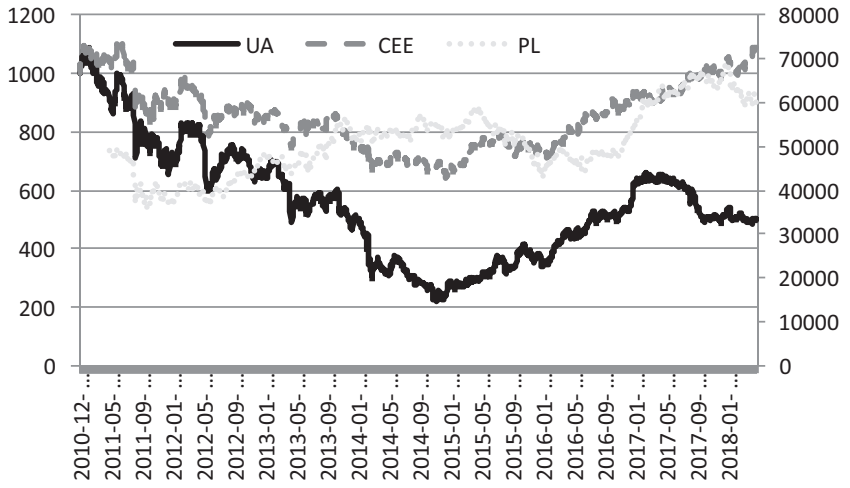

Figure 1. WIG-Ukraine, WIG-CEE, WIG-Poland indexes in 2010–2018 (points)
Source: WSE.

Table 2. Pearson correlation

Specification	WIGUKR~E	WIGPOL~D	WIGCEE
WIGUKR~E	1.0000	–	–
WIGPOL~D	0.1628	1.0000	–
WIGCEE	0.7825	–0.3987	1.0000

Source: WSE.

For econometric analysis of indexes the Autoregressive Integrated Moving Average (ARIMA) model based on the premise that past values have an effect on current values and therefore predicts future behaviour based on past behaviour is chosen. ARIMA models are commonly used to predict the future values of the variable which makes them popular for analysing nature, economics, and other time-varying processes but this statistical technique is the most prominent method in financial forecasting (Rangan and Titida, 2006; Merh, Saxena, and Pardasani, 2010).

ARIMA models are efficient in generating forecasts and constantly outperformed complex structural models in short-term prediction (Meyler, Kenny and Quinn, 1998). The results obtained with ARIMA model demonstrated their potential to predict stock prices satisfactory on short-term basis which could guide investors in stock market (Adebiyi, Adewumi and Ayo, 2014).

The specification of the model in this study is referred to as ARIMA (1, 1, 1) meaning autoregressive and moving average process is the first order processes and the differencing of observations to make the time series stationary is performed one time. The value of log likelihood component of ARIMA model (ignoring negative sign) is 6,587 which is sufficiently high. The coefficient of AR is less than 1 and is significant at 5% while the MA coefficient is significant as well as and lesser than 1, which suggests that differenced time series is stationary. The results of ARIMA model application to index of WIG-Ukraine are presented in the Table 3. The application of ARIMA model to the WIG-CEE and WIG-Poland indexes does not produce the easily interpreted results.

The results obtained with ARIMA revealed that the investors in stocks of Ukrainian agricultural companies base their expectations on recent performance of stocks. Because of lack of father and more broad view the investors overreact to any negative news from the country or from the emitent which explains the higher level of volatility (Renhao et al., 2015). The results of variance test indicate that the volatility of WIG-Ukraine index is higher compared both to the WIG-Poland and WIG-CEE. At the same time the variability of WIG-Poland was lower than WIG-CEE.

The specification of obtained ARIMA model on WIG-Ukraine suggests that small-scale investors while taking decisions may not possess all the necessary information. They are considering only the information on the stock conduct in close vicinity of the moment because the Ukrainian agro holdings do not communicate with investors properly and timely.

CONCLUSIONS

Ukrainian agribusiness needs long-term investments and the primary placement on international exchanges is one of the ways of attracting capital. The popularity of the Warsaw Stock Exchange among Ukrainian agricultural producers is primarily due to its close proximity and the comparatively low cost of conducting an IPO. The securities of 9 companies of the

Table 3. WIG-Ukraine ARIMA model results (Stata v. 12)

D. OPG	Coefficient	SE	*z*	*P* > *z*
ar: L1.	0.4993971	0.082282	6.07	0.000
ma: L1.	–0.3583992	0.089436	–4.01	0.000
cons	–0.2692482	0.268024	–1	0.315
Log likelihood	–6587.021	×		
Wald $\chi^2(2)$	215.25	×		
Prob. > χ^2	0.000	×		

Source: author's calculations.

agro-industrial complex of Ukraine are circulating on the Warsaw Stock Exchange and after experiencing the steep decline in 2011–2014 presently demonstrate the positive dynamics. The index of shares of Ukrainian agro-holdings listed on WSE WIG-Ukraine is more volatile if compared to the other indexes. The specification of ARIMA model shows that the trend in stock prices of WIG-Ukraine is self-sustaining due to limited information for taking decisions by the investors.

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LEVEL OF INVESTMENT EXPENDITURE VERSUS CHANGES IN TECHNICAL LABOUR EQUIPMENT AND LABOUR EFFICIENCY IN AGRICULTURE IN POLAND

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ABSTRACT

The aim of the paper is to analyse changes in the efficiency of the use of the labour factor and changes in the relation of production factors regarding the investment outlay level in individual voivodeships, in Poland, in 2002–2015. The research used the public statistics panel data from 2002–2015 (Local Data Bank). An increase in technical labour equipment, the level of investment outlays per one employed person in agriculture and an improvement in the efficiency of using the labour factor was found. At the same time, considerable regional diversification of investment activities, work equipment in fixed assets and labour productivity is still observed in Poland. The improvement of labour efficiency in agriculture is positively influenced by an increase in work technical equipment and the level of completed investments per one employee.

Keywords: investment, agriculture, labour efficiency, relation of production factors
JEL codes: E32, E22

INTRODUCTION

There are various definitions of investment in subject literature. Starting from the theory of economics, Hirshleifer (1965) presented the most general and most frequently used definition of investment, which perceived investment as a renunciation of current consumption in order to achieve future uncertain benefits. This definition shows that investment requires expenditure and assumes obtaining certain benefits that are deferred in time. The investment characteristics mentioned above result in the process being burdened with risk. However, to maintain a solid foundation for development, implementation is necessary.

In the case of agriculture, production investments are of decisive importance and constitute one of the most important elements of long-term growth of farms. They are carried out mainly with a view to improve the competitiveness of an economic entity, to increase efficiency and the level of profit as well as to extend the scale of operations or start a new business. In addition, investment in agriculture provides general social benefits. It depends on the nature of the investment, however, such goals as reducing the negative impact of agriculture on the natural environment, animal welfare, the need to eliminate hunger in the world and making farming sustainable requires an increase in investment in agriculture (Žídková, Rezbová and Rosochatecká, 2011; Kusz, Gędek and Kata, 2015).

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The aim of the paper is to analyse changes in the efficiency of the use of the labour factor and changes in the realities of production factors when it comes to the level of investment outlays in individual voivodeships, in Poland, in 2002–2015.

THEORETICAL BACKGROUND

The basic objective of tangible investments is to improve efficiency. Production investment, implemented by agricultural farms, contributes to an increase in equipment in property, plant and equipment, which in turn leads to a change in the ratio of production factors, and thus a change in the manufacturing technique. It is particularly important to change the relation of capital to work as it enables an increase in work technical equipment, and consequently should lead to an increase in work efficiency. This is the foundation for a sustained increase in agricultural income. For this reason, the level of investment made to improve the efficiency in agricultural is of decisive importance. It is also worth paying attention to the fact that an increase in agricultural producers' income is the basis for an increase in savings, which in turn determines the continued investment activity of farmers. To indicate the significance of primary income growth, this relationship can be reversed. The increase in investment induces an increase in the value of production capital, which in turn improves the relation of capital to work, thanks to which there is an increase in labour productivity. This is a condition for the growth of agricultural income, which in turn may turn into savings and subsequent investment. For this reason, the value of implemented investment in agriculture, especially their level per one employee in this sector of the economy is of key importance for growth and development in the long term.

Among the economic factors exerting an influence on farmers' investment activity, one should also pay attention to the level of prices of agricultural products, prices of means for production, prices of production factors and their mutual relations. The observed trends in price level changes in long periods are particularly important. Chavas (2011), while analysing changes in prices of agricultural products (in real terms) in the USA over the last 100 years, noticed a lasting downward trend. A similar trend was also demonstrated by Huffman and Evenson (2001) and Czyżewski and Kułyk (2007) and who were analysing changes in prices of agricultural products and prices of products purchased by farmers (in real terms) in the USA. In addition, it was also pointed out that the rate of decline in prices of products sold by farmers was higher than the prices of inputs. This meant a permanent opening up of price scissors and deterioration of the farmers' income situation. In turn, in the studies by Runowski and Ziętara (2011), attention was paid to the relationship of prices of production factors and prices of agricultural products. It can be seen that the highest growth dynamic is demonstrated by labour costs, and then by prices of goods purchased by farmers. On the other hand, the lowest upward trend is shown by the prices of agricultural products sold by farmers.

The current tendency causes a decrease in unit profitability of agricultural production. Farmers, in order to generate income at the parity level, need to increase the scale of production and strive to increase economic efficiency. In turn, the change in the price ratio of agricultural production factors necessitates a change in applied production techniques (Wicki, 2016). In the discussed conditions, the rapid increase in labour costs, as compared to other production factors, necessitates the implementation of labour-saving production techniques, resulting in an increase in the relation of capital to work. The effect of this is the substitution of more and more expensive labour inputs with relatively cheaper capital.

MATERIALS AND METHODS

The empirical material for the analysis was the CSO (Central Statistical Office in Poland) statistical data for the years 2002–2015 (Local Data Bank). In order to preserve the comparability of figures expressed in monetary terms, fixed prices from 2015 were used, to this end the consumer price index (CPI) was applied. The following ratios were used in the analysis: the level of investment outlays was assessed on the basis of the ratio of the value of investment per one employed in agriculture, the index of technical labour equipment (gross value of fixed assets per one employed in agriculture) and the factor of labour ef-

ficiency calculated as gross value added per one employee in agriculture. The average annual dynamics of changes in the aforementioned ratios was determined on the basis of the following formula ln(*Yn*/*Y*0) / *n*, where 0 relate to 2002, and *n* = 13 for 2015. ln(*Yn*/*Y*0) / *n*, where 0 refers to year 2002, and *n* = 13 for 2015 (Wicki, 2012).

RESULTS AND DISCUSSION

In this research, particular attention was paid to the level of technical labour equipment. This ratio informs us about the value of fixed assets per unit of work. Usually, a low value of this ratio adversely affects work efficiency (Gołaś and Kozera, 2008). The value of technical labour equipment in the analysed period, on average, in Poland, amounted to PLN 68.143 thousand (Table 1). At the same time, considerable regional diversity was found. The highest level of this ratio was characteristic of the West Pomeranian Voivodeship, and the lowest – the Lublin Voivodeship. Differences between these voivodeships was over 4.5-fold. The technical labour equipment, in the analysed period, in Poland, increased by 43.3%, while the average annual growth was at a level of 2.36%. The largest increase in technical labour equipment was recorded in the Małopolska Voivodeship (a real increase of 93.6%, average annual growth of 4.9%)

Table 1. Technical labour equipment and the level of investment outlays per one employed in agriculture, in Poland, in the years 2002–2015

Specification	Technical labour equipment			Investment outlays per one employed		
	average annual value (PLN thous.)	relative growth (year 2002 = = 100%)	average annual growth (%)	average annual value (PLN thous.)	relative growth (year 2002 = = 100%)	average annual growth (%)
Poland	68.14	143.3	2.36	14.05	161.5	3.69
Lower Silesia	119.36	154.9	3.86	17.14	145.6	2.89
Kujawy-Pomerania	76.33	128.4	1.31	12.23	207.9	5.63
Lublin	43.74	146.6	2.33	8.21	204.4	5.50
Lubusz	99.16	167.4	4.39	12.67	154.4	3.34
Łódź	60.05	136.6	2.36	11.66	194.0	5.10
Małopolska	36.56	193.6	4.90	12.71	188.8	4.89
Masovian	65.17	124.9	0.46	19.69	113.2	0.96
Opole	106.72	166.8	2.48	12.22	268.6	7.60
Podkarpacie	40.10	172.3	4.07	11.52	192.7	5.04
Podlasie	71.73	151.5	2.51	10.99	220.7	6.09
Pomeranian	99.70	95.3	–0.50	16.40	148.6	3.05
Silesian	111.87	127.6	1.11	14.55	148.6	3.05
Świętokrzyskie	38.83	106.2	0.04	9.27	129.0	1.96
Warmian-Masurian	119.15	104.1	0.58	11.68	179.2	4.49
Wielkopolska	96.42	172.2	3.60	14.75	179.7	4.51
West Pomeranian	165.21	103.0	2.03	15.13	213.0	5.82

Source: own calculations based on CSO Local Data Bank data.

and in the Podkarpackie Voivodeship (a real increase of 72.3%, average annual growth of 4.07%). These were voivodeships, which were characterized by the lowest values of this ratio for the analysed period. At the same time, the Świętokrzyskie Voivodeship similarly had a low level of technical labour equipment, but real growth was low (only 6.2%), as well as the average annual growth of 0.04%). This may indicate the ongoing process of convergence of regional agriculture in terms of technical equipment, but this does not apply to all voivodeships. At the same time, large changes in the value of technical labour equipment were recorded in the Wielkopolska, Lubusz and Opole Voivodeships, which in 2002–2015 were characterized by a higher than average level of this ratio in Poland. A decrease in the value of fixed assets per one employee was noted only in the Pomeranian Voivodeship (a downward decline of 0.5%), but also a small change was recorded for the West Pomeranian Voivodeship (a real increase of 3%), i.e. in voivodeships with a high level of technical equipment.

The increase in technical labour equipment is a consequence of the level of investment outlays per one employee. The annual average value of this ratio, in agriculture, in Poland, was PLN 14.05 thousand and in 2015 the level of investment per capita in agriculture was higher by 61.5% than in 2002 (Table 1). The Masovian, Lower Silesia, Pomeranian, West Pomeranian, Wielkopolska and Silesian Voivodeships were characterized by the highest investment activity. And the lowest investment activity was in the Lublin and Świętokrzyskie Voivodeships. The difference in the value of investment outlays per one employed among the voivodeships with the highest value of this ratio was the Masovian Voivodeship, and the voivodeship with lower investment activity – found in the Lublin Voivodeship was 2.4-fold. It is worth noting, however, that agriculture in the Lublin Voivodeship was characterized by a high average annual growth rate (5.5%), while in the Masovian Voivodeship it was only 0.96%.

The improvement of technical labour equipment should lead to an increase in work productivity, as a relation between production results per unit of work resource. As a measure of production results, gross value added was adopted, which as an income category is available in public statistics. Gross value added is one of the most objectified categories of business effectiveness assessment used in the assessment of work efficiency. Its specificity results from the fact that it measures productivity in terms of value-added by human capital in comparison to material costs coming from outside (Góral and Rembisz, 2017).

In agriculture, in Poland, labour productivity in 2015 was higher than in 2002 by 44.1% (Table 2). The average annual dynamics of changes in labour productivity, in agriculture, in Poland was at a level of 2.81%. In all analysed voivodeships, there was an increase in work efficiency, with the exception of the Lower Silesia Voivodeship, where work efficiency in 2015 was lower than in 2002 by 8.4%. The largest increase in this ratio in 2015, comparing to 2002, was recorded in the Podlasie, Masovian, Pomeranian and Lubusz voivodeships. The average annual value of the labour efficiency index, in Poland, in the years 2002–2015, was at a level of PLN 16.99 thousand. However, some significant regional differences were found. The lowest level of productivity at work was in Podkarpackie, Małopolska, Świętokrzyskie and Lublin Voivodeships, and the highest in West Pomeranian, Lubusz and Warmian-Masurian Voivodeships. Deep regional differences in labour productivity in agriculture may continue in Poland due to the large variation in dynamics of change. Faster productivity growth is particularly desirable in fragmented agricultural regions.

Statistical analysis of the interdependencies between the examined features of agriculture in particular regions indicates a positive correlation between the analysed variables (Table 3). This proves positive feedback between investment activity in agriculture expressed by the value of investment outlays per one employed, and the efficiency of using the labour factor and technical labour equipment. An increase in the level of investment outlays in agriculture in Poland enables change in the production technique and substitution of labour with capital, which consequently leads to an improvement in the efficiency of the use of the labour factor and an increase in its profitability. In the next step, it allows for the creation of savings, which can then turn into investment creating a stable basis for further development.

Table 2. Work efficiency in agriculture in Poland in the years 2002–2015

Specification	Gross value added per one employee in agriculture		
	average annual value (PLN thous.)	relative growth (year 2002 = 100%)	average annual growth (%)
Poland	16.99	144.1	2.81
Lower Silesia	20.41	91.6	–0.67
Kujawy-Pomerania	23.08	120.7	1.45
Lublin	9.83	169.8	4.07
Lubusz	31.39	130.8	2.07
Łódź	16.66	141.4	2.66
Małopolska	6.93	130.0	2.02
Masovian	23.80	183.0	4.65
Opole	21.29	110.5	0.77
Podkarpacie	4.63	133.2	2.21
Podlasie	17.42	194.2	5.11
Pomeranian	24.49	170.8	4.12
Silesian	14.66	126.5	1.81
Świętokrzyskie	9.76	138.2	2.49
Warmian-Masurian	31.12	139.8	2.58
Wielkopolska	26.50	126.5	1.81
West Pomeranian	34.94	127.6	1.88

Source: own calculations based on CSO Local Data Bank.

Table 3. Correlation matrix of technical labour equipment, investment outlays per one employed and gross value added per one employee in agriculture

Variables	Technical labour equipment	Investment outlays per one employed	Gross value added per one employee in agriculture
Technical labour equipment	1	–	–
Investment outlays per one employed	0.824*	1	–
Gross value added per one employee in agriculture	0.742*	0.870*	1

* significant for $P < 0.05$.

Source: own calculations based on CSO Local Data Bank.

CONCLUSIONS

Investing is a key element that exerts a fundamental influence on the social and economic development of a country. Implemented investment determines the strength or weakness of a given economy, and at a micro-scale, determines the competitive position of an enterprise. In this research it was found that:

1. Technical labour equipment in 2002–2015 increased, while in Poland there is still a significant regional variation in the level of this ratio, which may affect differences in the level of economic efficiency in agriculture.
2. The level of investment outlays per one employee in agriculture is regionally differentiated, while the value of this ratio in the analysed period also increased, which is, on the one hand, related to the investment needs of agriculture in Poland, but on the other forced by the need to substitute labour with capital. In addition, Poland's accession to the structures of the European Union and the availability of financial resources for the modernization of agriculture have had a positive impact on the activation of investment activities in agriculture.
3. The effect of changes in technical labour equipment and the level of investment outlays per one employee in agriculture is growing labour productivity in agriculture, whereby this productivity is also significantly diversified regionally. The issue of faster growth of labour productivity in agriculture in Poland should be prioritized within the framework of economic policy as the weakness of agriculture in this area hinders regional income convergence.
4. A statistical analysis of the correlations has shown that to improve the efficiency of using work in agriculture (gross value added per one employee in agriculture), it is important to improve the technical equipment of labour (R – Spearman correlation coefficients – 0.742) and increase investment activity expressed by investment outlays per one employed (R – Spearman correlation coefficients – 0.870).

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MODELLING OF INVESTMENT SUPPORT OF USE OF RESOURCE POTENTIAL OF AGRICULTURAL ENTERPRISES

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ABSTRACT

In the study the features and dynamics of investment support of Ukrainian agricultural enterprises are investigated. It concerns estimated investment in fixed assets of Ukrainian agrarian enterprises by sources of financing. It is proved that investment support is the most important prerequisite for the effective functioning and development of agricultural enterprises, as it contributes to an increase in resource potential, thus increasing industry efficiency, strengthening the country's food security, creating preconditions for the development of the social sphere and increasing soil fertility. The main problems of enticing investments in the agrarian sphere are considered. Integral indicators of ensuring and efficiency of the use of resources in agricultural production is calculated. Modelling of investment support for the use of resource potential of agricultural enterprises is carried out. The optimal directions of increase of investment support of use of resource potential of Ukrainian agricultural enterprises are offered.

Keywords: modelling, investment support, capital investment, resource potential, agricultural enterprise
JEL codes: Q14, Q16, O31

INTRODUCTION

Today, one of the main tasks of the Ukrainian economy should be to ensure sustainable economic growth. This is not only a quantitative increase in gross agricultural production, but above all an increase in the quantity of high-quality food products per capita. Implementation of the necessary economic and organizational measures to increase the level of resource potential of agricultural production is impossible without the use of economic and mathematical modelling.

The purpose of the article is to investigate the investment support of the use of resource potential of agrarian formations on the basis of mathematical modelling.

THEORETICAL BACKGROUND

The issue of attracting investments in the agrarian sector of the economy and investment support for the economic development of agricultural enterprises is investigated in the works of famous economists, in particular V. Andriychuk, M. Demyanenko, S. Kvasha, M. Kisil, Yu. Lupenko, V. Mesel-Veselyak, and others. However, some issues of investment support for the economic development of agricultural enter-

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prises remain insufficiently studied and require further research.

MATERIALS AND METHODS

The methodological basis of this scientific research is the scientific position and mathematical mechanism of system analysis, economic-mathematical modelling and multidimensional statistical analysis. An index method was used in the article to determine the comprehensive impact of a set of factors on the efficiency of the use of resources in domestic agricultural enterprises. In order to determine the rating assessment of the efficiency of farming of domestic agrarian formations, integral indicators were found across Ukrainian regions.

In the first stage, the primary indexes of the ratio of indicators of the regions to the Ukrainian average are calculated according to the following formula (1):

$$I_{ij} = \frac{x_{ij}}{\overline{x_i}} \quad (1)$$

where:

I_{ij} – the primary index of the integral index j-th region, determined on the i-th sign;

x_{ij} – the absolute value of the i-th indicator of j-th region;

$\overline{x_i}$ – the average value of the i-th indicator in the Ukraine.

In the next stage, the integral indicator of the estimation of the efficiency of management of agrarian formations was calculated with the formula (2):

$$IP_j = \sqrt[n]{\prod_{i=1}^{n} \left(\frac{x_{ij}}{\overline{x_i}} \right)} \quad (2)$$

where:

IP_j – the integral index of the estimation of the efficiency of agrarian formation management in the j-th region of the Ukraine.

The calculation of integrated indices for the estimation of the efficiency of production and economic activity of domestic agricultural enterprises makes it possible to compare investigated regions providing resources and efficiency of resource use.

RESULTS AND DISCUSSION

Increasing the level of innovation and investment provisions of the resource potential of agricultural enterprises in the Ukraine contributes to an increase in the volumes of agrarian production and improves its quality, thus gaining competitive advantages, increasing the efficiency of the industry, and increasing food security of the country (Hudzynskyi, 2013). Formation of opportunities for investment activity of enterprises takes place at the expense of different resources, but the main source of financing of investments in fixed assets in agricultural enterprises is own funds, received as a result of economic activity and at the expense of depreciation deductions. It is their own investment resources through profitable business activities which constitute a stable source and is a prerequisite for the investment process (Lupenko et al., 2014).

Domestic agricultural enterprises have potential for increasing agricultural production and increasing foreign economic potential, which requires constant attraction of investments (Table 1). For most domestic agricultural enterprises, the source of investment is own funds (depreciation, profit).

At the same time, in 2016, agriculture was in fact the only type of economic activity, whereby, compared with 2013, investments increased by almost 34%. In fact, agriculture in the Ukraine is now an industry in which investments are currently developing at the fastest rate. Sufficient investment support for agriculture in the Ukraine will increase the level of resource potential of agricultural enterprises. Accordingly, the modelling of investment support for the use of the resource potential of agricultural enterprises was carried out.

The development of innovation and investment processes in the agroindustrial complex is faced with the following problems: low level of agricultural machinery; insufficient modern level of agrotechnologies, which does not provide ecologically safe and economically effective results of agricultural activity; significant level of cultivation and degradation of agricultural land; lack of state support for breeding systems in livestock; insufficiency of scientific support of activity of certain branches of the agrarian and

Table 1. The dynamics of investment in fixed assets of agricultural enterprises in Ukraine

Specification	2010	2011	2012	2013	2014	2015	2016	2016 to 2010 (%)
Total (UAH billions)	189.1	259.9	293.7	267.7	219.4	273.1	359.2	190
Agriculture (UAH billions)	11.6	17.0	19.4	19.1	18.8	30.2	49.7	in 4 times
Specific gravity of agriculture (%)	6.0	6.5	6.5	7.0	8.4	10.7	13.9	×

Source: State Statistics Service of the Ukraine (2017).

industrial complex as well as a lack of specialized financial and credit infrastructure focused on servicing agricultural production (Ilychuk and Shpomer, 2017).

One of the main objects of economic-mathematical modelling is to increase the efficiency of the formation and use of the resource potential of agricultural enterprises in the Ukraine. Nowadays, a particularly important issue is the strengthening of the level of resource potential of agrarian units. In market conditions of the transformation of agricultural production, the use of the correlation-regression analysis revealed the extent of the influence of certain factors on the resource potential of agricultural enterprises. In addition, the index method and cluster analysis were used in the study to determine the comprehensive impact of a combination of factors on resource provision, resource efficiency and agricultural production efficiency of domestic agrarian formations (Kharchenko and Kharchenko, 2015a, b).

Thus, for the purpose of determining the rating assessment of the efficiency of the management of domestic agrarian formations, integral indicators were found across the regions of the Ukraine. The distribution of integral indicators in three groups is presented in Table 2.

Table 2. Integral indicators of ensuring, efficiency of resource use and efficiency of agricultural production

Group name	Indicators
I group Indicators of resource provision	1. The area of agricultural land (thous. ha) 2. Normative monetary valuation of 1 ha as of 1 January 2016 3. Land provision of 1 employee (ha agricultural land) 4. Conditional heads of hectares of 100 ha agricultural land (UAH) 5. Capital investment per 1 ha (UAH) 6. Tractors per 1,000 ha of arable land (pcs.) 7. Power capacity per 1 ha agricultural land (thous. kWh)
II group Indicators of resource efficiency	1. Production of gross output per 1 ha of agricultural land (UAH) 2. Gross output per 1 employed in agricultural production (UAH) 3. Production of gross output at 1 cost (UAH) 4. Production of gross livestock production per 1 conditional head (UAH) 5. Grain production per 1 harvester (centners)
III group Indicators of agricultural production efficiency	1. Profit million (UAH) 2. Profit per 1 ha of agricultural land (UAH) 3. Profit per 1 employee (thous. UAH) 4. Profitability (%) 5. Payment of labour 1 employee (UAH)

Source: authors' calculations.

The next step is calculating the integral index of the estimation of the efficiency of agrarian formation management. Analysis of regional differences based on the calculation of integral indicators allowed regionalizing regions and determining the ranking of regions by selected indicator blocks.

Thus, it was established that according to the rating of regions of the Ukraine, by providing an integrated index, the following regions are provided: Vinnytskiy – 1.417; Kyevskiy – 1.299; Cherkaskiy – 1.175 and Ivano-Frankivskiy – 1.173 have a high level of provision. Regions such as Lvivskiy – 1.135; Dnipropetrovskiy – 1.101; Poltavskiy – 1.081; Volynskiy region – 1.052; Khmelnytskiy – 1.032; Kharkivskiy – 1.010; Khersonskiy – 1.005; Rivnenskiy – 0.915 and Ternopil – 0.913 with the use of the integral index, has an average level of provision of resources. The remaining regions have a low level of resource provisions (Fig. 1).

The next step was to study the ranking of Ukrainian regions with the use of the integral indicator of resource use (Fig. 2). The results of the calculations showed that Lvivskiy – 1.270; Ivano-Frankivskiy – 1.224; Khmelnytskiy – 1.205; Ternopilskiy – 1.171; Cherkaskiy – 1.141; Sumskiy – 1.120; Vinnitskiy – 1.197; Kharkivskiy – 1.112 and Rivnenskiy – 1.089 regions have a high integrated resource use index.

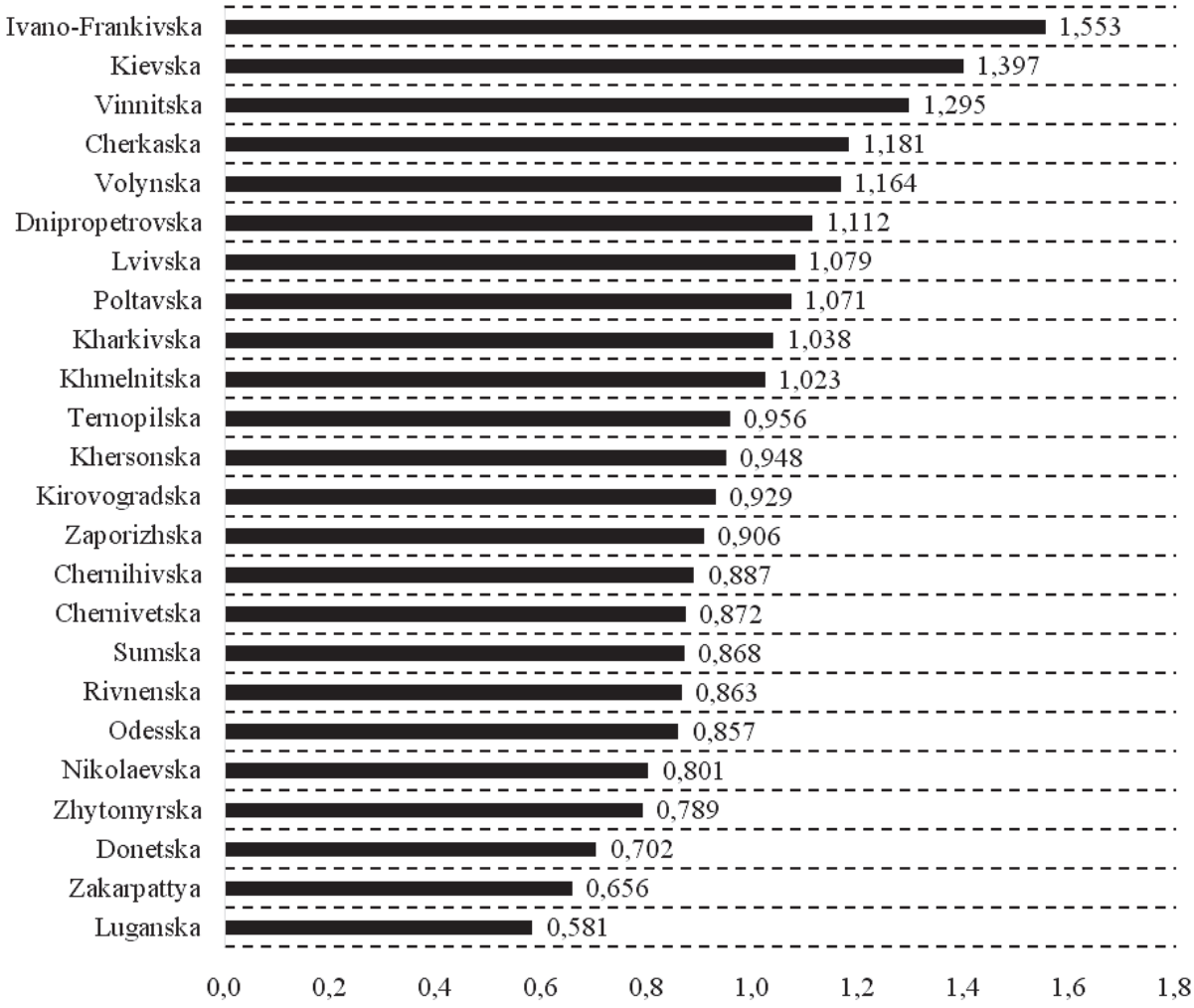

Figure 1. Rating of the Ukraine's regions by integrated provision resource index

Source: authors' calculations.

As for the integrated index of indicators of agricultural production efficiency, the Ivano-Frankivskiy region has the highest rating of 2.169. This is justified primarily by the small area of sowing and livestock specialization in the region. Also, the following regions have high ratings: Khmelnytskiy – 1.762 and Lvivskiy – 1.750.

The results of calculating integral indices in regions of the Ukraine in graphical form are shown in Figure 2.

The regions with the lowest level of resource availability, the efficiency of using these resources and the efficiency of agricultural production are located closest to the centre of the diagram.

Such regions as Donetskiy, Zhytomyrskiy, Chernivtskiy and Chernihivskiy have low available potential and low indicators of economic efficiency. Unlike the above regions, Vinnytskiy, Ivano-Frankivskiy, Kyivskiy and Cherkaskiy regions have a high level of available potential with an average level of agricultural production efficiency. In turn, regions such as Vinnytskiy, Ivano-Frankivskiy, Lvivskiy, Rivnenskiy, Sumskiy, Ternopilskiy, Kharkivskiy, Khmelnytskiy and Cherkaskiy have a high level of resource use.

It should be noted that the rational use of resources depends on a number of factors such as: a rational ratio of elements in the structure of resource potential, the management system and the introduction of resource-saving technologies.

Regarding the effective formation of the resource potential of domestic agrarian units, it is expedient simultaneously with the increase of cost indicators to improve its qualitative composition.

Also, in order to ensure an effective process for the formation and use of resource potential in its organization, it is necessary to take into account all the factors influencing it and determine the effectiveness of this potential.

Research has shown that nowadays one of the main factors of effective activity of agricultural enterprises, which allows to achieve extended reproduction, is innovation and investment support.

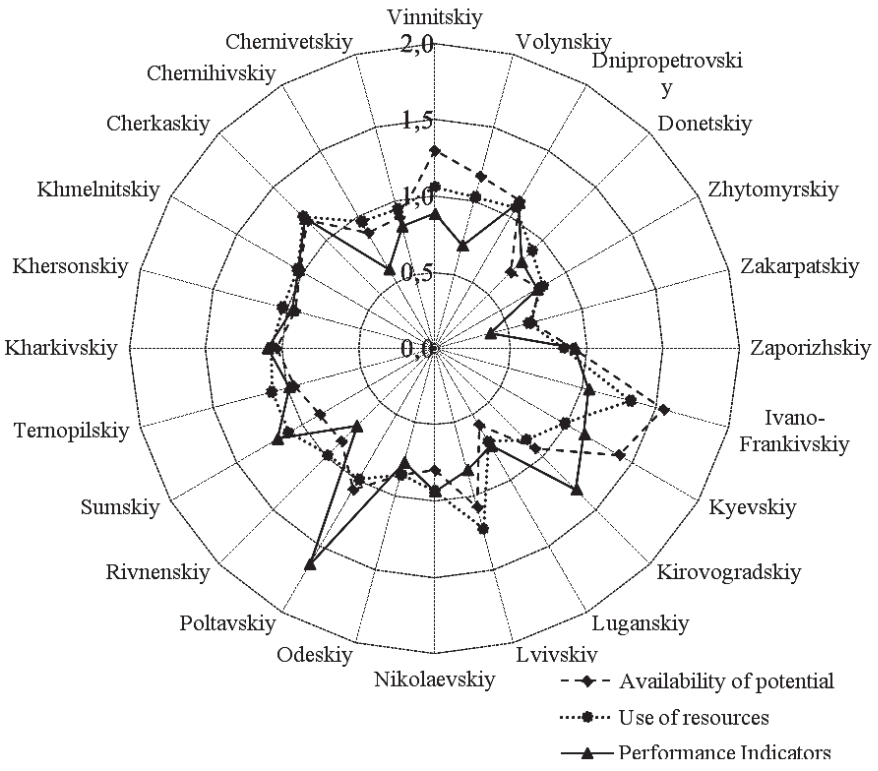

Figure 2. Results of calculation of integral indexes

Source: authors' calculations.

It was established that the innovative and investment support of efficient activity of agricultural enterprises is aimed at satisfying the food needs of the population by improving the land as a natural resource, creating new varieties of plants and breeds of animals, updating the material and technical base as well as ensuring the production of highly skilled personnel, etc.

Consequently, sufficient innovation and investment support for agricultural production will ensure a high level of competitiveness of agrarian units. Also, an effective innovation system, both on a micro-and macro-level, depends on the optimal information infrastructure and the links between the participants in the innovation process (Ermakov and Kharchenko, 2014).

Therefore, in order to successfully solve these goals, it is necessary to introduce an effective system of innovation and investment which provides the resource potential of agrarian formations that rationally combines material, organizational and intellectual aspects, the creation of favourable conditions for the efficient development of crop and livestock sectors with the attraction of public funds, credit mechanisms and investment capital etc.

CONCLUSIONS

It is believed that the main strategic directions of innovation and investment provision of agricultural potential of agricultural enterprises are: the implementation of scientific support of the agricultural sector, the development and implementation of an effective system of agro-technical measures, the creation of high-yield hybrids of plant varieties, the introduction of new approaches to soil cultivation, the revival and stabilization of the livestock population and the selection and training of highly skilled personnel.

Consequently, the realization of strategic tasks in the field of innovation and investment provision of agricultural enterprises' resource potential is a prerequisite for ensuring their effective long-term competitive advantages, increasing the scientific and technical level of production, and the efficiency of the use of resources, which will, in the long-run will promote the sustainable development of agricultural production.

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LEVEL AND EVOLUTION OF FARM TAXATION IN THE EUROPEAN UNION IN 2007–2015

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ABSTRACT

The purpose of this paper is to assess the level of and changes in taxes imposed on farms in European Union countries. The empirical study was based on FADN data. Because of the complex nature of aspects under consideration, the TOPSIS method was used to develop a synthetic indicator of farm taxation. The study was carried out in 2007–2009 and 2013–2015. For these periods, average values of simple characteristics were calculated which reflect the levels of farm taxation and are the basis for the synthetic indicator. Afterwards, the synthetic indicator was used to linearly arrange the countries by farm taxation levels in the EU in the periods considered.

Keywords: taxes, farms, European Union, FADN, TOPSIS
JEL codes: H21, Q14, Q18

INTRODUCTION

Agriculture is an important part of the economy of most European Union countries, and is subject to taxation just like any other sector. Contrary to common belief, numerous taxes are imposed on farming activities, including: agricultural tax, property tax, forestry tax, vehicle tax and VAT (Golasa, 2015). Agricultural taxation is of major importance for the competitiveness of economic operators active in the agriculture sector. The agricultural taxation policies in place differ from one EU country to another. The solutions adopted for the agricultural taxation model may support the farming activities, be neutral or hamper the development of specific economic sectors (Wasilewski and Ganc, 2012; Kulawik et al., 2013).

The main purpose of this paper is to assess the level of and changes in farm taxation in the European Union. The level of EU farm taxation was analysed based on 2007–2009 and 2013–2015[4] FADN[5] data.

THEORETICAL BACKGROUND

The national farming taxation policy includes defining tax rates and tax bases, and granting tax preferences and relieves (for a broader description, see Kulawik

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[4] The empirical study was based on average figures from 2007–2009 and 2013–2015.
[5] Farm Accountancy Data Network webpage http://ec.europa.eu/agriculture/rica/database/database_en.cfm [Accessed 11.12.2017].

et al., 2013; Kisiel and Idzkowska, 2014). Kulawik et al. (2013) identify two main agricultural tax regimes. Under the first one, farming activities are covered by the general taxation system. The second one provides separate regulations which may be either special preferential systems or limited preferences. Usually, tax preferences are used to make bookkeeping less burdensome, encourage saving and investment or promote insurance against catastrophic risks (Dziemianowicz and Budlewska, 2014). The national farming taxation system is extremely important as it affects the competitiveness of farms[6] and other operators active in the agriculture sector (Wasilewski and Ganc, 2012). Also, it impacts the scale, structure, organization and lines of agricultural production while also having an effect on the use of productive inputs (Dziemianowicz, 2006; Forfa, 2011, after Hanusz, 1996).

The competitiveness of farms in member countries is also affected by the Common Agricultural Policy (CAP), and especially by the system of support through direct payments and subsidies. The importance of CAP for agricultural development, and especially for the profitability of farming, is particularly noticeable in countries who joined the Union in recent years. Financial support largely contributed to the growth of farmers' income (for a broader description, see Poczta, 2010) which, in turn, affects the amount of taxes paid. Therefore, a research on the level of, and changes in, farming taxation in EU member countries seems important.

MATERIALS AND METHODS

Because farm taxation is a complex aspect which may be described with a series of simple characteristics (sub-indicators), it was synthetically assessed with the classic TOPSIS approach, a pattern-based method for the creation of a synthetic indicator. The classic TOPSIS approach is based on a concept introduced by Hwang and Yoon (1981). Unlike the Hellwig's (1968) method, it consists in calculating the (Euclidean or other) distance of objects considered not only from the pattern but also from the anti-pattern of development. The synthetic indicator of farm taxation in EU countries was created in five steps, as shown in Table 1.

The first step of this research consisted in selecting the simple characteristics. Based on substantive grounds, four simple characteristics were selected as the basis for the synthetic indicator of farm taxation: taxes[7] per 1 ha of agricultural land utilized by the farm (EUR/ha) (x_1); ratio of taxes to total labour inputs (EUR/AWU[8]) (x_2); ratio of taxes to total assets (EUR/EUR 1,000 worth of total assets) (x_3); and share of taxes in the family farming income (%) (x_4)[9]. The set of simple characteristics established based on substantive grounds was subject to further statistical verification to determine their discriminatory capacity and information capacity. Because of the high variability of simple characteristics and their poor mutual correlation, all of them were used in further research.

The second step of the research procedure consisted in normalizing the values of simple characteristics with the use of the zero unitarization procedure (Table 1). The normalization procedure was performed for the aggregate of average figures from 2007–2009 and 2013–2015 (referred to as object-years) in order to ensure comparability of results in the years considered. Afterwards, in step 3, the values of model units (i.e. the development pattern and anti-pattern) were determined and used as a basis to calculate the Euclidean distances of each country considered from the development pattern and anti-pattern (step 4). Step 5 consisted in calculating the values of the synthetic characteristic based on the calculated distances of objects (countries) under consideration from the model

[6] By taking over part of the land rent. About theories of land rent see more Czyżewski (2009).

[7] The indicators listed above were based on FADN SE390, defined as 'Farm taxes and other dues (not including VAT and the personal taxes of the holder) and taxes and other charges on land and buildings. Subsidies on taxes are deducted' (IERiGŻ-PIB, 2016).

[8] The Annual Work Unit is equivalent to 2120 working hours per year (IERiGŻ-PIB, 2016).

[9] In research homogeneous feature weights were assumed.

Table 1. Steps of creating the synthetic indicator based on the classic TOPSIS approach

Procedure step		Step description	Calculation formulas
Step 1	Selecting the simple characteristics	Selection and statistical verification of simple characteristics for this study based on substantive grounds	–
Step 2	Normalizing the values of simple characteristics	Using the zero unitarization procedure	$z_{ik} = \frac{x_{ik} - \min\limits_i \{x_{ik}\}}{\max\limits_i \{x_{ik}\} - \min\limits_i \{x_{ik}\}}$ for variables with a stimulating effect $z_{ik} = \frac{\max\limits_i \{x_{ik}\} - x_{ik}}{\max\limits_i \{x_{ik}\} - \min\limits_i \{x_{ik}\}}$ for variables with an inhibiting effect
Step 3	Calculating the coordinates of model objects of the pattern and anti-pattern	The coordinates of the development pattern (A^+) and anti-pattern (A^-) are calculated as the maximum and minimum values, respectively, of the set of normalized values of simple characteristics	
Step 4	Calculating the distance of each object from the development pattern and anti-pattern	Calculating the Euclidean distance of each multi-characteristic object *i* from the development pattern and anti-pattern	$d_i^+ = \sqrt{\sum_{k=1}^{K}(z_{ik} - z_k^+)^2}$ $d_i^- = \sqrt{\sum_{k=1}^{K}(z_{ik} - z_k^-)^2}$
Step 5	Calculating the value of the synthetic indicator	Based on Euclidean distances from the development pattern and anti-pattern	$S_i = \frac{d_i^-}{d_i^- + d_i^+}$

Source: own elaboration based on Wysocki (2010).

objects. This, in turn, was the basis for ranking the EU countries by level of farm taxation.

RESULTS AND DISCUSSION

As shown in Table 2, the highest levels of taxation per hectare of agricultural land were recorded in the Netherlands and Italy, ranging from ca EUR 62/ha (in Italy in 2007–2009) to slightly over EUR 124/ha (in the Netherlands in 2013–2015). This was several dozen times higher than the minimum level recorded in Swedish farms. Only four countries covered by this study (i.e. the Czech Republic, Lithuania, Slovakia and Denmark) reported a decrease in taxation per hectare of agricultural land over the study period. It was the contrary in all other countries; the highest increase was recorded in Finland (a growth rate of nearly 260%).

Table 2. Farm taxation indicators for EU countries

Specification	Taxes per 1 ha of agricultural land (EUR/ha)			Taxes to total labour inputs (EUR/AWU)			Taxes per EUR 1,000 worth of total assets (EUR)			Share of taxes in family farming incomes (%)		
	2007–2009	2013–2015	change (%)	2007–2009	2013–2015	change (%)	2007–2009	2013–2015	change (%)	2007–2009	2013–2015	change (p.p.)
Belgium	41.7	47.0	112.6	927.4	1 160.2	125.1	3.3	3.3	99.6	3.9	4.2	0.3
Bulgaria	3.7	6.1	162.8	37.8	100.7	266.4	2.2	2.9	132.2	2.0	2.7	0.7
Czech Republic	13.2	8.9	67.2	417.6	318.1	76.2	4.0	2.5	62.4	11.7	3.8	–7.9
Denmark	50.3	48.1	95.8	2 645.2	2 694.0	101.8	1.9	1.9	98.9	–14.4	14.6	29.1
Germany	24.9	33.9	136.4	908.6	1 342.0	147.7	2.7	3.3	124.0	6.4	7.4	1.0
Greece	8.9	16.3	182.8	54.2	150.2	277.2	0.8	1.4	175.4	0.5	1.5	1.0
Spain	10.2	11.9	116.8	253.7	353.2	139.2	1.1	1.8	155.3	1.5	2.1	0.6
Estonia	2.1	3.5	166.3	105.3	235.9	224.1	1.3	1.6	124.9	1.5	4.6	3.1
France	23.8	25.6	107.3	1 005.3	1 080.5	107.5	5.2	5.1	97.5	6.3	6.5	0.2
Hungary	10.0	13.9	138.6	298.9	427.2	142.9	3.6	3.8	103.8	4.4	3.6	–0.8
Ireland	3.3	5.0	153.4	130.1	209.3	160.9	0.2	0.3	161.2	0.8	1.0	0.2
Italy	62.4	111.5	178.7	734.7	1 635.5	222.6	3.0	4.6	152.9	4.1	7.3	3.1
Lithuania	3.5	2.5	73.0	83.5	68.8	82.5	1.6	1.0	63.9	1.0	1.0	0.0
Luxembourg	15.2	15.9	104.1	706.6	728.9	103.2	1.2	1.1	91.3	3.0	2.4	–0.6
Latvia	4.4	8.3	190.0	131.4	271.4	206.5	2.8	3.8	136.3	2.6	5.0	2.4
Netherlands	94.0	124.2	132.1	1 269.4	1 652.1	130.1	1.8	1.9	103.6	10.0	7.3	–2.7
Austria	27.2	36.3	133.6	572.2	714.4	124.8	2.1	2.5	119.5	3.1	4.8	1.7
Poland	16.7	20.9	125.1	179.0	231.7	129.4	2.9	2.3	80.3	3.8	4.4	0.6
Portugal	4.8	8.1	170.0	74.5	132.9	178.3	1.3	2.0	153.2	1.1	1.4	0.3
Romania	17.6	18.3	104.4	86.5	147.9	171.0	4.4	4.7	106.4	3.8	3.5	–0.3
Finland	4.9	12.6	258.7	186.8	593.9	318.0	0.7	1.6	228.0	1.2	4.1	2.9
Sweden	1.3	1.7	134.4	80.6	116.2	144.0	0.2	0.2	93.4	0.6	1.1	0.5
Slovakia	15.5	12.5	80.7	517.8	517.9	100.0	9.1	6.2	68.1	–32.0	37.7	69.7
Slovenia	3.5	4.7	132.3	22.3	35.0	157.0	0.2	0.2	119.0	0.6	1.0	0.4
United Kingdom	5.0	6.0	119.2	361.6	448.0	123.9	0.6	0.5	82.4	1.7	2.3	0.6

* This study does not include Malta and Cyprus (due to marginal importance of local agriculture) and Croatia (due to lack of 2007–2009 statistical data).

Source: own study based on FADN data.

The changes were even more pronounced for the amount of taxes per FTE. In 2013–2015, only Czech and Lithuanian farms recorded a lower level of employment taxes compared to 2007–2009 (by ca 17 and 24%, respectively). It was the contrary in all other countries; the highest growth rates were experienced in Finland, Greece and Bulgaria (Table 2).

The ratio of taxes to EUR 1,000 worth of total assets did not change that much over the period considered. In both time intervals, the lowest levels were reported by Slovenian, Swedish and Irish farms whereas Slovakian farms reached the highest ratios. As regards the share of taxes in the family farming income, the least favourable indicators were reported by Slovakian and Danish farms (37.7 and 14.6%, respectively, in 2013–2015). In the study period, the greatest improvement in that area was observed in Czech farms (a decline by nearly 8 p.p.) – Table 2.

As shown by this study, in 2013–2015, the level of farm taxation in EU countries was higher than in 2007–2009 (Table 3). In 2007–2009, the synthetic indicator of EU farm taxation ranged from 0.011 (in Slovenia) to 0.517 (in Denmark). In the 2013–2015 period, the range of variation was broader, with the values spanning from 0.017 in Slovenia to 0.650 in Italy. The study also evidenced the persistently high differences in farm taxation levels between European countries. This is reflected by the coefficient of variation for the synthetic indicator which consistently exceeds 70% in both periods under consideration.

The country ranking (Table 3) suggests that Danish and Dutch farms continue to pay the highest taxes. However, this is no longer the case for Slovakia, ranked third and seventh in 2007–2009 and 2013–2015, respectively. Italian farms became the leaders as they moved up from the fifth rank to the first. A more stable situation was ob-

Table 3. EU countries ranked by level of farm taxation in 2007–2009 and 2013–2015

Specification	2007–2009		2013–2015		Difference in ranks
	synthetic indicator	rank	synthetic indicator	rank	
Denmark (DAN)	0.517	1	0.517	3	–2
Netherlands (NED)	0.475	2	0.570	2	0
Slovakia (SVK)	0.460	3	0.359	7	–4
France (FRA)	0.384	4	0.391	4	0
Italy (ITA)	0.368	5	0.650	1	4
Belgium (BEL)	0.341	6	0.384	5	1
Germany (DEU)	0.273	7	0.376	6	1
Romania (ROU)	0.261	8	0.278	8	0
Czech Republic (CZE)	0.257	9	0.166	15	–6
Hungary (HUN)	0.224	10	0.246	10	0
Austria (OST)	0.210	11	0.268	9	2
Poland (POL)	0.187	12	0.170	13	–1
Luxembourg (LUX)	0.172	13	0.175	12	1
Latvia (LVA)	0.162	14	0.227	11	3
Bulgaria (BGR)	0.125	15	0.168	14	1
Lithuania (LTU)	0.094	16	0.057	22	–6
Spain (ESP)	0.091	17	0.135	17	0
United Kingdom (UKI)	0.080	18	0.095	21	–3
Portugal (POR)	0.074	19	0.120	18	1
Estonia (EST)	0.074	20	0.103	20	0
Greece (ELL)	0.054	21	0.108	19	2
Finland (SUO)	0.053	22	0.162	16	6
Ireland (IRE)	0.025	23	0.044	23	0
Sweden (SVE)	0.013	24	0.020	24	0
Slovenia (SVN)	0.011	25	0.017	25	0
Median	0.172	×	0.170	×	×
Coefficient of variation (%)	76.7	×	74.0	×	×

Countries arranged linearly by the value of the synthetic indicator in 2007–2009.

Source: own study based on FADN data.

served in Slovenia, Sweden and Ireland: the countries with the lowest levels of farm taxation in both periods covered by this study. The most unfavourable changes in taxation levels could be observed in Finland (the difference in ranks was 6). In was the opposite for Czech and Lithuanian farms who dropped in the ranking from tenth to fifteenth and from sixteenth to twenty second, respectively.

Figures 1 and 2 show the levels of farm taxation in EU countries and, respectively, the farms' economic

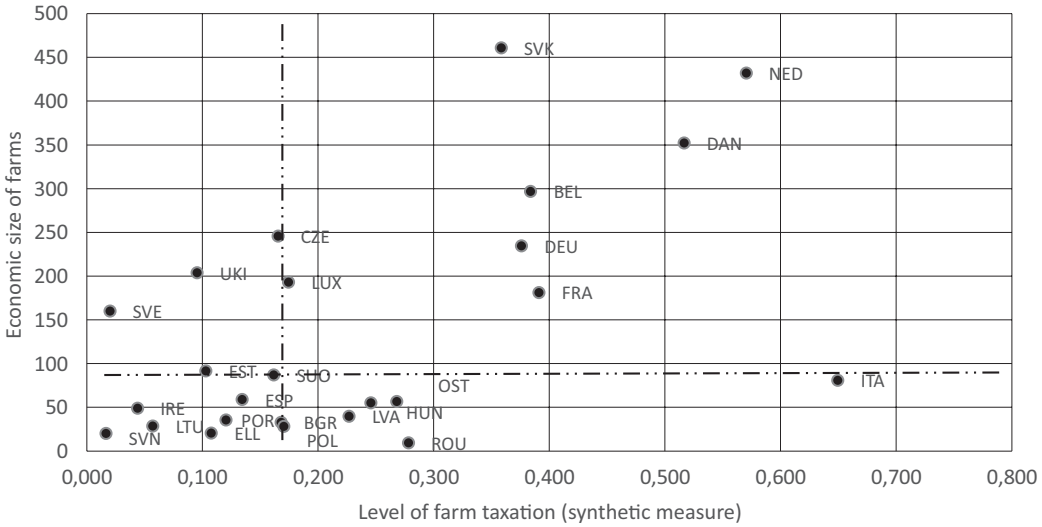

Figure 1. Correlation graph for the taxation level and economic size of farms in European Union countries (average values in 2013–2015; the Pearson linear correlation coefficient is 0.56; the vertical and horizontal lines represent the average values of characteristics under consideration)

Source: own study based on FADN data.

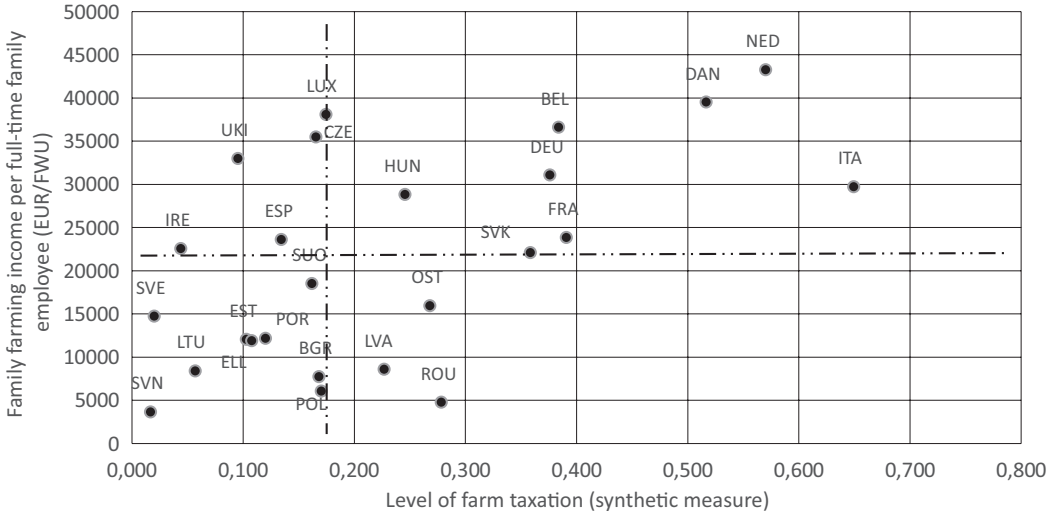

Figure 2. Correlation graph for the taxation level and family farming income per full-time family employee (EUR/FWU) in European Union countries (average values in 2013–2015; the Pearson linear correlation coefficient is 0.57; the vertical and horizontal lines represent the average values of characteristics under consideration)

Source: own study based on FADN data.

size and own labour profitability in 2013–2015. Based on Figure 1 data, it may be concluded that farms dealing with higher taxation levels were usually economically stronger. This is especially true for Dutch, Danish and Slovakian farms. However, that pattern was not followed by Italian farms who, tough small in economic terms, experienced the highest taxation levels in 2013–2015.

A certain relationship could also be traced between the level of farm taxation and the farms' own labour productivity (Fig. 2). With some exceptions, the farms demonstrating a high value of the synthetic indicator were also characterized by high levels of family farming income per full-time family employee (especially in the Netherlands and Denmark).

CONCLUSIONS

Based on this study, the level of farm taxation was confirmed to differ significantly across EU countries. In the study period, the highest levels of taxation were imposed on Danish, Dutch, Italian, French, Slovakian and Belgian farms. In turn, Slovenian, Swedish and Irish farms were ranked at the bottom. It may be concluded that farms charged with higher and lower amounts of taxes are generally those characterized by a high and low production intensity, respectively. High and low levels of farm taxation were usually found in countries with a relatively great or small importance, respectively, of the agriculture for the national economy. Note also that in 2007–2015, most EU countries experienced an increase in farm taxation levels. Countries where taxes play the least important role remained stable in the ranking. In turn, the group of top-ranked countries has considerably changed, with Italy moving four ranks up to become the leader. Conversely, Slovenia lost its high taxation status. The most favourable and the most unfavourable changes in taxation levels were observed in the Czech Republic and Lithuania, respectively (each of these countries moved six ranks up/down). Higher taxation levels were usually found to be accompanied by a higher productivity of non-salaried labour and by a greater economic strength of farms.

Acknowledgements

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RURAL AREAS OF POLAND AS THE BENEFICIARY OF EUROPEAN UNION FUNDING 2007–2013(15) FOR CULTURAL PROJECTS

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ABSTRACT

The paper presents the issues relating to the use of EU funds for cultural heritage projects in rural areas in Poland in the years 2007–2015. The study examines the structure of the funding of EU cultural heritage projects by the purpose of their implementation including revaluation of cultural heritage objects, creation and development of a new tourism product, renovation of sports and recreation infrastructure, promotion and other issues. The spatial analysis was carried out at the level of voivodships. The survey was conducted using the database of the National Information System of the Ministry of Infrastructure and Development of the Republic of Poland (NIS SIMIK 07-13) as at 31 December 2015. In the years 2007–2015, in both rural areas and rural districts, in the case of those projects which were aimed at developing infrastructure and restoring cultural heritage assets, while projects thematically related to the creation of a new tourism product and promotion were of lesser importance. However, the highest grants from EU sources were provided for projects thematically related to the reconstruction of cultural heritage and creation of tourism products, which shows that the activities aimed at preservation of cultural heritage and support for local entrepreneurship are of particular significance to European entities.

Keywords: rural areas of Poland, EU structural funds, cultural heritage
JEL codes: Z32, Z19, P48

INTRODUCTION

Social and economic development of rural areas in Poland is conditioned by a number of determinants which show the growing importance of culture (Hełpa-Liszkowska, 2013). Taking into account the definition of culture as a human lifetime achievement transmitted from generation to generation, it is worth noting that the way of conducting the rural economy is also a factor that shapes culture (Act of 15 February 1962). Thus, rural areas use and should use those resources which they produced in the earlier period. Cultural landscape, while preserving its harmonious character, comes to be an important factor of the location of business activity in rural areas (Cawley and Gillmor, 2008; Gralak, 2009; Murzyn-Kupisz, 2012; Ilczuk, 2014). Thus, cultural assets enable the preservation of identity, but at the same time, which is increasingly emphasized, they provide basis for economic development (MacDonald and Jolliffe, 2002). Cultural legacy therefore becomes an element of competitiveness of territorial self-government units; at the same time, however, it constitutes a major financial challenge for the present heads of communes and districts in connection with the maintenance of historic objects and traditions of the regions. That is

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why EU financial resources, which are used to finance projects aimed at the restoration of cultural heritage assets, are essential for local authorities.

The aim of the paper is to present the ways of spending EU funds allocated for the purposes related to cultural heritage assets located in rural areas and rural districts in Poland. The paper summarizes a series of works which discuss the issue of the use of EU funds for cultural purposes in rural areas against a background of other spatial categories: capitals of voivodships, health resorts and towns with county rights (Powęska, 2016; Gralak and Powęska, 2017). The focus of the paper is on rural communes and small towns, which are jointly considered as rural areas, as well as rural districts, which are treated as the units functionally linked to traditions and rural areas (Courtney and Errington, 2000; Kałuża, 2011; Heffner, 2016; Biczkowski, 2016; Pondel, 2017). A detailed content-related analysis conducted in this article takes into consideration the total value and the amount of EU funding with reference to rural areas and rural districts compared to other spatial categories across voivodships.

The study covered the period 2007–2015[2]. In order to achieve our main goal, the following research tasks were identified: (1) to define the share of rural areas and rural districts in the total value and in the level of co-funding from EU resources for 'cultural' projects in the particular voivodships, (2) to show diversity between voivodships in terms of the absolute value as well as in respect of EU funding for culture-related projects implemented in rural areas and rural districts, (3) to examine the structure of objectives pursued in rural districts and in rural areas in the particular voivodships.

METHODOLOGICAL ASSUMPTIONS

The study was conducted using data collected in the SIMIK database of the Ministry of Infrastructure and Development of the Republic of Poland for projects financed from European Union structural funds and implemented in Poland during the period 2007–2013(2015) as at 31 December 2015[3]. As indicated in the previous articles, although during that time the source of financing of projects thematically related to culture was seldom used in Poland (only 1.6% of all agreements), however, despite their small share in the total amount of EU aid funds, they had a significant impact on the cultural space of the regions.

European projects thematically related to culture were carried out under four Operational Programmes: Infrastructure and Environment, Human Capital, Innovative Economy and Technical Assistance. The projects analysed in this paper also comprise 'cultural' projects implemented during the period 2007–2015 under the Voivodship Regional Programmes. The analysis conducted in this study takes into consideration the following characteristics of the projects: thematic scope, total value and the amount of EU funding, as well as an area of project implementation. On the basis of the thematic scope of the projects four categories of spending EU funds were distinguished: revaluation of cultural heritage objects, creation and development of a new tourism product, sports and recreation infrastructure and – as one category – promotion, etc.

THE SURVEY AREA

In the years 2007–2015 the absolute value of the projects co-financed from the European Union funds and related to cultural heritage at the national level in Poland amounted to PLN 12.3 billion, of which PLN 2.5 billion were spent in rural areas, and a further PLN 2.3 billion were spent in rural districts. It follows from the above that the absolute value of 'cultural' projects implemented in the communes, small towns and rural districts, that is to say, in areas functionally related to the countryside, constituted approximately 39% of the value of all completed projects. In both rural areas (Fig. 1) and rural districts (Fig. 2) differences were observed between voivodships in terms of the absolute value, the amount of EU funding and the structure of the objectives of 'cultural' projects carried out in these areas.

[2] Under the N + 2 role UE 2007–2013 may be spent by the of 2015.
[3] Portal Funduszy Unijnych website https://www.funduszeeuropejskie.2007–2013.gov.pl.

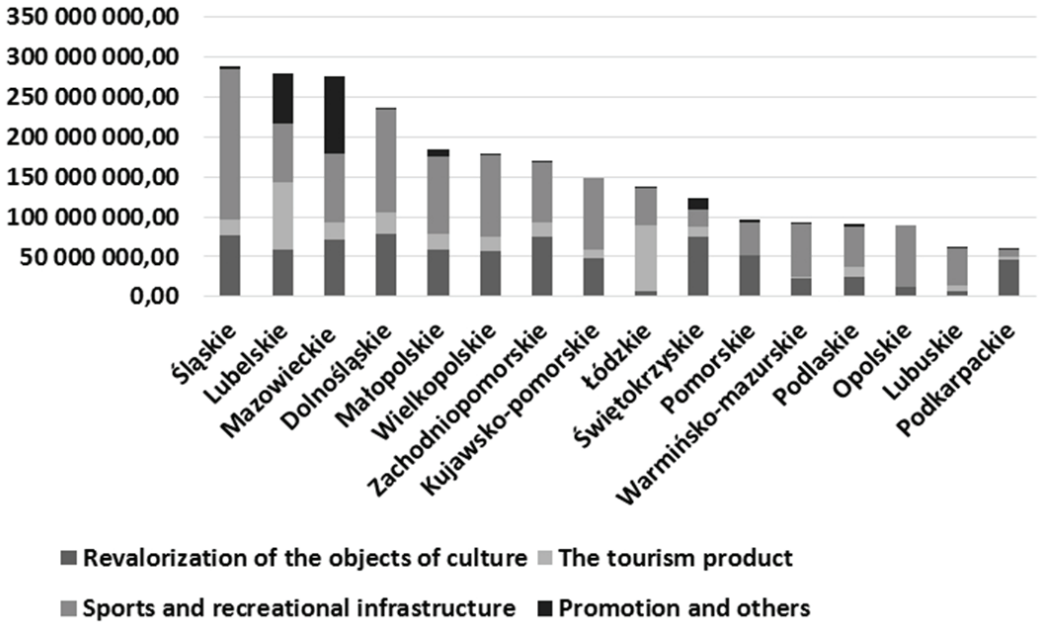

Figure 1. The absolute value of 'cultural' projects co-funded from European sources and implemented in rural areas during the period 2007–2013 (15) by voivodship, taking into account purposes of the projects (PLN thousand)

Source: author's calculations based on KSI SIMIK 07-13 as of 31 December 2015.

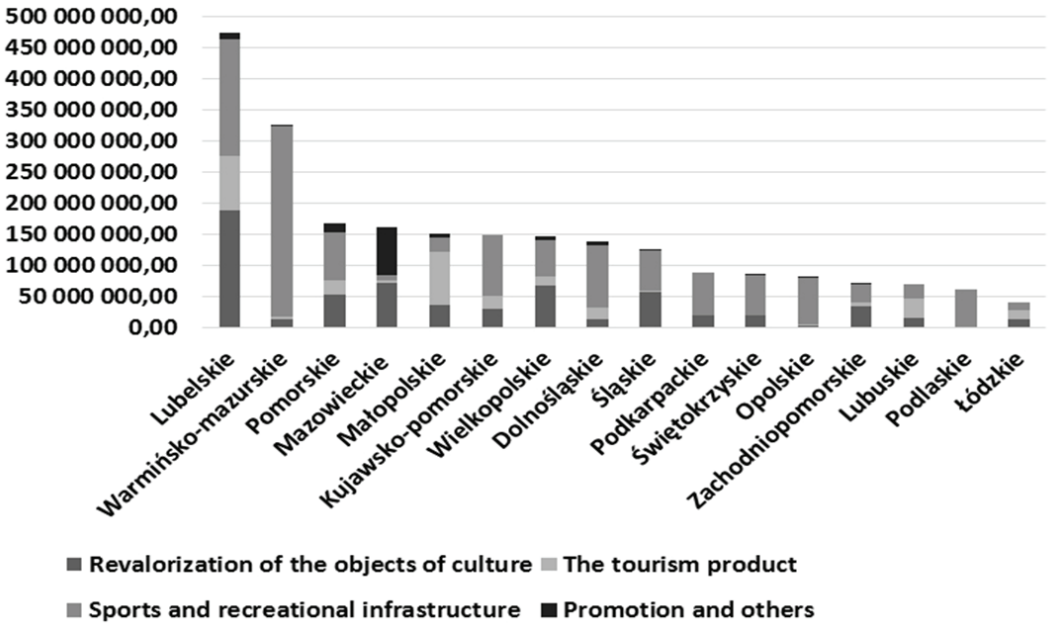

Figure 2. The absolute value of 'cultural' projects co-funded from European sources and implemented in rural districts during the period 2007–2013 (13) by voivodship, taking into account purposes of the projects (PLN thousand)

Source: author's calculations based on KSI SIMIK 07-13 as of 31 December 2015.

In terms of the absolute value of cultural projects implemented in rural areas, that is to say, in communes and small towns, three groups of voivodships can be distinguished (Fig. 1). Group one comprises Śląskie, Lubelskie, Mazowieckie and Dolnośląskie Voivodships, in which the absolute value of funds spent on 'cultural' projects ranged from PLN 200 million to PLN 300 million; in each of the voivodships of the second group (Małopolskie, Wielkopolskie, Zachodniopomorskie, Kujawsko-Pomorskie

and Świętokrzyskie), the absolute value of completed 'cultural' projects ranged from PLN 100 million to 200 million, and in the third group of voivodships (Pomorskie, Warmińsko-Mazurskie, Podlaskie, Opolskie, Lubuskie and Podkarpackie) this value was below PLN 100 million.

As regards rural districts, two groups of voivodships can be identified (Fig. 2). Group one includes voivodships (Lubelskie, Warmińsko-Mazurskie) in which the absolute value of completed 'cultural' projects ranging from PLN 300 million to 450 million was many times higher than that in the remaining voivodships, which should be regarded as group two. When the expenditures in rural areas and in rural districts are considered together, one can see that most of the funds were definitely obtained by the areas related to the countryside in the Lubelskie Voivodship (a total of more than PLN 750 million). In the Mazowieckie, Warmińsko-Mazurskie, Śląskie, Dolnośląskie, Małopolskie and Wielkopolskie Voivodships the value of completed 'cultural' projects in the rural environment during the period 2007–2015 was also significant (ranging between PLN 300 million and 450 million). However, in the remaining voivodships areas which were functionally related to the countryside benefited the least. The result obtained shows no regional dependencies, but it seems to be the effect of the impact of the potential of cultural assets in the regions.

When analysing the way of spending funds according to the objectives of completed projects, one should point to a high share, in both rural areas and rural districts, of the absolute value in expenditures related to the development of infrastructure and restoration of cultural assets; however, there were fewer projects thematically related to the creation of a new tourism product and promotion. Apparently, such a structure of expenditure within the framework of cultural projects is a reflection of current needs of the rural environment in which beneficiaries strive in the first place to improve living conditions in the countryside and, what is equally important, to restore and preserve traditional values.

The value of EU funding for 'cultural' projects carried out at the national level in Poland during the period 2007–2015 totalled about PLN 6 million, which constituted almost 49 % of their absolute value. On the other hand, in rural areas and rural districts the share of EU co-financing was higher and it totalled around 52% of completed projects in each one of them. When noting the increased financial support from the EU for 'cultural' projects in the rural environment one should also point to certain regional differences in this respect.

Entities in the Śląskie Voivodship achieved the highest rate of co-financing for culture-related projects implemented in rural areas (Fig. 3). It is worth noting that in the Silesian region the highest EU co-financing rate was observed in the case of projects relating to tourism product and promotion, while in the case of projects pertaining to reconstruction of cultural heritage assets and infrastructure this rate was relatively lower, which clearly differed from the structure of EU funding for 'cultural' projects at the level of rural areas across Poland. Equally high level of EU funding for culture-related projects implemented in rural areas was recorded in the Mazowieckie, Lubelskie and Dolnośląskie Voivodships. In Mazowieckie and Dolnośląskie Voivodships very high rates were reported in the case of projects concerning the reconstruction of cultural heritage assets, while in the Lubelskie Voivodship the infrastructure was of particular importance. It should also be mentioned that in the Dolnośląskie and Lubelskie Voivodships projects relating to promotion received a very high level of financial support. This is undoubtedly related to the fact that the capitals of these voivodships applied for being the capital of culture in 2016.

In the case of the remaining voivodships, just as in rural areas throughout Poland, the largest EU grants went to support the projects thematically related to the restoration of cultural heritage; there were also very important projects supporting the creation of a new tourism product, and, subsequently, development of infrastructure and promotion. When comparing Figure 3 with Figure 1 and with Table 1, one can find some differences in the preference of spending targets of EU funds between beneficiaries and decision-makers responsible for spending funds at European level. Local entities gave preference to the development of infrastructure and reconstruction of cultural heritage, while policy-makers in the European Union allocated the greatest amount of funding for cultural heritage

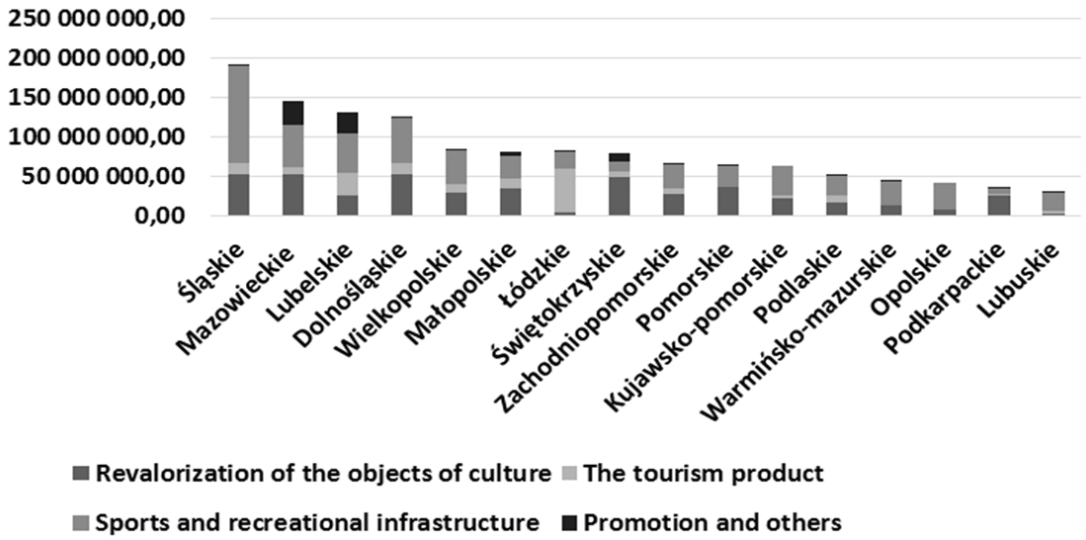

Figure 3. Co-financing from EU funds for 'cultural' projects co-funded from European sources and implemented in rural areas during the period 2007–2013 (15) by voivodship, taking into account purposes of the projects (thousand PLN)

Source: author's calculations based on KSI SIMIK 07-13 as of 31 December 2015.

Table 1. Co-financing from EU funds for 'cultural' projects co-funded from European sources and implemented in rural districts during the period 2007–2013 (15) by voivodship, taking into account purposes of the projects (%)

Voivodship	Revalorization of the objects of culture	The tourism product	Sports and recreational infrastructure	Promotion and others	Totally
Pomorskie	70.65	84.85	68.00	42.76	68.37
Śląskie	68.65	74.20	64.32	79.84	66.29
Świętokrzyskie	65.96	65.16	51.08	75.13	64.29
Łódzkie	67.96	66.51	45.94	70.97	59.68
Podkarpackie	56.55	65.73	70.76	27.14	58.69
podlaskie	69.56	74.40	48.11	77.69	58.44
Dolnośląskie	67.86	51.66	44.40	66.05	53.17
Mazowieckie	73.25	47.69	61.31	30.13	52.40
Warmińsko-Mazurskie	59.69	70.61	45.82	84.63	49.88
Lubuskie	57.87	43.50	48.79	29.94	48.96
Lubelskie	45.51	33.78	67.00	43.52	47.08
Wielkopolskie	53.40	58.95	40.19	84.54	46.69
Opolskie	71.42	–	42.42	–	46.43
Małopolskie	60.33	64.81	28.73	60.77	44.33
Kujawsko-Pomorskie	45.89	37.79	42.30	–	43.17
Zachodniopomorskie	37.47	36.99	41.78	54.77	39.36
Poland	59.89	53.19	49.61	41.85	52.63

Source: author's calculations based on KSI SIMIK 07-13 as of 31 December 2015.

assets and for the creation of a new tourism product. Thus, one may say that local entities attached the greatest importance to the current needs of local communities (infrastructure), and, secondly, to the preservation of cultural heritage. On the other hand, decision-makers at European level attached the greatest importance to the implementation in rural areas of those projects which directly took into account cultural objectives. At the same time, through the support from the European level for projects relating to the creation of new tourism products one may suppose that special support was provided to local entrepreneurship.

The largest EU funds for 'cultural' projects carried out in rural districts (Fig. 4), ranging from PLN 200 million to 250 million, were recorded in the Lubelskie and Warmińsko-Mazurskie Voivodships. In both voivodships the main aim of EU co-funding was the development of tourism infrastructure, and in the Lubelskie Voivodship the main focus was also on projects thematically related to the reconstruction of cultural heritage. In the group of voivodships in which EU funding ranged from PLN 50 million to 100 million (Pomorskie, Mazowieckie, Śląskie, Kujawsko-Pomorskie, Wielkopolskie, Małopolskie and Dolnośląskie) the greatest grants were also recorded in the case of projects aimed at the development of infrastructure, and, secondly, the restoration of cultural heritage. A clearly different structure of the amount of EU funding, depending on the targets, was observed in the Mazowieckie Voivodship, where rural districts received substantial funding for the promotion of the region.

Voivodships classified as the third group (Świętokrzyskie, Podlaskie, Zachodniopomorskie, Opolskie, Lubuskie, Łódzkie and Podkarpackie) obtained less than PLN 50 million funding from the EU for the implementation of culture-related projects. Financing structure varied greatly in these voivodships, while maintaining the dominance of infrastructure (Fig. 4). It is worth noting that in rural districts there was a very high rate of the share of EU co-funding relative to the overall value of the projects which aimed at promoting the regions, although gross expenditure for this purpose was relatively small (Table 1). By comparing Figure 4 with Figure 2 and with Table 2, one should note that both local beneficiaries

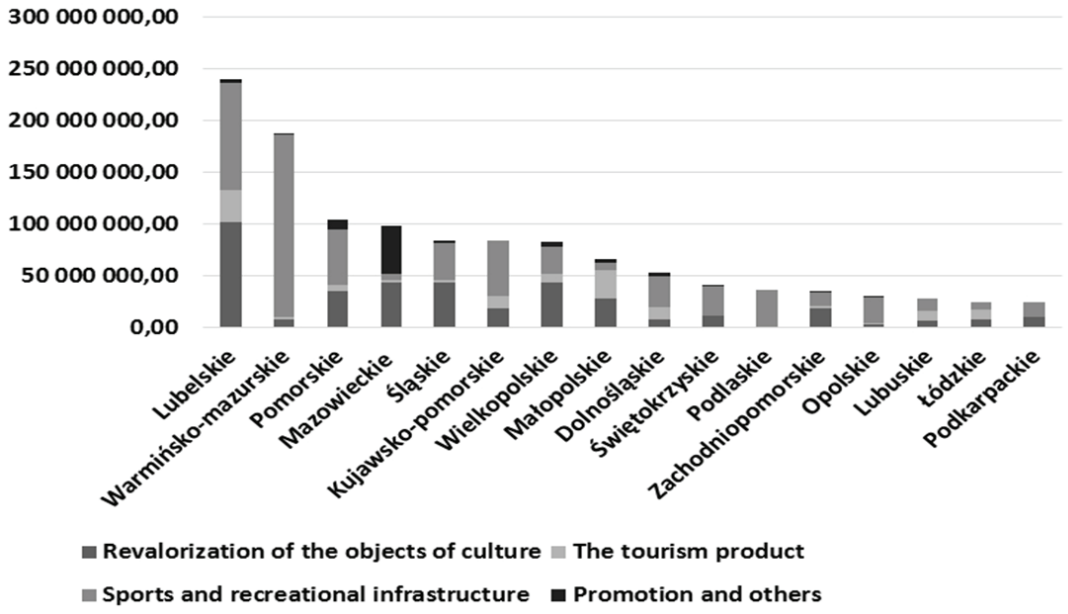

Figure 4. The level of co-financing from EU funds for 'cultural' projects co-funded from European sources and implemented in rural areas during the period 2007–2013 (15) by voivodship, taking into account purposes of the projects (thousand PLN)

Source: author's calculations based on KSI SIMIK 07-13 as of 31 December 2015.

Table 2. The level of co-financing from EU funds for 'cultural' projects co-funded from European sources and implemented in rural districts during the period 2007–2013 (15) by voivodship, taking into account purposes of the projects (%)

Voivodship	Revalorization of the objects of culture	Tourism product	Sports and recreational infrastructure	Promotion and others	Totally
Śląskie	76.56	57.38	55.75	84.60	65.64
Pomorskie	63.98	28.34	69.29	64.87	61.70
Mazowieckie	60.30	46.06	64.06	60.44	60.19
Łódzkie	53.56	67.43	56.75	–	59.35
Warmińsko-Mazurskie	53.33	71.14	57.43	72.25	57.45
Podlaskie	55.29	–	56.71	–	56.69
Wielkopolskie	63.53	53.76	46.34	83.69	56.68
Kujawsko-Pomorskie	61.04	56.60	54.60	*	56.20
Lubelskie	53.65	35.77	55.15	34.89	50.54
Zachodniopomorskie	50.09	48.97	46.78	50.82	48.63
Świętokrzyskie	56.96	58.09	44.71	47.31	47.61
Małopolskie	73.87	32.97	29.96	61.39	43.55
Lubuskie	42.95	29.44	49.98	–	38.85
Dolnośląskie	53.36	66.35	29.76	60.81	37.98
Opolskie	63.36	78.42	34.48	81.13	36.96
Podkarpackie	47.80	–	20.34	–	26.91
Poland	59.30	40.38	49.87	60.48	51.79

Source: author's calculations based on KSI SIMIK 07-13 as of 31 December 2015.

and European policy-makers preferred the development of infrastructure and the reconstruction of cultural heritage, the share of other objectives being lower. As regards rural districts, the highest level of EU co-financing was recorded in the Śląskie Voivodship (more than 65%) and in Pomorskie, Mazowieckie, Łódzkie and Warmińsko-Mazurskie Voivodships (approximately 60% for each one of them).

On the other hand, the lowest level of co-funding for 'cultural' European projects carried out at the level of rural districts was reported in the Małopolskie, Lubuskie, Dolnośląskie, Opolskie and Podkarpackie Voivodships. One can distinguish a group of voivodships in which a high activity was observed, both at the level of rural areas and rural districts, in the field of the implementation and acquisition of European funds for culture. These are: Mazowieckie, Śląskie, Lubelskie, Wielkopolskie and Małopolskie Voivodships.

CONCLUSIONS

The analysis conducted in the paper leads to the following conclusions.

In the years 2007–2015, both in terms of the absolute value and the structure, depending on the objectives of implemented 'cultural' projects, no regional dependencies were recorded, while the differentiation of the phenomenon was influenced by the cultural potential of the regions.

In terms of the absolute value of 'cultural' projects carried out in the rural environment the highest share was observed, in both rural areas and rural districts, in the case of those projects which were aimed at developing infrastructure and restoring cultural heritage assets, while projects thematically related to the creation of a new tourism product and promotion were of lesser importance. This structure of expenditures under 'cultural" projects indicates that local beneficiaries, while using EU funds, sought primarily to improve living conditions in the rural environment, not forgetting, at the same time, about the preservation of traditional values.

However, the highest grants from EU sources were provided for projects thematically related to the reconstruction of cultural heritage and creation of tourism products, which shows that the activities aimed at preservation of cultural heritage and support for local entrepreneurship are of particular significance to European entities. At the same time, it should be noted that EU funding for 'cultural' projects carried out in the areas which are functionally related to the rural environment was higher than that in Poland as a whole.

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FINANCIAL AID FOR POLISH AGRICULTURE AND CHANGES IN ITS SHARE IN THE STRUCTURE OF AGRIBUSINESS

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ABSTRACT

The study presents the share of agriculture in the structure of agribusiness and presents the forms of support it uses. It was found that agribusiness is characterized by dynamic changes. Against the background of the national economy, its share in labour resources, fixed assets, investment outlays and output and its gross added value is decreasing. As part of Polish agribusiness, agriculture has the dominant share. There is considerable support for agriculture with EU and national financial aid. The largest share of domestic aid constituted subsidies for investment loans and working capital loans.

Keywords: agribusiness, financial aid, agriculture
JEL codes: Q14, Q18

INTRODUCTION

The concept of agribusiness has been known in academic literature since the 1950s. It was first introduced to scientific literature in 1957 by I.H. Davis and R.A. Goldberg (Encyclopedia of agribusiness, 1998). In folk Poland in the 1960s and 1970s, this system of structure and dependence was defined as a complex system of food economy. It was especially more about political considerations, with the focus not to imitate western ideas in our economic reality. After 1989, there are no obstacles to using the concept of agribusiness in Poland. Therefore, this term is now freely used in scientific literature, statistics and scientific discussions. The aim of the study is to assess the state of the structure and function of agribusiness and the changes occurring in them. The following research hypotheses were adopted in the study:

1. Changes in agribusiness are derived from processes taking place in the national economy and lessen the role of agriculture.
2. Agriculture is losing (through the market) part of the generated financial surplus for other sectors of the national economy.
3. The scale of interventionism in agriculture is increasing.

AGRIBUSINESS – CONCEPT, SCOPE, SPECIFICITY

Nowadays, agribusiness is defined as a subsystem of the national economy, created as a result of vertical integration of all elements of the national economy involved in food production. Thus, agribusiness includes: agriculture, fishery, forestry, agri-food industry, industries producing means of production and services for agriculture and other industries involved

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in food production, purchase, transport of agricultural products and means of production, trade in ready-made food products. Agribusiness considered from the side of the branch-branch structure includes:

- agriculture dealing in the production of raw materials for food production;
- fishing, forestry, which also provide raw materials for food production or ready-made food;
- food industry dealing in the processing of agricultural raw materials and gastronomy;
- industries producing means of production and services for agriculture and food industry;
- trading in agricultural raw materials and ready-made food products (wholesale, retail, marketing);
- services provided for agribusiness (financial, transport, communication, information, construction, science, education, consulting).

Agribusiness also includes the production of raw materials for energy purposes, as well as providing services to the environment and the population. Historically speaking, in the early stages of socio-economic development, the production of food was handled by agriculture. Then, other activities were distinguished in this process, such as: agri-food processing, trade in services and industry, and crafts producing means of production for agriculture and food processing. Over time, these separate food production processes began to integrate creating a modern agribusiness consisting of three segments: I – industry producing means of production for agriculture and agri-food industry; II – agriculture; III – agri-food industry (Szuba-Barańska, Poczta and Mrówczyńska-Kamińska, 2016).

To sum up, agribusiness is a subsystem of the national economy that from a technological, financial, legal and organisational perspective fuses all those activities that participate in the production of agricultural raw materials, processing and distribution of food and derivative products. Agribusiness can also be defined as a field of knowledge, research and academic didactics: this is mainly about the assessment of changes in the share of agribusiness in the national economy, the assessment of changes in its structure and control mechanisms.

Agribusiness is a subsystem of the national economy, which co-creates the national global product. This product is made up of all departments that are part of agribusiness. At the same time their contribution to the creation of a national global product is different. Through a simplification, we can write the formula defining the role of agribusiness in creating a gross national product as follows:

$$NPGA = Pglr + Pglps + \Sigma Pgli \times bi$$

where:

NPGA – national product of global agribusiness;
Pglr – global production of agriculture;
Pglps – global production of the food industry;
Pgli – global production and this department involved in food production;
bi – coefficient defining the flow of products and services and – this section to agriculture and food industry.

In the case of Poland, the characteristic feature of agribusiness is its dynamic changes. Until 1990, agriculture played a dominant role, in terms of its share in production resources and production. The share of agriculture in agribusiness at that time was 77.2 and 52.5%, respectively (Encyclopedia of agribusiness, 1998). The greater share of agriculture in resources in relation to the share in the production of agribusiness results from the lower productivity of labour and property in it, which is the result of the laws of biology and the market situation.

As regards the restrictions on the size of agricultural production from the unit of area, they result mainly from the specifics of cultivated land. Due to its quality, location and diversity in this respect, the land influences the nature of the activity and financial results obtained from it. These features of agricultural land make it a source of rent. Already A. Smith noticed that running agricultural activity in various places causes various costs and brings different effects. These observations were continued by D. Ricardo, A. Weber and others. Differential rent I arises due to the different quality of agricultural land and its different location in relation to the market. Differential rent II is a relative effect of benefits resulting from differences in the intensity of agricultural management. Another form of rent is urban rent, which is a relative advantage achieved by landowners with a favourable

location (in academic literature it is referred to as differential rent III). Recently, an environmental income has also been written about (differential rent IV) (Czyżewski, 2009). In this case, the increase in the value of plots may result from environmental conditions characterized by high natural and microclimatic values, etc. In connection with the emergence of transfers under the Common Agricultural Policy there is a capital pension, which is obtained by owners of agricultural land. Capital pensions often occur in combination with benefits resulting from beneficial legislative solutions in the field of social security and taxation. The implementation of pensions resulting from the peculiarities of agricultural land has a fundamental impact on the pace of changes taking place in the agrarian structure. In principle, the possibility of deriving economic, especially capital, and legislative pensions hinders the transfer of land from small farms to development farms. Thus, the occurrence of these pensions delays changes in the whole agribusiness. Agribusiness as a production subsystem of the national economy is characterized by a certain specificity, namely:

- It is a subsystem that produces raw materials and food, without which no other products can be created.
- It is a subsystem that brings together various components, which are characterized by diversified efficiency, effectiveness, diversified sensitivity to external factors of production, and agricultural production is particularly sensitive to them. On the one hand, the specifics of land used for the production of food raw materials and the law of biology cause that in agriculture we have lower productivity of labour and capital in comparison to other components of agribusiness. On the other hand, both agricultural plant and animal production are the most dependent on environmental conditions. In principle, plant production is 'defenseless' in this respect. Producer under unfavourable conditions, suffers almost total losses.

However, in the case of activities that are also dependent on the environment such as construction, transport, etc., in conditions that are not suitable for them, the result is a failure to realize income (profits) and possible small losses.

The biological and technological features of agricultural production mentioned above cause that when it comes to economic relations under agribusiness, they are least beneficial for agricultural raw materials. Their undervaluation is frequently observed. Prices of agricultural raw materials show a tendency of having a smaller share in the prices of ready-made nutrients.

On the other hand, the prices of agricultural production means are re-evaluated against the prices of other products. As a result, the market position of agriculture is systematically deteriorating in relation to other sectors of the national economy, which is additionally strengthened by rigid demand for food.

Consequently, we note the continuing problem of income disparity among farmers in relation to other professional groups. This is the most important determinant of the agrarian issue. In addition, it is worth noting that there is a lack of residential infrastructure in rural areas, or it is much more modest than in cities. There is poorer access of rural population to large stores, public transport, banks, restaurants, stadiums, cinemas, theaters, public administration offices, highways, and underground. The vast majority of this infrastructure was financed from public funds, access to which, in principle, is given only to the urban population.

On the other hand, agriculture provides goods to the public in the form of: landscape, the environment, space for which no compensation is paid. In this situation, agriculture uses systems of intervention from national public authorities and the European Union.

FINANCIAL AID FOR AGRICULTURE

The amount of aid for agriculture from public funds, both EU and national, is countable and is presented in Table 1. On the other hand, some problems are caused by the valuation of the environmental role of agriculture and the amount of financial surplus flowing from it to non-agricultural departments, which mainly involves urban population.

Data from Table 1 indicate that small amounts of resources were allocated to support fisheries, an amount of just over PLN 4 billion. Agriculture

Table 1. Implementation of agricultural aid in 2005–2017 (PLN billion)

Form of aid	2010	2011	2012	2013	2014	2015	2016	2017	From the beginning of its launch
Direct support	10.2	12.9	10.7	14.8	14.1	14.7	21.3	14.2	158.7
PROW 2004–2006	–	–	–	–	–	–	–	–	10.9
PROW 2014–2020	–	–	–	–	0.6	0.4	3.8	4.1	8.9
The common organization of the markets in fruit and vegetables	0.7	1.1	1.7	1.8	1.1	0.7	0.3	0.1	8.0
Aid for fishery	0.4	0.8	0.8	0.8	0.8	0.4	0.1	0.1	4.2
SAPART program	–	–	–	–	–	–	–	–	4.5
Total EU aid	19.7	24.8	24.8	28.2	26.4	28.9	25.5	18.7	278.8
National aid	0.8	0.8	1.1	0.7	0.6	0.9	0.5	0.8	22.5
Total EU + Poland	20.5	25.6	25.9	28.9	27.0	29.8	26.0	19.5	301.3

Source: information on the implementation of ARMA's tasks, February 2018.

received a total of PLN 297 billion support from EU and national assistance. Domestic aid constituted only 7.5% of total aid. The assistance from the European Union was dominant. More than half of this total aid has been earmarked for direct support, an amount of over PLN 158 billion (52.2%). Support under the RDP in 2004–2017 amounted to over 95 billion. zl - which constituted about 31% of total support. Table 2 presents the level and structure of direct support granted to Polish agriculture in 2004–2017.

The information contained in Table 2 shows that uniform area payments constitute the dominant element of direct support. They accounted for over 60% of this type of agricultural aid. The second item is occupied by complementary area payments for other plants. The share of this type of support amounted to less than 18% of direct aid. Other types of direct support are small shares. What is noteworthy is the huge dispersion of direct aids. This increases the costs of servicing farmers through ARMA and creates opportunities for dishonest activities. Noteworthy is also extensive national assistance. ARMA from national funds provides financial assistance in the scope of:

- implementation of investments and processing in farms;
- creation or enlargement of farms by young farmers,
- resumption of production on farms;
- education of rural residents;
- collection of transport and utilization of fallen animals.

The information contained in Table 3 shows that almost half of the national aid was allocated for subsidies to investment loans. A significant share is subsidies for disaster and revolving loans. Other types of domestic aid are very much dispersed.

POLAND'S AGRIBUSINESS STRUCTURE AND ITS CHANGES

The structure of agribusiness is changing both in Poland and in other developed economies. This is due to the development processes of the entire economy of a given country and a group of countries. Together

Table 2. Level and structure of direct support for Polish agriculture in 2004–2017 (PLN million)

Types of direct support	2004–2011	2012	2013	2014	2015	2016	2017	Total
JPO*	43 661	10 214	11 442	12 676	6 284	6 414	4 798	95 491
UPO** other plants	25 316	1 643	965	–	–	–	–	27 925
UPO hops	19	2	2	2	3	3	3	34
UPO animal payments	3 893	471	338	–	–	–	–	4 703
UPO energy payments	30	–	–	–	–	–	–	30
UPO for raw tobacco producers	–	180	184	159	153	144	111	931
Payments for starch	–	38	37	36	36	37	24	207
Payments for tomatoes	–	–	–	–	17	18	6	41
Payments for flax	–	–	–	–	2	2	2	6
Payments for hemp	–	–	–	–	0.4	.4	0.1	0.9
Payments for fruit and vegetables	107	27	28	27	–	–	–	189
Payments for soft fruits	275	78	46	46	62	64	31	602
Payments for sugars	3 343	648	654	652	341	346	227	6 212
Payments for legumes	88	134	144	152	273	287	207	1 288
Payments for greening	–	–	–	–	4 252	4 340	3 137	11 719
Payments to farmers	–	–	–	–	264	276	170	709
Payments for cows	233	165	162	154	627	643	509	2 488
Payments for sheep	12	9	9	10	18	19	13	91
Payments for cattle	–	–	–	–	702	721	564	1987
Payments for goats	–	–	–	–	1	1	1	3
Payments for tobacco	–	118	120	119	–	–	–	358
TOTAL	76 980	13 734	14 133	14 186	14 314	14 621	10 784	158 755

* JPO – single area payment.
** UPO – national complementary area payments.

Source: as in Table 1.

Table 3. The level and structure of national agricultural aid granted in 1994–2017

Type of national support	Amount (PLN million)
Additional payments for investment loans	11 775
Subsidies for disaster and revolving loans	5 262
Equivalents for the afforestation of forest lands	618
Utilization of dead animals	946
Disaster relief	909
Support for the development of technical infrastructure of villages	1 039
EXTRA payments for milk	692
Loans for jobs	258
Together	22 474

Source: as in Table 1.

Table 4. Production resources and economic results of agribusiness in Poland in 2002, 2005, 2012 and 2015 (current prices)

Specification	Work resources (thousands of people)				Gross fixed capital formation (PLN billion)				Capital expenditures (PLN billion)				Global production (PLN billion)				Gross value added (PLN billion)				
	2000	2005	2012	2015	2000	2005	2012	2015	2000	2005	2012	2015	2000	2005	2012	2015	2000	2005	2012	2015	2000
An industry that produces means of production for agriculture and the food industry	407	444	434	434	44.1	48.0	50.1	50.1	3.4	4.0	5.1	5.1	3.4	4	5.1	5.1	37.3	57.0	59.5	59.5	16.8
Agriculture	3 932	2 084	2 326	2 384	109.1	112.7	130.3	139.6	2.1	2.4	4.5	5.3	2.1	2.4	4.5	5.3	56.0	63.3	103.1	98.6	17.7
Food industry	502	458	443	383	4.08	60.4	94.0	105.2	4.8	6.2	8.1	8.3	4.8	6.2	8.1	8.3	96.1	128.4	208.9	222.4	21.8
Total agribusiness	4 841	2 984	3 203	3 201	194.0	221.1	274.4	294.9	10.3	12.6	17.1	18.7	10.3	12.6	17.1	18.7	189.4	248.7	371.5	380.5	56.3
Share of agribusiness in the national economy (%)	32.2	21.0	20.1	21.7	13.4	12.0	9.0	8.7	7.7	9.0	7.0	7.5	7.7	9.0	7.0	7.5	13.0	13.6	12.9	10.8	8.5

Source: Mrówczyńska-Kamińska (2014).

with these changes in the agribusiness structure, the share in global production and gross added value of the food industry and trade is growing. The share of agriculture itself (previously indicated for this reason) and the supply industry are decreasing. It is worth pointing out that the share of all agribusiness in the national economy is decreasing, with a clear increase in production realized as part of it. Relevant information is presented in Table 4.

Data from Table 4 indicate that agriculture has the largest share in the employment structure in agribusiness in Poland. Employment in agriculture is about three times higher than total in the food industry and the industry producing means of production for agribusiness. As for fixed assets, in agriculture they are almost the same as in the other two components of Polish agribusiness. The dominance of agriculture in two basic factors of production, against the background of two industries, does not translate into its economic results. The food industry is definitely the best in this respect. While engaging large amounts of production factors, agriculture achieves the weakest income results relative to them. Agriculture also has a small, within the framework of agribusiness, level and share in terms of investment expenditures. All this is diminishing the role of agribusiness in the national economy. This relative reduction concerns both the means of production and the economic and financial results. The greatest relative decrease in agribusiness in the economy is observed on the labour resources side. In the years 2000–2015, they decreased by over 1.5 million people. Work resources located in agribusiness decreased by more than 10%, from 32.2% in 2000 to 21.7% in 2015.

As for the assets of fixed assets, its absolute value is increasing. From PLN 194 billion in 2000 to 294.9 billion in 2015. However, in relation to the entire national economy, a decline from 13.4 to 8.7% has been observed over the years. A similar pattern exists in the case of capital expenditures. These increased in the absolute dimension, from PLN 10.3 billion in 2000 to PLN 18.7 billion in 2015, whilst their relative share decreased slightly from 7.7% in relation to the national economy in 2000 to 7.5% in 2015.

In the case of global production in absolute terms, a double increase can be observed. With almost PLN 190 billion in 2000 to over PLN 380 billion in 2015. Despite this absolute increase, the global production of all agribusiness recorded a decline in the surveyed years from 13% in 2000 to 10.8% in 2015, against the background of the entire national economy. A similar situation can be observed in the case of gross added value, which has almost doubled in absolute terms, from PLN 56.3 billion in 2000 to PLN 107.2 billion in 2015, despite its absolute increase, its share in the entire national economy decreased from 8.5% in 2000 to 6.6% in 2015.

CONCLUSIONS

1. Agribusiness is characterized by dynamic changes. Against the background of the national economy, its share in labour resources, fixed assets, investment outlays and output and its gross value added is decreasing. Although the absolute values of these categories of agribusiness is growing, in addition to labour resources, these decreased in the years 2000–2015 by about 1.5 million people.
2. As part of Polish agribusiness, agriculture in the production factors (labour resources, fixed assets) has a dominant share. However, in terms of output (global production, gross value added), the largest share is observed in the food industry.
3. Noteworthy is the significant support of agriculture with EU and national financial aid. In total agriculture received, in 2005–2017, PLN 300 billion, which gives about PLN 27 billion annually. Of this assistance, 93% constituted EU aid, only 7% was national aid.
4. The largest share of domestic aid were constituted by subsidies for investment loans and for loans under loans and working capital loans. Other types of domestic aid as well as EU aid were characterized by considerable dispersion.
5. This aid is a compensation for agriculture for its contribution to the well-being of the environment, the outflow of financial surplus through the market mechanism to non-agricultural sectors and the inability of the agricultural population to use the so-called civilization rent.

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RATING OF THE CUSTOMER SERVICE QUALITY AT COOPERATIVE BANKS IN MYSTERY SHOPPER STUDY

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ABSTRACT

The objective of this paper is to evaluate the customer service quality at the cooperative banks in Poland and to test the extent of the customer oriented approach of selling banking services based on the relational model. The customer service level at the cooperative banks was evaluated as low in comparison with the results achieved by the commercial banks. The principles of the relational model and the customer-oriented sales model were fulfilled in 36%. The analysis of the needs, using the feedback about the customer, the customer commitment and the effective sales were the least implemented. The highest level of implementation concerned the principles of comfortable customer service, the greeting and presentation of the offer. The selling efficiency is highly correlated with upholding the principles of a customer-oriented sales model. The study used the Mystery Shopper method.

Keywords: satisfaction, sales, trust
JEL codes: G41, M31, M37, M52; E71

INTRODUCTION

The necessity to perfect the customer service and utilize the feedback information received from the customers constitutes the basis for building the market advantage. In the banking services, the customer satisfaction mainly depends on the preparations and the social skills of the personnel because the customers buy good mood together with the product. In the opinion of the Chairman of the Polish Banking Association 'last year recorded a clear improvement as regards the customer service quality and the satisfaction with the daily use of the banking services. The NPS index (net promoter score), which informs about the number of customers who are ready to recommend the services of their bank, was above zero as regards the whole banking sector, and it improved by as many as 16 points within a year' (Rudke, 2018). From the Mystery Shopper study we can conclude that on average the banks in Poland fulfil 63% of the customers' expectations. However, the diversification of the ratings of satisfaction with the banking services differs: Nest Bank fulfils only 33% and the cooperative banks – 36% of the customers' demands. These are the worst results on the market. On the other hand, mBank fulfilled 91% of the customers' expectations as regards the customer service at the bank branches, Eurobank – 87%, Getinbank – 84%, and Millennium Bank – 81%. These are the best results on the market (Piotrowicz and Machała, 2017). These results justify posing the question about the reasons for such low results of the cooperative bank which is promoted as a

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relational bank, a bank that are close to its customers and which understands and knows them. The answer to this question is even more important because 68% of the customers leave this bank and switch to the competitors because of the poor level of the customer service. 14% leave on account of the poor product quality, 9% because of the changes in the prices and the rest for the other reasons (Tomaszewicz, 2010). This opinion is justified by Barlow and Maul (2000) in one of the first research works on emotional values in the customer service process. This is a consequence of the customers' expectations to fulfil their functional and emotional needs. In the evaluation of Piotrowicz and Machała (2017), what was perceived as a 'wow' effect still a few years ago, nowadays is a sine qua non condition. The customers expect the bank personnel to present an offer in a comprehensive, exhaustive and relevant way. Moreover, being well-versed and competent in the offer is not enough. Knowing the customer, his/her style of using the financial services or lifestyle are of key importance. The objective of this paper is to answer the following questions: What is the level of the customer service quality at the branches of Bank Spółdzielczy? What is the extent of applying the principles of a customer oriented model of selling banking services based on a relational model? What is the banks' extent of utilization of the feedback information from the customers in the customer service process?

QUALITY OF THE BANKING PRODUCT

The components of the customer service quality are an integral part of creating a banking product in the banking services (Idzik and Gutkowska, 2014). This approach is only partially in agreement with the overall definition of quality proposed in the PN-EN ISO 9000:2006 norm, according to which quality is a stage where a set of product qualities meet specific customer demands (Prussak, 2003; Luning, Marcelis and Jongen, 2005; PN-EN ISO 9000:2009). From the bank's point of view, quality is the product's ability to fulfill the business objectives defined by such parameters as profitability and competitiveness (Karaszewski, 2005). Quality from the customer's point of view are product parameters and the customer service standards connected with the product (Prussak, 2003) which include: (i) the product core with its elementary functional benefits; (ii) the actual product that fulfils the necessary minimum of the buyer's expectations (price, quality, style, brand); and (iii) the enhanced product that includes additional benefits. Such an approach to the evaluation of the product quality can be described as technical. In the case of a banking product, the consumer definition of product quality considerably exceeds the technical parameters included in the offer (Idzik and Gutkowska, 2014). When defining a high quality banking product, the consumers most frequently provide adjectives which go considerably beyond the actual product as well as the enhanced product. A high quality banking product is transparent, comprehensive, offered according to the easy-to-follow rules, and in an honest and reliable manner. The consumers expect the bank personnel to understand their needs, respect and the serious treatment, and they assume that these expectations will be exemplified particularly in a banking product. This consumer definition of a high quality banking product indicates that it is necessary to change the scope of the definition of a banking product by ascribing human traits to the technical parameters of the products. In this original approach, the core product includes: fulfilling the elementary customer needs by the correct and safe provision of the services of the bank. The enhanced product means availability, price parameters, free-of-charge ATMs, reimbursement of a part of the costs, a network of bank branches, Internet and mobile banking, etc. Another stage in the banking product structure employs understanding the customer needs. This is expressed in the tailoring to the needs, consulting services, and assistance in making a decision. The highest level of the components creating a banking product include respect, and within it: keeping promises, empathy, altruism, long-lasting rules of cooperation and veracity (Idzik and Gutkowska, 2014). In the case of the sales service at a bank Tomaszewicz (2010) singles out four stages of building an intangible part of the product. Stage 1 – evoking overall trust includes first impression conveyed by the body language, tone of voice and the used expressions. Stage 2 – identification of the needs. Stage 3 – presentation of the offer and

stage 4 – closing. A different concept was presented by Machała (2015) which singled out: partner-like treatment; commitment and dynamics; understanding the customer's problem; tailoring the offer to the needs. When these factors are fulfilled, we can enter the relational stage where an emotional bond is formed based on mutual understanding which is described in more detail by Kyzirdis (1996) and Czuba and Skurzyński (2003). However in their next concept, Piotrowicz and Machała (2015, 2017) already revised their current approach and proposed 7 areas that created intangible quality of the banking product: greeting, identification of the needs, presentation of the offer, sales process and commitment, closing the meeting, atmosphere of the conversation and the customer service comfort. The mentioned areas constitute the main axis for building the standards of retail customer service at the banks in Poland, and not upholding them is the elementary threat to the quality of the banking services in Poland (Machała, 2014, 2015).

MATERIALS AND METHODS

The customer service quality studies were conducted using the Mystery Shopping method. The Mystery Shopping study enables one to control the quality of the customer service (Churchill, 2002) and combines the elements of the quantitative and qualitative surveys (Maison and Noga-Bogomilski, 2007). The Mystery Shopping study involves observation of the front-line personnel in their natural conditions by a trained auditor (Milic-Czerniak, 2005). The Mystery Shopping study can be describe by three main features of the conducted observation (Meder, 2005): (i) the observation is inconspicuous, the sales assistant does not know that the customer is the Mystery Shopper; (ii) the observation is monitored – the auditor follows a specific script which should concentrate on certain elements of the customer service; (iii) it is standardized – the Mystery Shopper pays attention to specific aspects and after the survey, he/she fills out a questionnaire (Rutkowski, 2007). The results of the surveys conducted using the Mystery Shopping method in the first quarter of 2017 constituted the source of empirical data for the conducted analysis. The research included 33 branches of cooperative banks out of which 13 were members of BPS, 13 were members of SGB, 3 banks were a part of Krakowski Bank Spółdzielczy and 4 were unaffiliated banks. The visits to the bank branches were of an informational character as well as of a transactional character. At each of the studied bank branches, the auditors opened current accounts (ROR), activated channels for electronic banking if such were available, contacted the bank by phone, by E-mail or by a contact form on the bank's website. The research employed the measure of assessment of the customer service quality commonly used by the banks in Poland to create and verify the standards of the customer service quality at the bank branches (cf. Piotrowicz and Machała, 2015). The main assessed areas were: greeting, identification of the needs, the presentation of the offer, the sales process and commitment, closing the meeting, the atmosphere of the conversation and the comfort of the customer service. Each area was assessed on several detailed aspects.

RESULTS AND DISCUSSION

Treating quality as a gap between the expectations and the customer experiences serves as a starting point to improve quality. The assessment of the gap that divides a given bank from the competitive banks in terms of the customer service quality provided at the bank branches also plays a similar role. The cooperative banks achieve much lower scores of the customer service quality in comparison with the commercial banks (Fig. 1). In the ranking of the customer service quality in the bank branches of 19 banks, the cooperative banks take the penultimate position with the result of fulfilling only 36% of the customers' expectations (Piotrowicz and Machała, 2017). Only Nest Bank scored lower (33%). In comparison with 91% achieved by mBank, the customer service quality leader, the cooperative banks are 55 p.p. behind.

The overall assessment of the customer service quality is an aggregated measure which includes: comfort of the customer service, greeting, presentation of the offer, closing the meeting, atmosphere of the conversation, identification of the needs as well as the sales and commitment (Fig. 2).

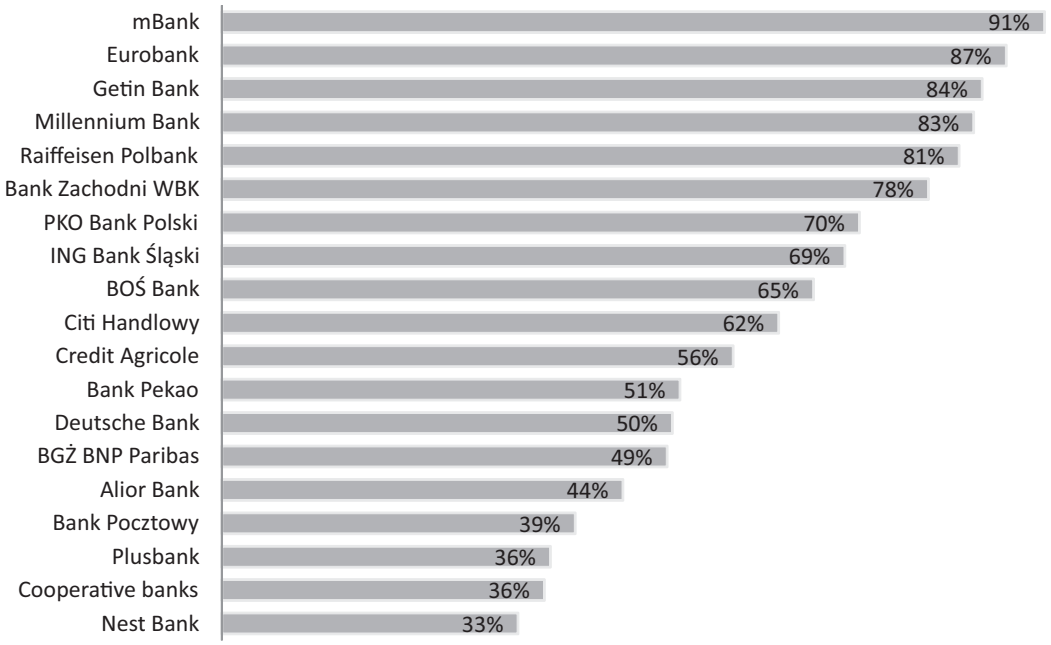

Figure 1. Rating of the customer service quality in banks in Poland

Source: own research on the basis of Piotrowicz and Machała (2017).

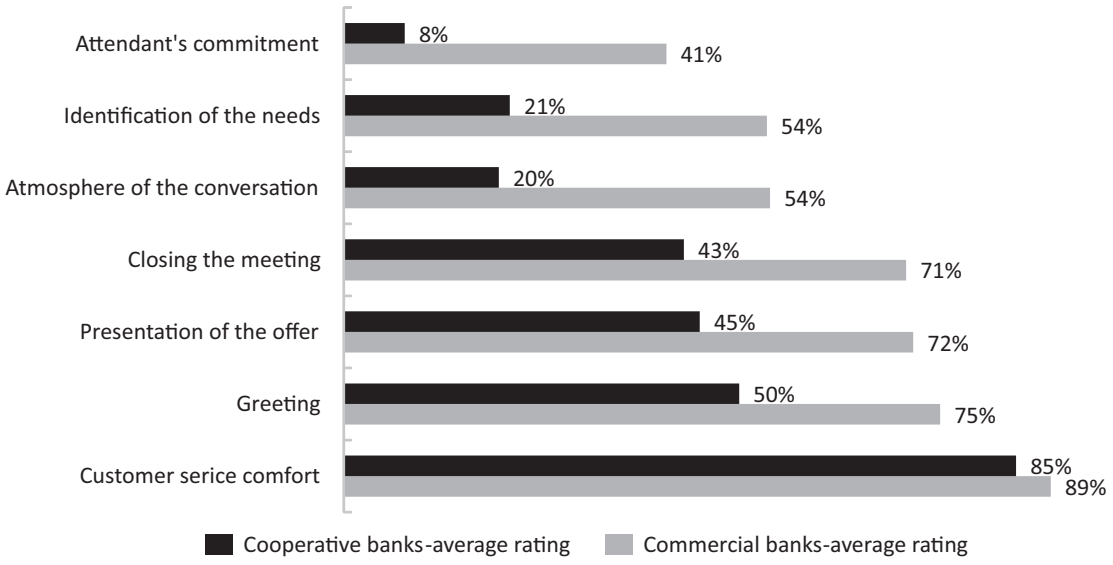

Figure 2. Properly fulfilled standards of the customer service quality at the cooperative and commercial banks

Source: own research on the basis of Piotrowicz and Machała (2017).

Despite the fact that the cooperative banks declare a relational customer service model which centres around the familiarity with the customer and understanding his/her needs, in reality the assessment of this area is low (Fig. 2). The identification of the customer needs is fulfilled barely by 21%, and the personnel commitment and the real willingness to address the customers' needs are fulfilled only by 8% in comparison with the real-life customers' demands in this regard. In the case of presentation of the of-

fer, greeting or closing the meeting, the cooperative banks fulfil almost half of the standards for these areas of the customer service at the bank branches. The only area that scored relatively high and did not differ much from the scores of the commercial banks was the comfort of the customer service which reached 85%. In comparison with the average market score among the commercial banks, the cooperative banks scored lower at the bank branches in all areas of the customer service quality. The gap in comparison with the market average is 33 pp as regards personnel commitment, 33 p.p. –identification of the needs, 34 p.p. – atmosphere of the conversation, 28 p.p. – closing the meeting, 27 p.p. – presentation of the offer, 25 p.p. – greeting, and 4 p.p. – comfort of the customer service. From several to a-dozen-or-so detailed aspects are used to measure the customer service quality at the bank branches in each of the areas. Here are some of them.

In the case of the cooperative banks, the first meeting with a customer attendant does not provide a good basis for building relations. In 22% of the cases, the attendant gave the impression as if the customer was bothering him/her, in 65% of the cases the attendant was polite, but did not go beyond normal courtesy, and in barely 13% of the cases the attendant was really happy to see the customer. This result is four times lower than among the commercial banks (Fig. 3). In the evaluation of Tomaszewicz (2010), it is this stage that determines whether the attendant can win the customer's trust or not (40% of the cases). In the opinion of Machała (2015), the identification of the needs is the key stage in the assessment of the quality of the sales customer service at the banks. During the sales customer service at the commercial banks in Poland, 40% of the personnel do not identify the customers' needs at all, or the posed questions do not allow for identification of the needs anyway. However, 60% of the customer service attendants at the commercial banks identify sufficiently the customers' needs. At the cooperative banks, barely 8% of the attendants carry out an effective identification of the needs. 92% do not identify the customers' needs at all or the questions they ask are insufficient for this purpose. In the opinion of Machała (2015), the open-ended questions which begin with 'How...' or 'In what way...' are very helpful during the stage of the identification of the needs. In the case of 70% of the bank branches in Poland on average, the personnel ask customers open-ended questions, but in the case of the cooperative banks, only 26% of the attendants pose such questions during the sales meeting. The sales process may have different dynamics and the attendants' commitment by one-fifth is a determinant for the final sales results.

Taking into consideration the average results for the commercial banks in Poland, 18% of the customer service attendants were not committed at all and wanted to present the offer as quickly as possible and to finish serving the customer; however, in the case of the cooperative banks, this number was 52%. The attendants who are committed to the customer service at commercial banks constitute 46% and at cooperative banks – barely 5% (Fig. 4).

In response to the customers' needs the attendants should present a customized offer which in many cases includes additional products. On average in Poland in 71% of the branches of the commercial

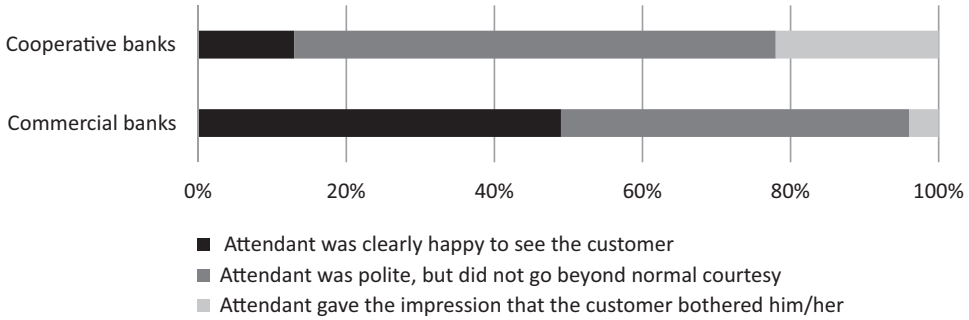

Figure 3. Bank attendants' behaviour when greeting the customer
Source: own research.

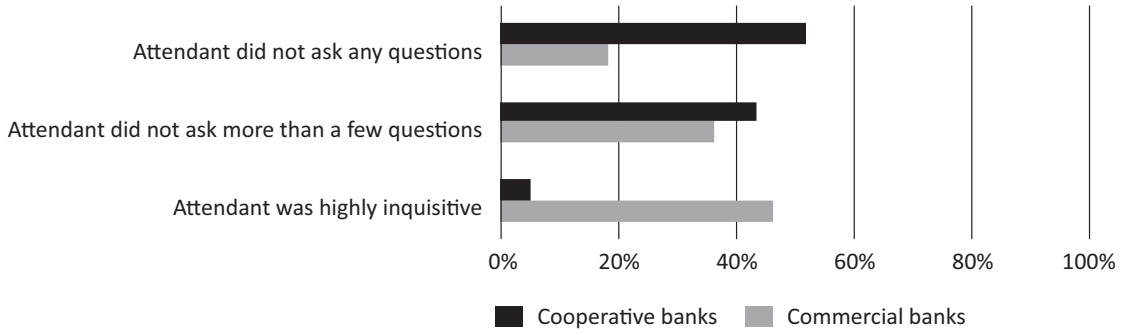

Figure 4. Attendants' commitment to the customer service
Source: own research.

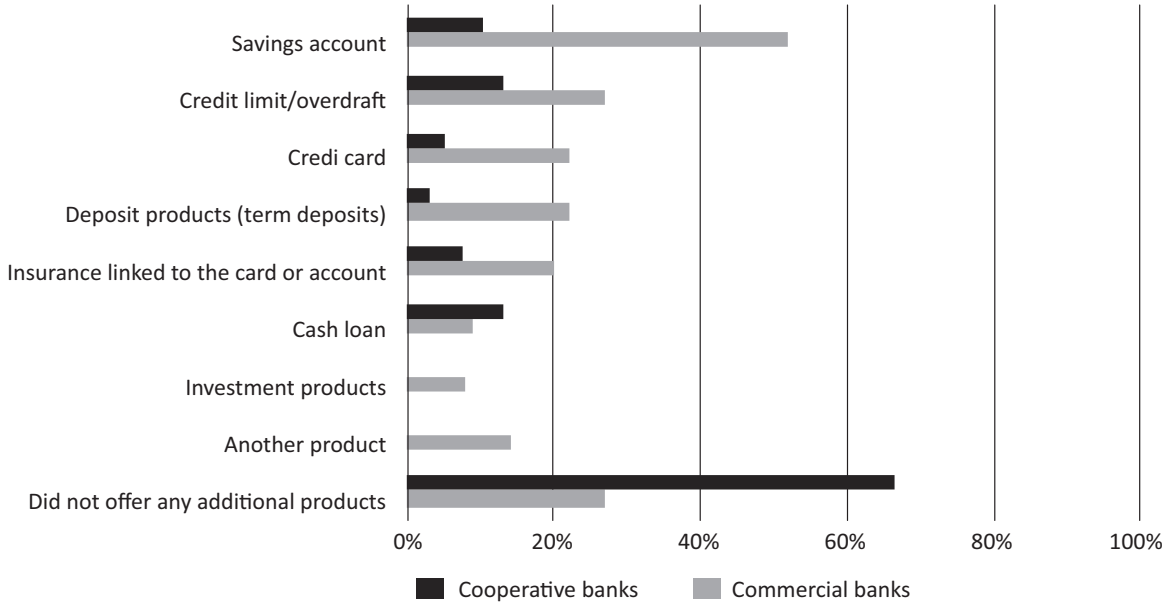

Figure 5. The scope of cross-selling used by the bank attendants when presenting the offer of a ROR current account
Source: own research.

banks, the attendants undertake actions to tailor the offer to the customers' needs. In the case of the cooperative banks, 26% attempt to tailor the offer. The scope of the offered additional products (Fig. 5) as well as the customers' inclination to buy the product are the direct results of tailoring the offer. In the case of the cooperative banks, 66% of the customer service attendants during the sales talk do not propose any additional products apart from the one the customer asked about. At the commercial banks this figure stands at 27%.

CONCLUSIONS

The presented results can be a clue for the future model of the direct customer service at the banks. The level of the customer service at the cooperative banks lingers behind the standards employed at the commercial banks. The after-sales effectiveness of the cooperative banks' attendants is twice as low in comparison with the commercial banks. The cooperative banks practice the customer-oriented model of selling services to a limited extent. Getting infor-

mation about the customers as well as using this information in the customer service process, tailoring the offer and building relations with the customer are on a very low level. Selling the financial services is to provide a certain combination of elements such as: knowledge, patience towards the customer, politeness, help and professional qualifications in fulfilling the customers' needs. All these elements should occur simultaneously. Moreover, the customer-oriented approach will require the fulfilment of several necessary conditions: determination and commitment of the management, efficient internal communication at the bank, strong middle management and having the Customer Experience Management program.

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RELATION BETWEEN SELECTED WEATHER FACTORS AND INSURANCE INDEMNITY IN UKRAINIAN AGRICULTURE

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ABSTRACT

The present paper is devoted to examining if weather variables have a significant impact on the level of indemnity in examined agriculture insurances, i.e. insurance of winter crops. The authors will determine whether indicators as excessive rainfall and extreme temperatures (especially frost) contribute to crucial increase of insurance indemnity. According to currently existing theories, weather changes have vital consequences both for farmers and for insurers as they take over the risk. The goal of the present paper is to analyse strength and direction of correlation between weather variables and insurance indemnity in case of winter plants to state whether these influence amounts of money paid to farmers for their crops' losses.

Keywords: insurance indemnity, weather variables, agriculture
JEL codes: G22, Q14

INTRODUCTION

It has been acknowledged that climate change is one of the greatest ongoing risks to our society (World Economic Forum, 2017). The problem of climate change and its influence has recently moved from the ecological areas of study to economics. The unpredictable character of the climate makes the business of agriculture more risky and costly. That is why the variety of weather conditions and the circumstances under which the insurer will compensate the insured from year to year has become more extensive. The research question is if critically changing weather conditions always cause the increase of insurance indemnity. The case of Ukrainian agricultural insurance is the subject of our research.

THEORETICAL BACKGROUND

At present, agricultural insurance is developing towards the minimization of the asymmetry of information concerning agricultural risks and towards a more effective estimation of insurance losses. Agricultural insurance losses have a direct connection with natural disasters and climate change. Due to this, different theoretical approaches are being explored that attempt to explain the relationship between weather changes and agricultural insurance. Most papers discuss insurance indemnities in the context of the implementation and development of index insurance. Different types of indexes are used in agricultural insurance: weather index, commodity price index, vegetation index, area yield index, etc. The main advantages of index

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insurance are the objectiveness and non-sensitive to moral hazard and adverse selection instead of traditional insurance. The mechanism of index insurance provides the dependence of insurance indemnities on critical weather indices. The idea of index insurance is based on the concept of providing financial protection to the cultivator against losses due to adverse weather incidents, such as rain deficit and excess rainfall, frost, heat, relative humidity, etc. In practice, the weather indices may include: the total seasonal rainfall indices, weighted rainfall indices, multiple phase weather indices, consecutive dry days indices, excess/untimely rainfall indices, low temperature or frost indices, high temperature indices, weather indices for pests and diseases (World Bank, 2011).

We would like to point out that weather index insurance has become more popular in some countries such as India, USA, Canada, Uruguay, Mexico, Ukraine, Malawi, or Brazil. This type of agricultural insurance is widespread in developing countries as it produces optimal insurance coverage with minimal asymmetry of information (due to clear meteorological indicators). That being the case, we tried to de monstrate the relationship between selected weather parameters and insurance indemnity in the case of winter crops. It has been said that weather factors determine the risk of crop losses, but what about the relationship between weather parameters and insurance indemnities? Different aspects of this question have been discussed by various researchers (Table 1).

Some questions concerning weather insurance indices were researched, such as the underwriting of agricultural risks under the conditions of a changing climate and fluctuating insurance prices (Che Mohd Imran, 2012), the influence of climate change on crop insurance premium rates (Tack, 2013). It has been demonstrated by research that:

– there is a close relationship between lowering the chemical input of farmers from one side and the moral hazard of agricultural insurance on the other side (Smith, 1996);
– there is only a tenuous relationship between insurance indemnities in agriculture and natural disaster losses in China due to the 'saving' policy of insurance companies; this was the main reason for the weak development of agricultural insurance in China up until 2007 (Wang, 2011);
– the opportunities and challenges of using techniques like satellite imagery, weather stations, drones (Krishna, 2017);
– in 2017 weather factors caused 58% of the total losses in Ukrainian agriculture (International Finance Corporation, 2017).

The demand for agricultural insurance is characterized by a range of indicators such as the number of insurance contracts, the territory which was insured, the insurance sum, premiums and level of indemnity payments. It may be observed from Table 2 that the total number of contracts declined from 2011 to 2017. Most of these contracts concern insurance

Table 1. Selected articles about the relationship between weather indicators and insurance indemnity

Source	Title	Conclusions
Willams et al. (1997)	An Expected-Indemnity Approach to the Measurement of Moral Hazard in Crop Insurance	'moral hazard affects multiple peril crop insurance indemnities in poor production years but that no significant moral hazard occurs in years when growing conditions are favorable'
Raju et al. (2016)	Transforming Weather Index-Based Crop Insurance in India: Protecting Small Farmers from Distress.	high correlation between rainfall deficit (drought) and insurance indemnities
Maestro, Bielza and Garrido (2106)	Hydrological drought index insurance for irrigation districts in Spain	unitary indemnity estimation does not completely offset economic losses that might affect ligneous crops in case of drought, especially when drought affects production in subsequent years
Clarke (2016)	The theory of rational demand for index insurance	the risk that the farmer experiences a loss and receives no insurance indemnity because it is not a loss that is reflected in the index

Source: own elaboration.

Table 2. Selected indicators concerning agricultural insurance in Ukraine in 2010–2017

Specification	2010	2011	2012	2013	2014	2015	2016	2017
Insurance contracts	1 217	2 710	1 936	1 722	1 392	1 062	793	957
Insured yields (thous. ha)	553	786	727	869	732	689	700	661
Insurance sum (UAH million)	n.d.	n.d.	n.d.	n.d.	3 055	3 969	6 240	5 933
Insurance premiums (UAH million)	72.1	136.3	130.4	135.4	72.8	77.7	157.0	204.3
Subsidy (UAH million)	0	0	0.086	0	0	0	0	0
Level of indemnity payments (%)	3.8	50.9	28.0	9.7	7.6	12.9	44.2	4.9

Source: International (2018).

against frost damage during the dormant period of plant growth and early springtime frost (according to data 2017).

On the other hand, the absolute indicators of insurance premiums and sums have ceased to increase. This may be explained by changes in Ukrainian currency exchange rates and prices in the world market for some types of grain.

MATERIALS AND METHODS

The research includes 3 different aspects: weather conditions, agriculture and insurance. The scope of our research involves Ukraine as one of the leaders in world agriculture (wheat production 26,700 thousand tonnes, maize – 28,418 thousand tonnes in 2017) (OECD, 2018a). Ukrainian share in world wheat production equals 3.58% and in world maize production about 2.78% (OECD, 2018b).

Firstly, we discuss the extent of the weather changes in 2017 and during the period 2007–2017. For this discussion we use some weather indices (maximum temperature, minimum temperature and average rainfall) with weekly values in the period from 1 December 2016 till 30 April 2017. The study of weather changes in selected Ukrainian districts was based on the data of the Speedwell Weather System. Secondly, we explore the subject of insured areas and the types of insured crops. For this analysis we used the reports of the Ukrainian Ministry of Agriculture and other government and international institutions. The third aspect is an analysis of the insurance indemnity in selected districts of Ukraine that avoided the highest insurance indemnities per insured hectare in 2017.

RESULTS AND DISCUSSION

Within the scope of the research, twelve Ukrainian districts were examined. The variables, that were taken into consideration were the area insured in hectares, the number of insurance contracts, premiums in UAH, the insurance premium per unit area insured, and the insurance indemnity in UAH. Because different districts have different areas to be insured, it was necessary to include a new indicator – indemnity in UAH per hectare insured, to allow a fair comparison to be made. This indicator was then juxtaposed with data concerning weather variables. The results are presented in Table 3. The correlation between indemnity per hectare and selected weather variables was not very significant (absolute value below 0.25), only in the case of the minimum temperature recorded it was at a level of –0.44, showing that lower temperatures (frost) cause an increase in the indemnity per hectare.

Four districts with a higher indemnity per hectare insured were examined: Cherkasy, Khmelnytskyi, Zaporizhia and Ternopil. Correlation coefficients between indemnity per hectare insured and weather variables: rain, maximum, and minimum temperature were as follows: 0.78, 0.63, –0.37. An increase in rain intensity and in maximum temperatures leads to a higher indemnity per hectare insured.

The data presented above for the regions shows that the standard deviation calculated for the year 2017 for all the examined variables differs from the one calculated for the last ten years. These discrepancies, however, are at various levels – the most significant variations may be observed in the case of rain intensity, the least significant ones occurred in the case of

Table 3. Summary statistics for weather variables

District	Insurance premiums for area insured	Indemnity/ /area insured	Rain		Maximum temperature		Minimum temperature	
			standard deviation – 2017	standard deviation – last 10 years	standard deviation – 2017	standard deviation – last 10 years	standard deviation – 2017	standard deviation – last 10 years
Zaporizhia	265	48.47	7.20	1.60	7.40	6.62	6.26	4.54
Khmelnytskyi	207	41.15	3.49	1.28	8.02	6.66	6.09	4.66
Cherkasy	422	85.00	6.99	2.03	7.50	6.79	6.06	4.69
Ternopil	201	23.24	2.73	0.99	2.73	6.51	6.13	4.80
Vinnytsia	536	8.46	6.73	1.42	7.42	6.70	6.95	4.75
Dnipropetrovsk	269	1.11	10.35	2.28	7.17	6.84	6.61	4.63
Donetsk	118	4.80	6.72	1.42	6.39	6.51	6.26	4.77
Zhytomyr	312	13.46	6.02	1.47	7.42	6.59	6.64	4.48
Ivano-Frankivsk	231	3.02	2.96	1.13	7.69	6.02	6.37	4.76
Lviv	479	4.42	4.16	1.89	7.32	5.95	6.00	4.28
Kharkiv	88	0.90	6.96	1.69	6.97	7.05	7.40	5.20
Chernivtsi	403	6.56	4.04	2.10	8.00	6.52	6.16	4.85

Source: own calculations based on: Speedwell Weather on-line database, International Finance Corporation (2018).

minimum temperature. To examine these differences, the coefficient of variation was calculated. The percentage results are presented below (Table 4).

Although data regarding temperature were originally expressed in degrees Celsius, they were converted to kelvins, to enable the calculation of coefficients

Table 4. Coefficients of variation

District	Indemnity/area	Rain (%)	Maximum temperature (%)	Minimum temperature (%)
Zaporizhia	48.47	128.27	2.61	2.35
Khmelnytskyi	41.15	83.13	2.85	2.28
Cherkasy	85.00	145.78	2.65	2.27
Ternopil	23.24	94.70	0.99	2.30
Vinnytsia	8.46	98.13	2.63	2.60
Dnipropetrovsk	1.11	163.66	2.54	2.48
Donetsk	4.80	114.44	2.27	2.34
Zhytomyr	13.46	91.73	2.62	2.48
Ivano-Frankivsk	3.02	83.57	2.69	2.40
Lviv	4.42	73.37	2.58	2.26
Kharkiv	0.90	111.84	2.48	2.78
Chernivtsi	6.56	112.01	2.81	2.30

Source: own calculations based on: Speedwell Weather on-line database, International Finance Corporation (2018).

of variation (that must only be calculated using a ratio scale). The degree of variation with temperature was low, oscillating between 2 and 3%. It is interesting to note that a clear link between variations in rainfall and indemnity per hectare insured may not always be observed. For example, the district of Dnipropetrovsk has a very high coefficient of variation while at the same time having a very low indemnity per hectare insured. In contrast, the district of Khmelnytskyi has a low coefficient of variation (in relative terms, in this set) but it has the third highest indemnity per hectare insured.

CONCLUSIONS

Our work has led us to conclude that:

- based on an analysis of twelve districts, we found that the correlation between indemnity per hectare and selected weather variables (minimum and maximum temperature, rainfall) was not very significant (absolute value below 0.25), only in the case of the minimum temperature it was found to be at a level of –0.44, showing that lower temperatures (frost) cause an increase in indemnity per hectare;
- in the case of the analysis of four districts with higher indemnities per hectare we found that an increase in rain intensity and in maximum temperatures lead to a higher indemnity per hectare insured;
- the clear link between the variation in rainfall and indemnity per hectare insured may not always be observed: the districts with the highest level of variation in rainfall had the lowest indemnity per hectare in 2017 as was the case with Dnipropetrovsk. At the same time, it is necessary to acknowledge that variations in the maximum and minimum temperature did not affect the insurance indemnity. And vice versa, there is evidently a relationship between the insurance indemnity and the amount of rain in the Cherkasy district.

Taken together, these results suggest that rainfall and maximum and minimum temperatures are not the main factors that may have an effect on the high insurance indemnity for the insurance of winter plants.

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USE OF AGRICULTURAL SERVICES IN EUROPEAN UNION COUNTRIES

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ABSTRACT

The purpose of this paper is to assess the use of agricultural services in European Union countries in the context of selected features of agriculture. The Ward's Method was used to isolate six typological clusters of European Union countries. It may be noticed that clusters with a high levels of fixed capital consumption and total intermediate consumption are characterized by a higher use of services than other clusters. The absence of a noticeable relation between the share of crop output in the structure of agricultural output, or between the labour input and the use of agricultural services can be explained by differences in natural conditions, traditional farming models and preferences in choosing between developing the farm's own machinery or using services.

Keywords: agricultural services, European Union
JEL codes: O13, Q19

INTRODUCTION

Substitution takes place in defined boundaries between the following three factors, which make up agricultural production: labour, land and capital; the components of a productive input may also be substituted by one another. In general terms, a farm can achieve a defined production output by combining productive inputs and their components in various ways. Such combinations are determined by price levels of individual inputs that result from the abundance of resources of relevant productive inputs and their components. One of the ways to optimize the production process is to substitute the farm's own labour and capital inputs with procurement of production services. This paper focuses on agricultural services that constitute one of the types of production services in agriculture in individual countries of the European Union[2]. Therefore, the main purpose of this paper is to assess the use of agricultural services of the European Union countries in the context of selected aspects of agriculture.

THEORETICAL BACKGROUND

According to the EU legislation (Commission Regulation (EC) 138/2004), agricultural services constitute the hire of machines and equipment with corresponding labour. Agricultural services can be divided into two categories: (1) Agricultural services in the form of contract work at the production stage (i.e. agricultural contract work), 'other' agricultural services (the operation of irrigation systems, the design, planting and maintenance of gardens, parks and green areas for sport facilities and the like; tree pruning and

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[2] The study did not include Cyprus and Malta due to the marginal economic importance of agriculture in those countries.

hedge trimming, etc.). The term to perform contract work can be misleading, however it is clarified in the following way: contract work (…) may be performed by: (a) specialist contractors for whom these are the principal activities (contractors in the true sense).

Agricultural services support the rationalization of the crop production process: using potential and knowledge of service providers allows to reduce the costs of building and maintaining the farms' own potential as well as to reduce human labour input. Moreover, this is a way to attain higher production efficiency and better product quality. Services are also the carriers of knowledge and of progress in the organization of production and technologies implemented. Therefore, they enable limiting the adverse environmental impact of crop production, for instance by reducing the intensity of soil structure degradation (more sophisticated machines require a smaller number of operations) or by a better selection that results in using less herbicides and pesticides. Although agricultural services alone directly involve crop production processes, their significance goes beyond that. When properly used, they become a part of the process that ushers the shift from traditional and industrial agriculture towards sustainable agriculture.

A large labour force a shortage of capital is a situation which mostly favours the exploitation of the productive input present in abundant quantity, i.e. labour. In such conditions, capital costs, including service procurement, are lower and often limited to activities that increase land productivity (i.e. fertilization and wide use of chemicals). Having in mind the need to ensure further growth of agricultural output, a decrease in the farming labour resources and an increase in their costs results in an increased importance of capital inputs, especially those that allow for labour efficiency to be improved, e.g. by equipping the workforce with machinery and agricultural equipment. However, improving the farms' equipment with fixed assets increases the demand for production services related to the manufacturing, use and employment of those assets in the production processes (i.e. renovation, maintenance and repair services). At the same time, allocating some capital inputs to services used in the production process (instead of the farm's own assets), leads to a decrease in production costs which is consistent with the commitment to attain economies of production scale and to improve the farm's economic performance[3].

MATERIALS AND METHODS

To assess the use of agricultural services in individual EU countries in the context of selected features of agriculture, the countries were grouped by intra-cluster variation with the use of agglomerative hierarchical clustering[4]. The Ward's method was among many different hierarchical methods as it is widely recognized for its outstanding efficiency (Sokołowski, 2002). The more similar are the items, the sooner they may be connected with one another (the minimization of the sum of squared deviations of any two clusters that can be formed at any stage) (Sokołowski, 2002). In the case of research presented in this paper, this method allowed to identify clusters of countries with similar characteristics in terms of estimated variables; this can be helpful when drawing conclusions on variables that characterize and/or determine the use of agricultural services. The Euclidean distance was used for clustering purposes[5] and variance analysis was then performed:

$$\text{distance}\,(x, y) = \{\sum i\,(x_i - y_i)^2\}^{½}$$

The clusters are put in hierarchical order so that lower-rank clusters are included in upper-rank clusters, in line with the hierarchy of similarity between items (Pawlak, 2008; after Marek, 1989). Considering the fact that non-correlated features have the greatest influence on the clustering process (Błażejczyk-Majka and Kala, 2005), the calculated indicators were assessed for correlation coefficients; the variables were standardized first.

[3] cf. Cieśla, Kowalska-Grudzień and Kruczek-Patko (1987).

[4] Clustering, as a method of putting items in order is an essential process to be used when studying economic phenomena (Błażejczyk-Majka and Kala, 2005).

[5] The Euclidean distance is one of the most frequently used methods for items characterized by measurable features (Marek; 1989; Pawlak and Poczta, 2011; after Mardia, Kent and Bibby, 1979).

The selected features that characterize the agriculture of individual EU countries were taken into consideration in the clustering process. A series of attempts to develop a typology based on various sets of features were carried out. The set of features presented in this paper turned out to be the only one that complied with both substantive and statistical selection criteria. After eliminating strongly correlated variables[6], the typology was created with the use of the following indicators that characterize and/or determine the use of agricultural services in agriculture of individual countries of the European Union:

- x_1 – value of agricultural services per hectare of agricultural land (EUR),
- x_2 – Annual Work Unit (AWU) input per farm,
- x_3 – agricultural service intensity rate (EUR per EUR 1,000 worth of crop output),
- x_4 – fixed capital consumption per hectare of agricultural land (EUR),
- x_5 – total intermediate consumption per hectare of agricultural land (EUR),
- x_6 – share of crop output in agricultural output (%).

The features that characterize the identified typological clusters are based on the values of measure of differences between means of active features (Wysocki, 2010).

Dana from the Statistical Office of the European Union for 2004–2017 and publications on the subject in question were used to perform the calculations.

RESULTS AND DISCUSSION

As a result of the clustering process that included a step-by-step diagram[7], six relatively homogenous clusters of EU countries were obtained (Fig. 1, Tables 1 and 2).

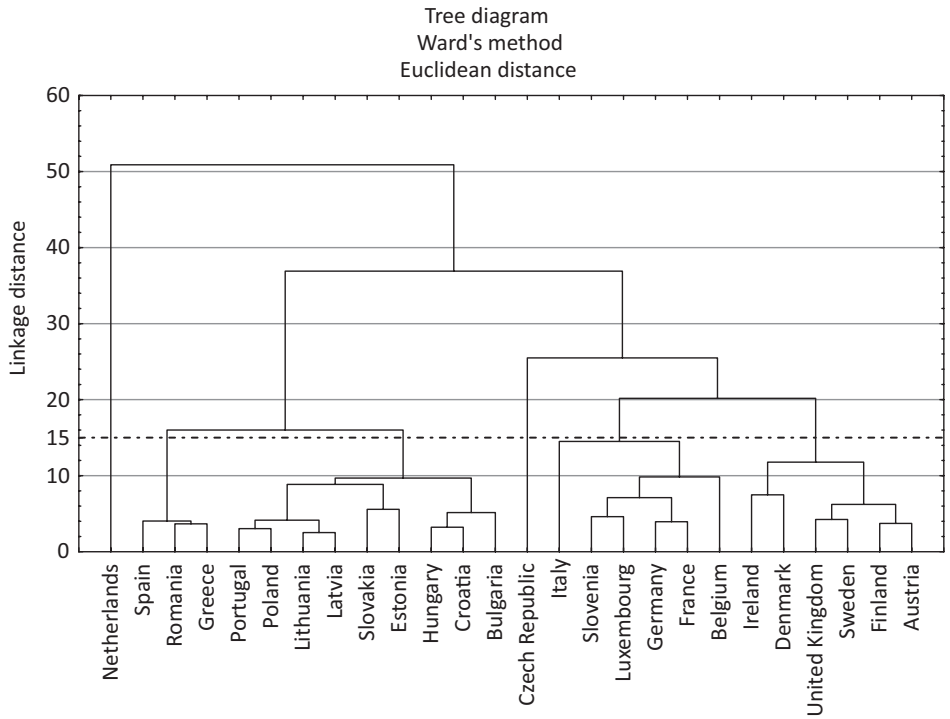

Figure 1. Tree diagram of the EU countries by the use of services and by characteristics of agriculture

Source: Eurostat (online data). Retrieved: http://ec.europa.eu/eurostat/data/database [Accessed 18.05.2018], own calculations.

[6] The correlation of the initial set of features was analyzed. Afterwards, highly correlated features were eliminated.

[7] The tree diagram was cut at the 15th level. This is where many clusters were formed within a very short linkage distance. According to Błażejczyk-Majka and Kala (2005) and Stanisz (2007), the diagram of the agglomeration process may indicate the cutting place of the tree diagram. Usually, it coincides with the place where a clear flattening is visible.

Table 1. Intra-cluster mean values of active features describing the use of services and characterizing agriculture countries of the European Union

Specification	Class						Mean
	I	II	III	IV	V	VI	
Value of agricultural services per 1 ha of agricultural land (EUR)	1 285	20.7	40.9	30.8	90.2	80.4	56.5
Service intensity rate (value of agricultural services per EUR 1,000 worth of crop output)	187	19.8	62.6	42.5	68.5	122.4	80.7
Share of crop output in the structure of agricultural output (%)	50.3	68.3	55.4	57.0	50.3	37.9	52.3
Annual Work Unit (AWU) per farm	2.0	0.6	1.1	3.8	1.4	1.1	1.1
Fixed capital consumption per 1 ha of agricultural land (EUR)	1 788	220	114	163	566	431	251.3
Total intermediate consumption per 1 ha of agricultural land (EUR)	8 633	861	801	931	1 788	1 322	1 134.6

Source: Eurostat (online data). Retrieved: http://ec.europa.eu/eurostat/data/database [Accessed 22.04.2018], own calculations.

Table 2. Values of measure of differences between means of features describing the use of services and the characteristics of agriculture in countries of the European Union and in classes thereof (Ward's method)

Specification	Class					
	I	II	III	IV	V	VI
Value of agricultural services per 1 ha of agricultural land (EUR)	43	–1.3	–0.6	–0.9	1.2	0.8
Service intensity rate (value of agricultural services per EUR 1,000 worth of crop production)	3.4	–1.9	–0.6	–1.2	–0.4	1.3
Share of crop output in the structure of agricultural output (%)	–0.3	2.3	0.4	0.7	–0.3	–2.0
Annual Work Unit (AWU) per 1 agricultural holding	3.2	–2.1	–0.1	10.0	0.9	0.0
Fixed capital consumption per 1 ha of agricultural land (EUR)	8.6	–0.2	–0.8	–0.5	1.8	1.0
Total intermediate consumption per 1 ha of agricultural land (EUR)	21.7	–0.8	–1.0	–0.6	1.9	0.5

Source: own calculations based on Table 1.

The first type of cluster (I) was a singleton composed of the Netherlands. This type is characterized by the greatest value of agricultural services per hectare of agricultural land (EUR 1,285), the highest service intensity rate of agricultural production (EUR 187/ EUR 1,000 worth of crop output), the highest number of AWU per farm (2 AWU) and the highest level of fixed capital consumption and total intermediate consumption per hectare of agricultural land (EUR 1,788 and EUR 8,633, respectively). Apart from that, the

share of crop output in the structure of agricultural output of this country came to 50%.

The second typological cluster (II) included Spain, Romania and Greece. Agriculture in this type of countries is characterized by the lowest value of agricultural services per hectare of agricultural land (EUR 20.7) and per EUR 1,000 worth of crop output (EUR 19.8). Also, this cluster exhibited the lowest number of AWU per farm (0.6). A characteristic feature of this cluster is the highest share of crop output in the structure of agricultural output (nearly 70%).

The third cluster (III) included eight Central and Eastern European countries (including four Baltic countries: Poland, Lithuania, Latvia, Estonia, followed by Slovakia, Hungary, Croatia and Bulgaria) and Portugal. In these countries, the agriculture is characterized by the lowest value of the total intermediate consumption per 1 ha of agricultural land (EUR 801). The value of services per hectare and the value of services per EUR 1,000 worth of crop output was higher in those countries than in clusters II and IV.

The fourth type (IV) consisted of only one country, the Czech Republic. The agriculture of this type is characterized by the greatest number of AWU per farm (almost 4 AWU) and a low value of agricultural services per EUR 1,000 worth of crop output (EUR 42.5). It is the result of a large average area of farms in the Czech Republic and of agricultural production being based mostly on own machinery and equipment. In this country, large farms continue the tradition of state-owned farms and production cooperatives that were active before 1990. This has many consequences, including tying up a relatively large amount of labour resources.

The fifth cluster (V) included six countries: Italy, Slovenia, Luxembourg, Germany, France and Belgium. A characteristic feature of agriculture in this cluster is a high agricultural services per hectare of agricultural land and a very high level of fixed capital consumption and total intermediate consumption per hectare of agricultural land, reaching EUR 431 and EUR 1,788, respectively.

The sixth typological cluster consisted of six Western European countries: Ireland, Denmark, the United Kingdom, Sweden, Finland and Austria. This cluster is characterized by a very high service intensity rate of agricultural production (EUR 122.4 per EUR 1,000 worth of crop output), a high value of fixed capital consumption per hectare of agricultural land (EUR 251.3), and the lowest share of crop output in the structure of agricultural output.

CONCLUSIONS

The clustering procedure resulted in identifying six clusters of EU country type that differ from each other by the use of services and by selected agricultural characteristics. Although the population surveyed demonstrates a varying share of crop output in the structure of agricultural output, it is difficult to find any relation between that diversity and the use of services. Surprisingly, this is also true for the amount of labour inputs. In cluster IV, large labour inputs are accompanied by a relatively small use of services (note however that this is a singleton, the Czech Republic). The values obtained in other clusters do not indicate the existence of, for instance, a substitution between labour inputs and procurement of agricultural services. The absence of a clear relation between the share of crop output in the structure of agricultural output and the amount of labour inputs, on one side, and the use of services, on the other side, can be explained by differences in natural conditions, traditional farming models and preferences in choosing between the developing the farm's own machinery and using services. On the other hand, it may be noticed that groups characterized by high levels of fixed capital consumption and total intermediate consumption also demonstrate a higher service output compared to other clusters.

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MUNICIPAL INFRASTRUCTURE AND THE LEVEL OF FISCALISM IN LOCAL TAXES

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ABSTRACT

Municipalities are responsible for the condition of technical infrastructure installations, shaping the conditions of functioning of companies at the local level. The operation of municipal infrastructure generates costs that need to be financed by budgetary revenue. The aim of this paper is to identify the interdependencies between the level of municipal infrastructure provision and the level of fiscalism in property tax. The Technique for Order Preference by Similarity to Ideal Solution (TOPSIS) method was used for the synthetic assessment of the development of the municipal infrastructure. The analyses conducted confirmed the correlation between the condition of technical infrastructure and the level of fiscalism of municipalities. Municipalities with higher standard of public services related with technical infrastructure had higher property tax rates. A higher fiscalism level of municipalities is accepted if the installations allowing for a better standard of living and conducting business is provided.

Keywords: infrastructure, municipality, local taxes
JEL codes: H41, H71, H72

INTRODUCTION

The introduction of territorial self-government empowered local communities giving them the right to decide in their own matters within their fields of competence (cf. De Benedictis-Kessner and Warshaw, 2016). Self-governance meant, on the one hand, the renouncement from centralised control over multiple public tasks, usually connected with defining their standard. On the other, the created territorial self-government units (mostly municipalities) gained the ability to have influence on the revenue within local tax policy over time (cf. Dupor and Guerrero, 2017).

Experience at international level shows that there are certain interdependencies between local goods or public services and the tax policy of self-governments (cf. Zodrow and Mieszkowski, 1986). According to Tiebout (1956) theoretical analysis, when choosing a place of residence, people compare the local offer of public goods with local tax level. This paper attempts to verify this relation on a local level and to assess the interdependencies between the level of fiscalism and the level of municipal infrastructure provision in based on empirical data from Poland in the period 2010–2015.

The aim of this paper is to identify the interdependencies between the level of municipal infra-

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structure provision of self-governments of municipalities and the level of fiscalism in property tax.

THEORETICAL PREMISES OF THE IMPORTANCE OF LOCAL INFRASTRUCTURE FOR THE ECONOMIC DEVELOPMENT AND OF ITS FINANCING

Infrastructure is crucial for socio-economic life and this is why it is the public sector's responsibility (Bond, 1999; Szewczuk and Zioło, 2008). The local technical infrastructure is a part of municipal property and is controlled by territorial self-government units, mostly municipalities.

The research of the role of infrastructure in economic growth is connected with the so-called big-push concept according to which exceeding a certain developmental threshold allowing for self-stimulation and the sustainability of growth and development processes is particularly problematic for deprived areas (Rosenstein-Rodan, 1961; Ratajczak, 2000). In the theory of economy, there are at least two different views on the relation between infrastructure and economic development. According to the first one, represented by Ragnar Nurkse, the creation of infrastructure elements is a condition for, therefore should precede, economic development processes (Nurkse, Haberler and Stern, 1962). Hirschman (1964) did not agree with this opinion and believed that the economy goes through particular development phases with temporary insufficiency of infrastructure. It means that infrastructure objects are created in the consequence of the economic development of regions.

The functioning of the infrastructure sector is often considered an example of a natural monopoly. High market entry barriers related with a very high cost of creating infrastructure objects (sometimes referred to as sunk costs, as they cannot be recouped) are characteristic for this market structure. On the other hand, when the infrastructure already exists, the costs of providing another unit of goods are low, which leads to low marginal costs.

A natural monopoly is a sign of market failure concerning the infrastructure sector and takes the following forms (cf. Szablewski, 1991):

- Production scale increase takes place with a downward average costs curve. It means that the lowest cost of total demand satisfaction is possible only when there is only one supplier on the market.
- External effects are related with infrastructure development. External benefits appear when the functioning of one entity has positive effects for other entities without due compensation from them (cf. Barro, 1990). Under the conditions of a market economy, due to the lack of possibilities to internalise these benefits, there is a risk of lower than socially expected level of supply of infrastructure services and goods.
- Spatial and physiographic conditions as well as material situation of the residents may significantly diversify the costs of support of infrastructure services recipients and their price. However, due to the fact that they mostly satisfy basic needs, more egalitarian ways of their distribution are needed.

MATERIALS AND METHODS

The primary source of data included data about property tax rates obtained from resolutions of municipal councils in Poland. Another source of data about the level of municipal infrastructure development were the indexes of the percentage of persons serviced by waterworks and sewerage networks, and gas networks obtained from the CSO Local Data Bank. Due to the large scope of analysed data, the spatial scope was limited to the Małopolskie province municipalities (182) and the temporal scope to six years (2010––2015). The property tax was chosen from local taxes due to its greatest significance in own revenue and the widest range of application of fiscal sovereignty instruments (Przygodzka, 2014).

Due to the complexity of the analysed phenomena (they are described by many sub-indices), the TOPIS (Technique for Order Preference by Similarity to Ideal Solution) method was used for synthetic assessment. This method is a multi-criteria method of decision support and a benchmark method of synthetic measure creation (Hwang and Yoon, 1981).

The value of the synthetic measure was determined in the following order:

1. Normalisation of simple characteristics value – unification of characteristics by transforming dampers into boosters using zero unitarisation through the following formulas:

$$z_{ij} = \frac{x_{ij} - \min\limits_{i} x_{ij}}{\max\limits_{i} x_{ij} - \min\limits_{i} x_{ij}}, \quad \text{when} \quad X_j \in S$$

$$z_{ij} = \frac{\max\limits_{i} x_{ij} - x_{ij}}{\max\limits_{i} x_{ij} - \min\limits_{i} x_{ij}}, \quad \text{when} \quad X_j \in D$$

S – stimulants,
D – destimulants.

2. Determining the coordinates of the pattern and anti-pattern of development:

$$A^{+} = \left(\max_{i}(z_{i1}), \max_{i}(z_{i2}), ..., \max_{i}(z_{ij})\right) = (z_1^{+}, z_2^{+}, ..., z_j^{+})$$

$$A^{-} = \left(\min_{i}(z_{i1}), \min_{i}(z_{i2}), ..., \min_{i}(z_{ij})\right) = (z_1^{-}, z_2^{-}, ..., z_j^{-})$$

3. Developing Euclidean distances of particular objects from the pattern and anti-pattern of development:

$$d_i^{+} = \sqrt{\sum_{j=1}^{m}\left(z_{ij} - z_j^{+}\right)^2}$$

$$d_i^{-} = \sqrt{\sum_{j=1}^{m}\left(z_{ij} - z_j^{-}\right)^2}$$

4. Determining synthetic measurement values for particular objects based on the following formula:

$$q_i = \frac{d_i^{-}}{d_i^{-} + d_i^{+}}, \qquad i = 1, 2, ..., n$$

These calculations allowed for a ranking of municipalities based on the level of provision of technical infrastructure to be created. This criterion was later used for objects grouping. The following indicators were used to measure the infrastructural equipment of municipalities: share of inhabitants served by water supply network, share of people using the sewage network and the share of people served by the gas network. The synthetic results of the analyses are presented in tables.

RESULTS AND DISCUSSION

The high costs of municipal infrastructure creation requires searching for financing sources (Chan et al., 2009; Wagenvoort, Nicola and Kappeler, 2011). Territorial self-government units may use both internal and external investment financing. The spectrum of external sources is wide and includes returnable and non-returnable financing of self-government investment tasks. However, they are not the subject of this paper and will not be analysed in detail here. Internal sources provide the highest decision-making autonomy, but often, they do not guarantee enough funds to cover all investment projects costs. Among the internal sources, own revenue that directly determines the possibilities of development is considered the most important. Local tax and fees are also important, as they are not only a source of financing of the budget, but also allow affecting the behaviours of entities they apply to. It means that decisions within the local tax policy can affect the amount of budget revenues and the behaviour of taxpayers subject to local taxes.

The fiscal sovereignty of municipalities is executed primarily through shaping tax rates (cf. Przygodzka, 2014) within the limits laid down in the relevant legislative acts.

In the studied period, the municipalities increased property tax rates both with regards to residential and business buildings, whereby these changes were not big (Table 1). The rates for residential buildings grew slightly faster (1.19) than these for persons conducting business activity (1.13). It is worth noting that on average, the rates for residential buildings were lower (73% of maximal rates) than for business-related buildings (76% of maximal rates). In residential buildings taxation, spatial diversification is higher than in commercial buildings, as proved by coefficients of variation.

The synthetic assessment of the level of development of municipal infrastructure using the TOPIS method allowed for arranging groups of municipalities and distinguishing groups with similar levels of

Table 1. Comparison of selected statistical measures of property tax rates in Małopolskie province municipalities (PLN/m^2)

Specification	2010		2011		2012		2013		2014		2015	
	A	B	A	B	A	B	A	B	A	B	A	B
Mean	0.46	15.60	0.48	15.91	0.51	16.80	0.54	17.38	0.55	17.60	0.55	17.64
Median	0.49	16.00	0.50	16.00	0.54	17.00	0.55	17.57	0.56	17.88	0.57	17.91
Standard deviation	0.13	2.58	0.13	2.59	0.14	2.67	0.13	2.70	0.14	2.74	0.14	2.74
Coefficient of variation	0.27	0.17	0.27	0.16	0.26	0.16	0.25	0.16	0.25	0.16	0.25	0.16

A – residential buildings; B – buildings related with economic activity

Source: own research.

availability of infrastructure installations. Based on the synthetic measure, 4 groups of entities were distinguished:

– I group – with the lowest development level ($q_i < 0.33266$),
– II group – with low development level ($0.33266 < q_i < 0.45294$),
– III group – with medium development level ($0.45294 < q_i < 0.60495$),
– IV group – with the highest development level ($q_i > 0.60495$).

The classification of municipalities allowed for indicating areas with the best and the worst standard of public services. The group of entities with the highest level of technical infrastructure development includes mostly large cities and local development centres. Rural municipalities in this group are mostly located next to the largest cities of the region or their dominant function is tourism. Peripherally located municipalities (mostly from southern and eastern parts of the region) dominated the group of entities with the lowest development level. These entities have a low level of entrepreneurship and a weak non-agricultural labour market and are exposed to migration (cf. Wojewódzka-Wiewiórska, and Dudek, 2016).

To assess the relations between the fiscalism level of municipalities in terms of property tax and the level of development of municipal infrastructure, the tax rates in particular groups were analysed. The groups were distinguished based on the value of synthetic measure obtained using the TOPSIS method (Table 2).

Table 2. Comparison of property tax rates as percentage of maximum rate in Małopolskie province based on the level of development of municipal infrastructure (%)

Specification	2010		2011		2012		2013		2014		2015	
	A	B	A	B	A	B	A	B	A	B	A	B
I group	66.5	70.8	66.9	70.4	68.4	70.7	69.7	70.9	69.8	71.0	68.9	70.7
II group	67.6	72.8	67.8	72.4	69.5	73.8	71.4	73.2	71.8	73.7	70.9	73.4
III group	72.6	76.3	72.5	76.1	74.6	77.7	74.6	77.0	75.4	77.2	74.4	76.9
IV group	79.4	84.5	78.1	83.5	80.3	84.3	80.2	83.6	80.6	83.8	79.5	83.4

A – residential buildings; B – buildings related with economic activity.

Source: own research.

The analysis confirmed the relation between the level of development of technical infrastructure and the level of fiscalism of municipalities in terms of property tax. The average taxation level was the lowest in municipalities with the lowest level of availability of public services. The higher the level of equipment with municipal infrastructure installations, the higher the level of fiscalism. The units with the highest level of infrastructure equipment had the highest property tax rates (expressed as percentage of maximum rates – Table 2). Therefore, residents incur higher costs in exchange for a higher standard of public services provided by the local self-government.

Each year, the level of fiscalism with regards to residential and business-related buildings increased along with the improvement of infrastructure availability. It is worth noting that the greatest differences are observed between the 3rd and 4th group, which may lead to a conclusion that the municipalities offering the best municipal infrastructure have significantly higher taxes. Although the average level of fiscalism is higher in the case of buildings used for business purposes than in case of residential buildings, it is worth noticing that this difference is decreasing. This is due to the faster growth of residential building tax rates.

CONCLUSION

The level of development of municipal infrastructure determines the conditions of life of the residents and is an important factor of the location of companies. In shaping their public services offer in terms of technical infrastructure, municipalities affect their competitiveness towards neighbouring entities.

The construction and maintenance of infrastructure requires expenditures from local budgets. The question of whether the level of development of municipal infrastructure with the scope of fiscalism with regards to local taxes arises. The conducted research confirmed the existence of such a relation. The higher the municipalities' fiscalism in terms of property tax, the better the quality and availability of the municipal infrastructure.

Municipalities offering a higher public services standard to their residents and entrepreneurs compensate the increase of infrastructure operation costs with higher taxes. Attempting to maintain a vast offer of public services while keeping the fiscalism level low would increase the debt of territorial self-government.

Territorial self-government units aiming toward improving the conditions of technical infrastructure should provide for an increase of the revenue from local taxes allowing them to cover growing maintenance costs in their long-term financial plans. Achieving residents' acceptance of growing tax rates is possible if the quality of life and conducting business improve.

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EU FUNDS (RDP) AND THEIR IMPACT ON LOCAL DEVELOPMENT

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ABSTRACT

The paper presents the results of research aimed at determining the impact of the use of EU funds on local development on the example of voivodeships. The first stage of the research was performed with the use of Hellwig's development model method. It was aimed at classifying individual voivodships and assigning them to one of four groups in terms of their level of development. The next stage was to check whether the examined features proving the level of local development are also related to the level of use of EU funds under RDP. In the third stage, the analysis of Ward clusters was used and answers were sought as to whether the units which are clustered together in terms of the level of use of EU funds are at the same time included in the same groups in terms of the level of local development.

Keywords: local development, Hellwig's method, Ward's method
JEL codes: 018, C10

INTRODUCTION AND THEORETICAL BACKGROUND

The main objective of RDPs for 2014–2020 is 'to improve the competitiveness of agriculture, sustainable management of natural resources and climate action, and balanced territorial development of rural areas'[2]. Nowadays, an increasing number of authors undertake to conduct research on the impact of the use of EU funds for agricultural development and, consequently, the development of a given territorial unit (Brzózka and Nurzyńska, 2002; Knieć, 2012; Piworowicz, 2015; Misztal, 2016; Nowak et al., 2016; Sawicka and Borowy, 2007; Tomczak, 2009; Wójcik, 2011). The concept of local development is multidimensional, and therefore does not have a uniform definition. Currently, the main driving factor is considered to be the endogenous potential on which the dynamics of its development depends (Sobczyk, 2010). Under RDP 2014–2020, which directly affects the development of endogenous potential, public funds amounting to EUR 13,612,211,428 are planned to be used, including EUR 8,697,556,814 from the EU budget (EAFRD) and the remaining EUR 4,914,654,614 from national contribution[3]. That is why it is so important to address this issue.

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[2] Ministerstwo Rolnictwa i Rozwoju Wsi [Ministry of Agriculture and Rural Development] webpage http://www.minrol.gov.pl/Wsparcie-rolnictwa/Program-Rozwoju-Obszarow-Wiejskich-2014-2020.

[3] Ibidem.

MATERIALS AND METHODS

The substantive selection of factors characterising the level of local development was based on the study of literature (Kamińska and Janulewicz, 2009; Adamowicz and Janulewicz, 2012; Bujanowicz-Haraś et al., 2015; Adamowicz et al., 2016; Janulewicz and Janulewicz, 2016; Nowak, Janulewicz and Krukowski , 2016), and the level of use of EU funds was based on (Nowak et al., 2016). On this basis, 88 diagnostic variables characterising the level of local development and 22 variables describing the level of use of funds under RDP 2014–2020 were selected. Then, it was checked whether the variables meet formal criteria: they are measurable, complete and ensure comparability (Adamowicz et al., 2016). Taking into account statistical criteria, the so-called quasi-constant variables (for which the coefficient of variation did not exceed 11%) were removed from the set, e.g.: the share of agricultural commodity production in total agricultural production (V = 4.50%). The next step was to eliminate overly correlated features, e.g. agricultural land in good agricultural condition with the total area of farms (0.99). Ultimately, the paper adopted 27 features, on the basis of which the level of local development was determined.

The same procedure was adopted for the variables describing the level of use of EU funds under RDP. The variables characterised by a low coefficient of variation, e.g. Axis 1, were rejected from further analyses. Action 112: Setting up young farmers (V = 1%). Another reduction was the rejection of funds which were excessively correlated with each other, e.g. Axis 2. Action 221, 223. Afforestation of agricultural land and afforestation of non-agricultural land with Axis 2. Action 214: Agri-environmental programme for which the Pearson correlation coefficient was 0.89. Out of 22 actions under RDP, 12 were used for further analyses after selection. At the same time, it is worth emphasising that information on the funds used was for the years 2014-2015, and the features describing local development – for 2016. It was assumed that the effects of the funds on local development could be observed only after a certain period of time.

The paper also uses cluster analysis, which allowed to bundle voivodeships which are most similar to each other and at the same time are as different as possible in terms of the level of use of EU funds under RDP. One of the hierarchical methods of grouping, i.e. the Ward's method, was used. The grouping of voivodeships was carried out using Statistica 13 software. The results of grouping using the Ward's method are presented in Figure 1.

Ultimately 39 diagnostic variables were selected for analysis: x_1 – slaughter livestock production – share of voivodeships in total slaughter livestock production (%), x_2 – purchase of products per 1 ha of arable land – basic cereals (kg), x_3 – purchase of products per 1 ha of arable land – potatoes (kg), x_4 – purchase of products per 1 ha of arable land – cow's milk (l), x_5 – total income per capita (PLN), x_6 – outlays in the public sector per capita (PLN), x_7 – outlays in the private sector per capita (PLN), x_8 – gross value of fixed assets per capita (in PLN), x_9 – average usable area of 1 flat (m^2), x_{10} – registered unemployment (%), x_{11} – total use of NPK mineral fertilizers per 1 ha of arable land according to the new definition (kg), x_{12} – share of home gardens in the total area of the voivodeship (%), x_{13} – share of meadows and pastures according to the new definition in the total area of the voivodeship (%), x_{14} – share of perennial crops according to the new definition in the total area of the voivodeship (%), x_{15} – number of expressways and motorways per 1,000 km^2 (km), x_{16} – number of trucks per 1,000 people (in pcs.), x_{17} – number of motorcycles per 1,000 people (pcs.), x_{18} – number of bike tracks per 10,000 km^2 (km), x_{19} – number of bike tracks per 10,000 people (km), x_{20} – total length of railroads per 100 km^2 (km), x_{21} – total length of railroads per 10,000 people (km), x_{22} – number of people using the sewage system (%), x_{23} – number of people using the gas pipeline (%), x_{24} – household gas consumption per capita (m^3), x_{25} – enrollment rate – basic vocational schools – age 16–18 years (%), x_{26} – gross enrollment rate – post-secondary schools, including colleges – age 19–21 (%), x_{27} – graduates of higher education institutions per 10,000 people (persons), x_{28} – Axis 1. Action 114. Use of advisory services by farmers and forest holders (PLN per 1 beneficiary), x_{29} – Axis 1. Action 121. Modernisation of agricultural holdings in forests (PLN per beneficiary), x_{30} – Axis 1. Action 123. Increasing the added value of

primary agricultural and forestry production of forests (in PLN per beneficiary), x_{31} – Axis 1. Action 126. Restoring agricultural production potential of forests (PLN per 1 beneficiary), x_{32} – Axis 1. Action 132. Participation of farmers in forest food quality schemes (PLN per 1 beneficiary), x_{33} – Axis 1. Action 133. Forest information and promotion activities (PLN per 1 beneficiary), x_{34} – Axis 1. Action 142. Forest agricultural producer groups (PLN per 1 beneficiary), x_{35} – Axis 2. Action 226. Restoring forestry production potential damaged by disasters and introducing forest prevention instruments (PLN per 1 beneficiary), x_{36} – Axis 3. Action 313, 322, 323. Renovation and development of forest villages (PLN per 1 beneficiary), x_{37} – Axis 4. Action 413. Implementation of local forest development strategies (PLN per 1 beneficiary), x_{38} – Axis 4. Action 421. Implementation of forest cooperation projects (PLN per 1 beneficiary), x_{39} – Axis 4. Action 431. Functioning of the local action group, skills acquisition and forest activation (PLN per 1 beneficiary).

The X_{10} variable is considered to be an inhibitor, while the others are considered to be stimuli.

For selected variables, statistical characteristics, which are presented in Table 1, were defined. They present disproportions between particular voivodeships, which were illustrated by means of minimum and maximum values and the coefficient of variation, recorded in particular voivodeships. The coefficient of variation of characteristics describing the level of local development ranged from approx. 13 to 138%. The highest diversity was recorded in the variables characterising the share of perennial crops according to the new definition in the total area of the voivodeship (V = 138%). The smallest one occurred in the case of the variable describing the average usable area of a flat for which the coefficient of variation was equal to V = 13%.

As regards the variables describing the level of use of EU funds (Table 2), the highest variability was recorded in relation to Axis 1. Action 133. Information and promotion activities (V = 362%), and the

Table 1. Statistical characteristics of diagnostic variables characterising individual voivodships from the point of view of local development

Variable	Mean	Minimum	Maximum	Standard deviation	Coefficient of variation (%)
x_1	1.06.2025	1.7 (Podkarpackie)	20.8 (Wielkopolskie)	1.05.1985	94
…	…	…	…	…	…
x_{27}	86.64	41.79 (Lubuskie)	143.67 (Małopolskie)	25.52	29

Source: own elaboration based on data from Local Data Bank GUS (2016).

Table 2. Statistical characteristics of diagnostic variables characterising particular voivodeships in terms of the level of use of UE funds under RDP 2014–2020

Variable	Mean	Minimum	Maximum	Standard deviation	Coefficient of variation (%)
X_{28}	2 062	1 461 (Zachodniopomorskie)	2881 (Mazowieckie)	421	20
…	…	…	…	…	…
X_{39}	1 216 959	997 071 (Podlaskie)	1604126 (Lubuskie)	154 464	13

Source: own elaboration based on data from the Local Data Bank GUS (2015).

smallest variability for Action 121. Modernisation of agricultural holdings in forests (V = 11%).

RESULTS AND DISCUSSION

Classification on Hellwig's development model method

To determine the level of local development of the voivodeships, Hellwig's development model method was used, which was described in detail in the following publications: Kamińska and Janulewicz (2009); Adamowicz and Janulewicz (2012, 2016); Bujanowicz-Haraś et al. (2015); Janulewicz and Bujanowicz-Haraś (2016).

As research shows, Group I, with the highest level of local development, includes only 2 voivodeships (Mazowieckie and Wielkopolskie). The second group turned out to be the most numerous and concentrated 6 voivodeships: Pomorskie, Dolnośląskie, Śląskie, Opolskie, Lubuskie and Kujawsko-Pomorskie. The third group consisted of 5 voivodeships: Zachodniopomorskie, Łódzkie, Podkarpackie, Małopolskie and Lubelskie. Whereas, voivodeships characterised by the weakest local development (group IV) included only three entities: Warmińsko-Mazurskie, Podlaskie and Świętokrzyskie.

Taking into account investment outlays in the private sector, it can be noted that they are much higher (PLN 6,229) in Group I (with the highest level of local development) and the lowest (PLN 2,536) in Group IV (with the lowest level of local development). The same dependencies can be observed for the following characteristics: gross value of fixed assets per capita (PLN 120,180 – Group I, PLN 75,787 – Group IV), registered unemployment (5.95 to 11.77%) or gas consumption in households (144 m^3 to 57 m^3 for Group IV). The reverse situation can be observed with regard to the average usable area per capita, which is the lowest (91.5 m^2) in voivodships classified in Group I, and the highest (103.2 m^2) in Group IV.

Table 3. Classification based on the values of partial synthetic measure describing the level of local development of voivodeships

Group number	The number of countries in the group	The level of measurement	The member voivodeships
I	2	Above 0.3799	Mazowieckie (0.4704), Wielkopolskie (0.4502)
II	6	From 0.2850 to 0.3798	Pomorskie (0.3606), Dolnośląskie (0.3466), Śląskie (0.32545), Opolskie (0.32529), Lubuskie (0.29818), Kujawsko-Pomorskie (0.2952)
III	5	From 0.1899 to 0.2849	Zachodniopomorskie (0.2831), Łódzkie (0.27043), Podkarpackie (0.22438), Małopolskie (0.21226), Lubelskie (0.20315)
IV	3	Blow 0.1899	Warmińsko-Mazurskie (0.18703), Podlaskie (0.16808), Świętokrzyskie (0.13856)

Source: own elaboration based on data from the Local Data Bank GUS (2016).

Table 4. Average values of the variables determining the level of local development

Specification	Group I	Group II	Group III	Group IV	Total average
x_1	20.15	4.05	4.22	4.77	6.25
…	…	…	…	…	…
x_{27}	111	81	94	69	87

Source: own elaboration based on data from the Local Data Bank GUS (2016).

The impact of EU funds on local development

According to the conducted research (Table 5), significant statistical dependencies can only be noted for two characteristics: Axis 1. Action 114. The use of advisory services by farmers and forest holders is correlated with the voivodeship's share in the production of slaughter livestock (0.75) and Axis 4. Action 421. Implementation of cooperation projects with the number of kilometres of railroads per 10 thousand residents (0.76).

Cluster analysis by the Ward method

According to the conducted research (Fig. 1), Group A included only one voivodeship (Świętokrzyskie), which in Hellwig's model method was classified to group IV (with the lowest level of local development). Group B also included only one voivodeship – Podkarpackie, which represented Group III according to Hellwig's method. Group C also comprised only one voivodeship – Mazowieckie, which in Hellwig's method was classified to Group I (with the highest

Table 5. Correlations between the value of the selected financial fund measures used under the RDP 2014–2015 and selected factors characterizing local development

Variables	x_{29}	x_{39}
x_1	**0.75**	–0.03
x_{21}	–0.23	**0.76**

Source: own study based on data from the BDL 2015–2016 GUS.

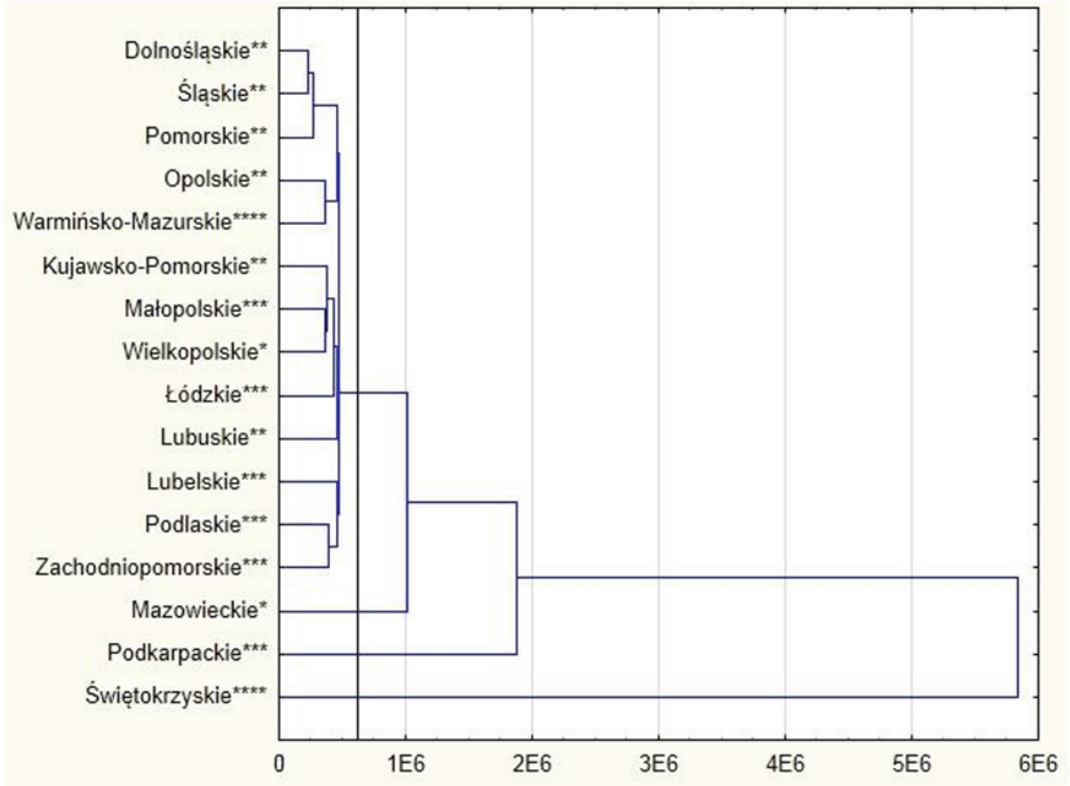

Figure 1. Breakdown of voivodeships by the WARDA method from a level of use of EU funds perspective (*number means the group into which the commune was classified using Hellwig's method)

Source: own elaboration using Statistica 13 software.

level of local development). Group D turned out to be the most numerous, comprising 13 voivodeships, one of which represented the group with the highest level of local development (Wielkopolskie), 6 voivodeships belonging to Group II, 5 voivodeships belonging to Group III and one to Group IV.

CONCLUSIONS

The results of the research allowed to determine the level of local development in 16 voivodeships in Poland. The use of the taxonomic method (Hellwig's development model) made it possible to classify individual voivodeships to one of four groups from a local development level perspective. Group I (with the highest level) included 2 voivodeships: Mazowieckie and Wielkopolskie. The second group consisted of 6 voivodeships: Pomorskie, Dolnośląskie, Śląskie, Opolskie, Lubuskie and Kujawsko-Pomorskie. The third group consisted of 5 voivodeships: Zachodniopomorskie, Łódzkie, Podkarpackie, Małopolskie and Lubelskie. Whereas, among the voivodeships characterised by the lowest level of local development (Group IV) were three voivodeships: Warmińsko-Mazurskie, Podlaskie and Świętokrzyskie. When analysing the average values of particular variables characterising the level of local development in voivodeships with the highest level of local development, it can be observed that for 7 variables (out of 27) they are the most favourable (highest for the stimuli and lowest for the inhibitors), and in comparison with the total average (calculated for all voivodeships), the average values of Group I are higher for 19 variables.

The direct impact of EU funds could only be distinguished in relation to two variables: Action 114. Use of advisory services by farmers and forest holders, which was correlated (0.75) with the voivodeship's share in the production of slaughter livestock and Action 421. Implementation of cooperation projects with the number of kilometres of railroads per 10 thousand residents for which the correlation coefficient amounted to 0.76.

In the Ward cluster analysis, it can be noted that Groups A, B and C consisted of one voivodeship each representing a different level of local development, while group D was the most numerous and mainly consisted of entities classified to Groups II and III.

The methods used showed a disproportion between local development and use of EU funds. The obtained results confirm the usefulness of synthetic measures in assessing the level of local development. At the same time, limitations in the interpretation of test results should be borne in mind.

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PRIORITY DIRECTIONS OF EXPENDITURE IN THE OPINION OF RESIDENTS OF SELECTED RURAL COMMUNES OF THE LUBELSKIE VOIVODESHIP

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ABSTRACT

One of the main objectives of both local and regional development is to increase the level of satisfaction of the needs and preferences of residents, which implies an increase in the quality of life in a particular area. Therefore, it is important to define strategic directions and priorities of activities which are of key importance from the point of view of satisfying the needs of the communes' residents. Therefore, the aim of this study was to identify and analyse priority directions of expenditure in selected rural communes of the Lubelskie voivodeship in the opinion of their residents, as compared with urban and urban-rural communes. In order to achieve the research objective, a survey was conducted among the residents of selected communes of the Lubelskie voivodeship. The survey showed that according to respondents from rural communes, the priority directions of expenditure included roads and pavements with street lighting, healthcare, tourism, recreational and sports infrastructure, as well as support for the development of investment areas. Investment needs related to social infrastructure, social welfare and pro-environmental activities were also of relative importance. Respondents from rural communes more often indicated the majority of the above investment needs than respondents from urban-rural and urban communes (except for recreational infrastructure and pro-environmental measures, tourist trails in urban-rural communes and sports and healthcare infrastructure in urban communes).

Keywords: local development, rural areas, local development policy, resident needs, investment needs
JEL codes: H70, O18, O21

INTRODUCTION

Development at a local and regional level is a complex and multi-faceted concept. Literature indicates various objectives of local development, which can be considered in three dimensions: satisfaction of basic needs of the population, use of possessed resources and opportunities in the immediate environment to stimulate economic development and entrepreneurship, ensuring sustainable development and efficient operation of entities and institutions in the local unit (Wojtasiewicz, 1997). In the final perspective, local development should contribute to an increase in meeting the needs and preferences of residents, and thus an increase in the quality of life of a given area. Therefore, it is important to identify the needs of residents, including needs which can be satisfied depending on the activities of local government units. This should be an indication for the commune authorities regarding the formulation of local development policy,

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including strategic planning. Therefore, the aim of this study was to identify and analyse priority directions of expenditure in selected rural communes of the Lubelskie voivodeship in the opinion of their residents, as compared with urban and urban-rural communes.

THEORETICAL BACKGROUND

The issues of local level development are widely discussed in literature. The very concept of local development is defined in a varied manner (Trojanek, 1994), which results from its complexity and the multiplicity of factors influencing local development. Parysek states that local development is linked to the local scale of socio-economic activity and is based on local development factors, i.e. local needs, local resources or local organisations and enterprises. It is undertaken in order to improve the material and non-material situation in a place of residence and is connected with shaping the best possible living conditions (Parysek, 2001). Local development is 'a harmonised and systematic activity conducted in a local community with participation of interested parties, the results of which serve to meet the social needs of the local population and contribute to overall progress' (Kosek-Wojnar, 2006). This development takes place simultaneously in economic, social and cultural spheres.

Strzelecki stresses that the main objective of social and economic development is to ensure the highest possible standard of living and quality of life for residents. Therefore, local development is a complex of qualitative changes of the local territorial structure concerning the quality of life of its users and the conditions of operation of business entities (Strzelecki, 2008). Brol states that the territorial self-government, as part of the development process, carries out various public tasks, which include improving the quality of life of residents and building the competitive potential of a territorial unit (Brol, 1999).

Development is a deliberate and conscious process that is influenced by public authorities through rational use of resources in possession (Sztando, 1998). Empowering local government units, as well as decision-making autonomy in the scope of freedom of choice of development goals and ways of their implementation gives communes the opportunity to manage and conduct development policy in their area. The basic instruments of strategic management include, among others, development strategies. Due to the fact that the local government is responsible for all public matters concerning the life of residents in a given unit, the purpose of its activities should be to satisfy the needs of the local community through the implementation of current and investment tasks (satisfying the collective needs of the community is the commune's own responsibility (Act of 8 March 1990 on Commune Self-Government). Dynamic changes taking place in various areas of life lead to transformations in the needs and attitudes of residents. Therefore, the implementation of investments should respond to the growing demands of local communities regarding the offer of public services (Cymerman et al., 2015).

Therefore, it is of importance to define strategic directions and priorities of activities which are of key importance from the point of view of satisfying the needs of the communes' residents. This diagnosis should be made in the form of a survey (Sztando, 2010). Therefore, in the process of preparing and implementing the commune's development strategy, a very important role is assigned to the commune's community (Wiatrak, 2011). Active participation of residents in the development of the strategy is desirable and constitutes a behavioural component of social capital, the level of which is relatively low in Poland (Wojewódzka-Wiewiórska, 2015). Social activity contributes significantly to the stimulation of development processes, which poses challenges to local politics in terms of the need to build civil society (Potoczek, 2017).

MATERIALS AND METHODS

In order to achieve the research objectives, empirical research was conducted using a sociopsychological research method in the form of a survey. The research tool was a questionnaire in paper form. The survey was conducted in 2017 among the residents of selected communes of the Lubelskie voivodship (12 rural communes, 5 urban-rural communes and 7 urban communes). A total of 1,083 correctly filled in questionnaires were obtained, of which 470 were from respondents in rural communes. They constituted the source material used for the analyses under the

present study. Among the rural communes, where the research was conducted, the following deserve a mention: Tomaszów Lubelski, Tarnawatka, Trzebieszów, Puchaczów, Łabunie, Komarówka Podlaska, Wohyń, Michów, Niemce, Wólka, Trawniki and Włodawa.

The paper uses a non-random comfortable sample selection with the use of the snowball technique. The results are presented in tabular form. Descriptive statistics, including frequency analysis, were used to interpret the results. In addition, the Z test statistic was used to assess statistically significant dependencies between the respondents' gender and the preferred directions of expenditure.

RESULTS AND DISCUSSION

As part of the survey, respondents were asked to indicate which investments or activities in the commune should be financed in the first place. The respondents could indicate three most important – in their opinion – directions of expenditure. As a result of the survey, it was found that roads and pavements were the most frequently indicated directions of expenditure in the communes by respondents from the analysed rural communes of the Lubelskie voivodeship (Table 1). Over 47% of the respondents considered this type of investments to be a priority. Unmet needs in the area

Table 1. Directions of expenditure in the opinion of residents of analysed communes (%)

Specification	overall (n = 1083)	rural (n = 470)	urban-rural (n = 240)	urban (n = 373)
Roads and pavements	42.2	47.2	45.4	33.8
Healthcare	28.2	28.5	26.3	29.0
Tourist paths, e.g. bicycle paths	21.0	22.8	26.7	15.0
Street lighting	12.2	18.3	9.6	6.2
Recreational infrastructure (playgrounds, activity areas)	17.5	16.4	19.2	18.0
Development of investment areas	14.0	16.0	14.2	11.5
Other tourism infrastructure	13.4	15.1	12.1	12.1
Social infrastructure (day care centres, meeting places)	12.7	14.5	12.9	10.5
Taking care of green areas	13.7	12.8	14.6	14.2
Social welfare	9.3	11.5	6.7	8.3
Sports base/infrastructure (pitches, courts, other)	10.3	10.9	5.4	12.9
Support for renewable energy sources	10.6	10.2	11.3	10.7
Extracurricular activities for children and young people	8.3	10.2	10.4	4.6
Modern solutions in administration (e.g. e-Office)	10.2	10.0	10.0	10.5
Housing	8.6	9.4	7.9	8.0
Educational base/infrastructure (schools, pre-schools)	8.5	8.5	10.0	7.5
Municipal infrastructure (sewerage, water supply)	6.8	7.7	9.6	4.0
Cultural and artistic activities	8.0	7.0	10.0	8.0
Car parks and parking spaces	14.3	6.6	24.6	17.4
Drainage and flood protection infrastructure	3.2	3.6	3.3	2.7
Environmental protection infrastructure	2.1	1.9	2.9	1.9

Source: own study based on research.

of street lighting were reported by 18.3% of respondents from rural communes. It is worth noting that respondents from rural communes more often pointed to needs in the scope of construction and modernization of roads and pavements, as well as street lighting than respondents from urban and urban-rural communes. This may indicate a lower level of satisfaction of this type of needs in rural areas of the Lubelskie voivodeship in comparison with areas with a higher level of urbanisation.

Another important direction of expenditure in the opinion of respondents from the analysed rural communes of the Lubelskie voivodeship was healthcare (28.5% of answers). It is worth noting that this share was higher in rural communes than in urban-rural communes, but slightly lower than in urban communes.

According to respondents, an important group of investment needs were expenditure on tourist and recreational infrastructure, as well as sports infrastructure. Needs regarding the construction of tourist paths (including bicycle paths) were indicated by 22.8% of respondents from the analysed rural communes, recreational infrastructure (e.g. playgrounds and activity zones) – 16.4%, other tourist infrastructure – 15.1%, sports infrastructure (e.g. playgrounds, courts, other) – 10.9%. Respondents from rural areas were slightly more prone to indicate the need for this type of investment expenditure than residents of urban and urban-rural communes (except for recreational and sports infrastructure in urban communes). It should be noted that investments of a sports and recreational nature constitute a special group of investments, which can be connected with the term 'social innovation' (Słocińska, 2016).

For 16% of respondents from rural communes, support for development of investment areas was important. It should be stressed that respondents from rural communes more often pointed to the need for this type of investment than respondents from other types of communes. This seems particularly important in the context of increasing investment attractiveness and supporting the development of entrepreneurship in rural areas. This is valuable due to a relatively low level of investment attractiveness of rural areas in the Lubelskie voivodeship (Godlewska-Majkowska et al., 2017).

According to respondents, a relatively important direction of expenditure was social infrastructure (day care centres, meeting places) – 14.5% of answers, and social welfare – 11.5%. The needs, in this respect, were relatively more frequently reported in the investigated rural communes than in other types of communes. Expenditure on pro-environmental measures, in the form of taking care of green areas, were indicated by 12.8% of respondents, and obtaining energy from renewable sources by 10.2% of respondents. It is worth noting that the needs of investment in this area were relatively more frequently indicated as a priority by respondents from urban-rural and urban communes than rural communes. This may indicate a lower level of environmental awareness of the rural population and the need to intensify educational activities in this area. This is particularly important in the context of the involvement of the public in the implementation of sustainable development at a local level (Giordano, 2005).

Moreover, 10.2% of respondents from rural communes considered financial support for extracurricular activities for children and youth as important, and another 10.0% – modern solutions in administration (e.g. e-Office). In the light of literature, factors related to education and the efficient flow of information are considered elements that create an environment supporting innovation in a given area (Dziekański and Pawlik, 2011).

The remaining directions of expenditure were considered by respondents from rural communes of the Lubelskie voivodship as less important (less than 10% of the answers). These include: housing, educational and municipal infrastructure, cultural and artistic activities, car parks and parking spaces, drainage and flood protection infrastructure, and environmental protection infrastructure.

In the next stage of the research, an analysis was made of the dependencies between the directions of expenditure and the gender of respondents from rural communes (the studied population consisted of 60% women and 40% men). Using the Z test statistics to compare the column ratios, no statistically significant

Table 2. Directions of expenditure in rural communes vs gender of respondents (statistically significant differences) (%)

Specification	Women	Men	Overall	Z Test
Healthcare	32	23	28	B
Sports base/infrastructure	8	15	10	A
Municipal infrastructure	6	11	7	A

A – statistically significant difference between indications of men and women (higher percentage of men); B – statistically significant difference between indications of men and women (higher percentage of women).

Source: own study based on research.

dependencies between the direction of expenditure and gender were identified for most expenditure categories. The distribution of answers in the category of women and men was similar.

Statistically significant differences were confirmed using the Z test with regard to expenditure on: healthcare, sports infrastructure and municipal infrastructure (Table 2). The research has shown that women are more likely than men to indicate the need for investment in healthcare. It is worth noting that men, more often than women, considered financial support for sports and municipal infrastructure to be important.

CONCLUSIONS

The basic objective of local development is to provide residents with the highest possible standard of living and quality of life, which gives rise to the need to identify and analyse the needs of the local community. The aim of this study was to identify and analyse priority directions of expenditure in selected rural communes of the Lubelskie voivodeship in the opinion of residents, as compared with urban and urban-rural communes. The paper uses a non-random comfortable sample selection, therefore the studies cannot be representative of the entire population of municipalities.

The survey showed that according to respondents from rural communes the priority directions of expenditure included roads and pavements with street lighting, healthcare, tourism, recreation and sports infrastructure, as well as support for the development of investment areas. Investment needs related to social infrastructure, social welfare and pro-environmental activities were also of relative importance. Respondents from rural communes more often indicated the majority of the above investment needs than respondents from urban-rural and urban communes (except for recreational infrastructure and pro-environmental measures, tourist trails in urban-rural communes and sports and health care infrastructure in urban communes). As a result of the study concerning respondents from rural communes, for the majority of categories of expenditure, no statistically significant dependencies between the direction of expenditure and gender were identified. Analyses have shown that women are more likely than men to indicate the need for investment in healthcare; whereas men are more likely than women to point to the need for financial support for sports and municipal infrastructure.

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BEHAVIOURAL FINANCE IN AGRIBUSINESS – THE BIRTH OF A CONCEPT

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ABSTRACT

Up until now, a model approach has constituted the core of mainstream economics with regard to the decision maker and decision-making conditions. The financial (and economic) crises appearing with increased frequency and numerous market anomalies, although considered predictable by economists and being only a residual component of econometric models, are related to the growing financialization of the economy and an existing asymmetry of information in the absence of full decision-maker rationality. The importance of the psychological characteristics of individuals, their knowledge, the level of trust and priorities, recognized more and more commonly in economic practice, make it necessary to conduct research to identify 'difficult quantifiable' characteristics of decision-makers, including their purely economic considerations. (as a supplement to previous economic considerations, including the inclusion of new variables to econometric models that have been in operation for years). The aim of the study was to systematize the evolution of the *homo oeconomicus* concept along with an indication of further possible directions in its development. A survey of behavioural finance in relation to agribusiness has also been reviewed, which is a perfect example of the evolution of mainstream economics.

Keywords: *homo oeconomicus*, rationality, agriculture, speculative motif
JEL codes: G41, Q14, D87

INTRODUCTION

Issues concerning the way people make decisions in the sphere of economic life attract the interest of researchers from many scientific areas related to economics – sociology, psychology, philosophy, ethics and others. Knowing the motives of an individual's actions is the basis for explaining and predicting behaviour in specific situations and in specific conditions. The first concepts that capture the communality of human life appeared in antiquity. The dilemma concerning human nature, its weaknesses and shortcomings, was already present at the stage of the collective community in the Platonic approach (Plato, 2003) and the Aristotelian 'political animal' (Aristotle, 1953). The tearing desires of human nature, according to Hobbes (1954), are the result of extreme selfishness of every person, lack of morality and susceptibility to breaking the rules of law that lead to '*bellum omnium contra omnes'* (war of all with everyone). According to Adam Smith (1954, 1989), although man follows the implementation of his own selfish plans and ambitions to achieve them, he is willing to pursue the interests of strangers, provided that they have a

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beneficial effect on achieving their own goals. This idea, derived from the philosophical concept of economic harmonization of human nature of John Locke (1995), laid the foundations for the concept of *homo oeconomicus*.

MATERIALS AND METHODS

The model view of mainstream economics requires the adoption of clear rules for decision-makers, who, while choosing between different variants of action, should be characterized by a set of certain personality traits, full knowledge and full rationality, so that the decision made by them in the conditions of an effective market, without asymmetry of information, represent the best option from the point of view of their Bayesian goals (Wilkinson and Klaes, 2012). The adoption of specific, time-constant assumptions about the characteristics of each decision maker, including their goals and expectations allows the economy to model variables such as supply, demand, price and others. This assumption, being a somewhat simplified model of the decision maker, although useful from the point of view of econometric modelling, is becoming increasingly distant to reality, as evidenced by the past financial crisis (crisis of trust) and daily economic practice.

Although the awareness of the lack of full rationality of the decision-maker has been functioning in economics for hundreds of years, the bases of contemporary behavioural finances, including the condition of limited rationality and psychological analysis, have somewhat sporadically appeared since the middle of the last century. However, the methodological workshop and the achievements of behavioural finance should still be considered insufficient.

The aim of this study is to systematize the evolutionary approach to the concept of *homo oeconomicus*, along with an indication of further directions to its development. In order to achieve the main goal, a review of research in the field of behavioural finance with regard to the finances of agriculture (agribusiness) was carried out. Through the evolution of the views of mainstream economics they are inherently coupled with the development of behavioural finance. The article is descriptive and based on a review of the history of economic thought and a review of global research in the field of behavioural finance in agribusiness.

EVOLUTION OF *HOMO OECONOMICUS* IN ECONOMIC THEORY

In the 1960s, John Stuart Mill (1959) stated that economics is by definition a science of selfish behaviour, because every person cares about their own interests. This utilitarian philosophy defined 'own interests' as an achievement of happiness, which is the only goal and good to which all people aspire. Humans are absorbed, therefore, by the main purpose of their existence and subordinate all actions to this goal. The anthropological and ethical concept of human nature described by Wilhelm von Humboldt (2008) is therefore the quintessence of *homo oeconomicus* – greedy, characterised by a high level of individualism and possessing all rationality. Such a person, acting rationally, maximizing usability and always choosing the best variants of action has for years constituted the foundation for the classical idea of profit maximization.

Herbert Simon (1976) writes that according to the theory of limited rationality, humans have a limited ability to acquire and process information and analyse its consequences, therefore the decisions made by them are based only on some alternative options, with a fairly limited spectrum of capabilities. Also Harveey Leibenstein (1988) postulates the inclusion of social and psychological factors in the classic concept of *homo oeconomicus* – mainly selective rationality. This concept assumes the inclusion of realism in assessing the situation, calculating the benefits and counting the limitations related to personality traits, independence of judgment, reflexes, and sensitivity. According to Becker (1990), the concept of *homo oeconomicus* should take into account the lack of full rationality, as well as transaction costs and risk issues. In the contemporary canon of finances, an economic man should be replaced by a man looking for satisfactory solutions (March and Simon, 1964; Augier and Feigenbaum, 2003). Research on the economic behaviour of people, its decisions and destinations should include elements of sociological, psychological and ethical sciences. As Simon notes, rationality

requires full knowledge and the possibility of predicting the consequences of any considered choices. Knowledge of possible choices is incomplete and in practice the entrepreneur takes into account only some variants – not all options can be considered. The mere assessment of the entrepreneur's choices is the result of supporting the inadequate experience reinforced by the imagination and individual preferences of the decision maker, which makes those choices only aspire to be optimal, although they do not have to be (Simon, 1976). The reasons for limited rationality should be found in insufficient information and in its asymmetry, but also in the lack of time and money (information is not free), in the lack of the ability to remember all variables, or, as Stoner, Freeman and Gilbert (1999) note – in the limits of the decision maker's intelligence. Significant distortions in complete information are also the result of individual needs, motives and aspirations, but also unconscious habits, habits of reflexes, as well as the individual's values and tasks that diverge from the organization's fundamental goals (March, Simon, 1964). As a result, the structure of the choices made by entrepreneurs resembles the mechanism of 'stimulus – reaction' rather than the model of rational choice between the known alternatives. Rationality places itself therefore within the psychological environment or, more broadly, through the prism of a dynamically changing environment. The adopted model of incomplete rationality therefore presents the choice of a specific solution as a result of a conscious level of aspiration, which additionally changes over time depending on the circumstances, experiences or emerging alternatives (Simon, 1979). As Leibenstein (1988) notes, the *homo oeconomicus* model should not be completely ruled out, because rational economic reasons have not lost their validity due to the perception and inclusion of human imperfections in research. A situation in which a person behaves rationally is, however, extremely rare, or even theoretical and utopian.

The necessity to supplement the neoclassical *homo oeconomicus* paradigm with the assumption of incomplete rationality is perceived by contemporary economics, as evidenced by the awards granted by the Bank of Sweden, to researchers such as Kahneman, Tversky and Thaler. As Thaler and Sunstein (2012) points out, behavioural economics is too delicate to deal with neoclassical models, trying only subtly to indicate the deviations appearing from them, not to say that these models are incorrect. According to Mullainathan and Thaler (2000), further economic researches should take into account three basic assumptions functioning in the classical economy: unlimited rationality, lack of weak will and lack of altruism.

THE BEHAVIOURAL ASPECTS OF MAINTAINING CASH

Beginning with the analysis of consumption as an aggregate quantity characterizing all individuals in society, Keynes created a theory of consumption including psychological and social factors in the decision-making process, such as an extreme propensity for consumption and saving. He also drew attention to the influence on the economic decisions made by entities which are related to the conditions in which they operate, with their knowledge, the accuracy of their predictions and trust in the economy (or state institutions). As a result, economic operators, according to Keynes (2003), make decisions in conditions of limited rationality and very often are characterized by a so-called animal nature. This specific irrationality, a bandwagon effect and a series of emotional behaviours also refer to the motives of keeping cash. Transactional, prudential and speculative motives related to maintaining liquid funds are a combination of rational, economic and effective determinants as well as a number of psychological factors based on individualized expectations, emotions and subjective judgements. The transaction motive constitutes a rational premise for maintaining financial liquidity related to the necessity of current and future expenditures. The precautionary theme contains in its design an element of rationality, because it constitutes a necessary safety margin related to uncertainty regarding future inflows and outflows. This motive to a large extent refers to psychological aspects related to the management of funds. It refers, i.a. to psychological aspects related to risk appetite / tolerance, predictions based on incomplete information, or a preference for liquidity. The speculative motif is connected with the need to have cash in order to use potential future mar-

ket opportunities. Similarly to the previous motives, it has fully rational premises related to the willingness to implement profitable investment projects in the future. In reality, however, it is based on expectations, postponing consumption over time and the lack of knowledge of possible variants of the future situation and their consequences.

As Franc-Dąbrowska (2011) points out, the identification of cash maintenance motifs in agriculture enterprises is an extremely important area of research due to the unity of the households and the farms. These farms are characterized by very low indebtedness and a conservative approach to managing financial liquidity. As Franc-Dąbrowska (2008) and Mądra (2007) points out, in relation to the Keynesian approach to maintaining financial liquidity, agricultural enterprises are dominated by the prudent motive of keeping cash. Simultaneously, the speculative motive is virtually unnoticeable. This approach indicates behavioural aspects related to financial liquidity management - primarily with respect to risk aversion, which is illustrated by the shape of a value curve for profits and losses in the first part of perspective theory in terms of Kahneman and Tversky (1979).

An even wider catalogue of factors determining the level of cash was mentioned by Shim and Siegel (2004). As in the case of Keynes, these determinants are of an economic and behavioural character and complement each other. In practice, the separation of factors which are a result of rational economic reasons, from decisions motivated by psychological factors is extremely difficult, because of their mutual interpenetration and difficulties in quantifying behavioural factors. The identification of psychological aspects related to shaping financial liquidity and the strength of their impact is therefore an extremely valuable, desirable direction of research in the discipline of finance.

BEHAVIOURAL FINANCES IN AGRIBUSINESS –A REVIEW OF RESEARCH

Research in the field of behavioural finance in agriculture is a very interesting and prospective research area. It can be applied to the issues of taxation in agriculture, investment, financial planning, the assessment of state intervention effectiveness, capital structure and the identification of causes of payment bottlenecks (Zaleśkiewicz, 2012). Studies that take into account psychological factors, as the authors themselves note, are frequently of an initial character and can not be generalized to the population of farms and enterprises in the food processing sector. These studies are largely based on an economic experiment whose research sample consists of students trying to make decisions in conditions of incomplete information, taking into account their individual psychological characteristics (Kropp et al., 2009).

Among world-wide studies that take into account psychological factors in financial management, research by Kropp et al. (2009) deserve special attention. The authors used an economic experiment to establish the relationship between wealth and creditworthiness. Researchers proved that creditworthiness results more from a relative, arbitrary perception of wealth and social position than from an economic calculation that is an image of the individual's actual wealth. Numerous studies and analyses in the field of broadly understood finances (excluding agricultural finances), including behavioural factors, were also implemented by Zielonka (2005), Szyszko (2009), Mastalerz (2010) and Swacha-Lech (2012).

Research that includes psychological factors is being more frequently implemented in relation to agriculture. The first studies at the interface between classical finances and behavioural finance were Phimister's (1995) analyses regarding the impact of loan restrictions on agricultural holdings. The author has proved that the loan restrictions among Danish dairy farms are not determined by the size of the farm, but by the share of agricultural land owned by the farm. Thus, the experiment indicated, similarly to Kropp and others, a subjective perception of wealth.

Research by Musshoff and Hirschauer (2011) indicated that limited rationality among farmers is a significant determinant of their approach, in particular among farmers unwilling to change. These studies constituted a case study aimed at establishing a financial decision making mechanism by farmer-borrowers and by means of an analysis taking into account incomplete information and limited cognitive abilities.

The studies of Tubetov, Maart-Noelck and Musshoff (2013) included an experimental approach to compare farmers' investment behaviour and determine whether they are convergent with financial factors, i.e. NPV benchmarks and real options. Research has shown that farmers have a greater preference for maintaining liquid means allowing them to maintain a high degree of flexibility – by giving up viable investment projects. The investment processes and attitudes of farmers towards investments were also the subject of research by Ihli, Maart-Noelck and Musshoff (2013). The researchers proved that farmers benefit from learning and waiting for investment, and social and demographic factors (as well as economic factors) affected investment behaviour.

Behavioural finance in relation to agriculture is also an increasingly popular topic in Poland, although the number of studies in this field can certainly be considered unsatisfactory. The most important analyses include research by Gomez y Paloma et al. (2008), who drew attention to the diversification of farmers' investment plans – which, according to researchers, are determined more by the individual psychological characteristics of the farmer and farm resources than by the farm management system and the direction of production. The subject of behavioural finance with regard to the finances of agriculture and its surroundings was also undertaken by Franc-Dąbrowska (2010). The author presented theoretical considerations regarding the role of profit in light of various economic trends, also in the perspective of the behavioural theory of the enterprise. Behavioural finance in relation to the agricultural environment was also the subject of research by Siudek (2011). The author proposed a theoretical behavioural model that takes into account the maximization of benefits of cooperative bank members from transactions concluded with them (also by farmers).

Kata's research (2013) carried out on a random sample of farmers in Poland proved, on the basis of statistical analysis, that behavioural factors, such as risk-based attitude, openness to cooperation and satisfaction with life status, together with demographic characteristics, have a significant impact on farmers' decisions in the credit market.

CONCLUSIONS

The economic argument concerning the evolution of the *homo oeconomicus* concept points to the shortcomings of mainstream economics. The decision maker's model and decision-making conditions adopted by it should therefore be treated as a certain simplification, which enables the estimation of strictly economic values. The assumption pointing to the full rationality of decision-makers, unlimited view, egoism and opportunism seems to be insufficient and to a large extent deviating from reality. As a result, economics becomes a theoretical science, increasing the distance in relation to economic practice.

This does not imply, however, the need to replace the previous achievements of economics with behavioural finance. The author postulates a broader inclusion of elements of psychology and psychoanalysis into classical economic views. A fundamental doubt may be raised by the fact that elements of behavioural finance, which are obvious and brought to our awareness by most researchers, are not present in previous theories and economic views. In the author's opinion, only the current level of economic modernization, concentration on nuances and details, growing number of information sent to decision-makers and the related increase of information asymmetry mean that the 21st century has brought with it a clear need to supplement (and sometimes correct) classical economic views with issues concerning imperfect decision-making conditions, as well as imperfections of decision-makers themselves and different priorities. Before that, however, it is justifiable to develop and consolidate the achievements of behavioural finance at a conceptual and methodological level. Only the inclusion of elements of behavioural finance in the classical economy will allow for adapting the mainstream economics to an extremely dynamic reality.

As Rinaldi (2009) observes, there is now a need to replace the commonly criticized, negated, and yet still functioning mainstream concept of *homo oeconomicus* with a different, alternative concept taking into account elements of psychology and psychoanalysis. The desired direction of further research is, therefore, oriented towards the development of the concept of

neuro oeconomicus – an economic human, taking into account certain shortcomings resulting from our capabilities and imperfections which are of a cognitive and motivational nature.

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ECO-INDUSTRIAL BANK ATTENDANCE TO ECO-INDUSTRIAL SYMBIOSIS

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ABSTRACT

This article aims at conceptualization of new construct of eco-industrial bank and discusses its role in the development of eco-industrial symbiosis. The concept has been grounded in late theoretical streams of industrial ecology and industrial networks. The eco-industry bank plays a significant role of connecting ecology with business for the stakeholders' economic and social benefits. According to the concept the broad objectives of the bank are to use financial resources with economic, social and environmental responsibility and to give priority to environmental interaction with business and society.

Keywords: eco-industrial bank, eco-industrial symbiosis, industrial ecology
JEL codes: Q57, G21, L14, Q01

INTRODUCTION

Nowadays, sustainable development is the most important challenge for each economic unit (Brundtland Commission, 1987). Preconditions of responsible business are connected with recognition of widespread interdependence of species and ecosystems, understanding of business performance beyond simple economic profits, and changing approach from shareholder to stakeholder (Kakabadse et al., 2005; Baraldi et al., 2010; Lee and Carroll, 2011; Porter and Derry, 2012; Iivonen and Moisander, 2014).

The literature highlights that exogenous incentives for responsible business may come from governmental policies or non-governmental organizations (Desrochers, 2001; Håkansson and Waluszewski, 2002). However, the Kalundborg Industrial Park was never planned for industrial symbiosis, and it was spontaneously developed over a period of 20 years. The endogenous incentives of responsible business may come from successful business cooperation (Ehrenfeld and Gertler, 1997; Lowe, 2001, Bunjongsiri et al. 2015).

One of the most important incentive of sustainable development is financial support. Moreover, the need to provide investors with more objective, reliable and standardized information on loan performance (e.g. payback periods, return on investment, default rates) is being key to scaling up private sector interest in greening business and consumption (e.g. construction of passive houses). A large majority of the respondents to the public consultation considered that financial barriers are the most urgent to address, in particular regarding high upfront investment costs

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and limited access to credit, too long payback times and credit risks (European Commission, 2013). In economies like Poland, additional constrains come into existence like: poor institutions, low environmental and social awareness of citizens and decision makers (Kronenberg and Clift, 2005; Kronenberg and Bergier, 2012).

THEORETICAL BACKGROUND

Literature on environmental impacts of industry traditionally focused on the technological aspects. Today, the view shifts towards more holistic approach. Green industry deals with complexity of social, ecological and economic aspects (Dornfeld, 2012). The broadening of industrial ecology towards wider social and business dimensions lays in assumptions that environmental protection is more than the recycling of materials, sustainable development is more than environmental protection, transition towards sustainability requires the involvement of all business and social actors (Posch, 2010). Industrial ecology serves for: process and product design, defining industrial development, establishing new forms of cooperation, organizing material recycling in loop-closing systems, analysing industrial interdependencies, and creating holistic communities (Ayres and Ayres, 2002). Industrial symbiosis is the main object of study of industrial ecologists. It is the interrelationships among firms, as well as among their products and processes, at the local, regional, national, and global eco-systems (Chertow, 2000). The interacting industries may be collocated in a formal industrial symbioses or in informal industrial symbioses i.e. cooperate without any element of common management (Ehrenfeld, and Gertler, 1997; Desrochers, 2001).

The inter-firm relationships are naturally transformed into a network structure. It is evident that industrial nodes can be connected by various types of ties including material and energy flows, financial transactions, information, and social interaction (Schiller et al., 2014; Velenturf and Jensen, 2015). Industrial symbiosis networks emerge as a series of symbiotic relationships between and among regional active ties and involve physical exchanges or material and energy carriers as well as the exchange of knowledge, human or technical resources, concurrently providing environmental and competitive benefits (Posch., 2010; Schiller et al., 2014; Li and Shi, 2015). Despite industrial ecology's primary interest in the functional ties that establish metabolism of the network, it also needs to consider indirect social influences, e.g. research institutes spreading knowledge, banks handing out loans or regulators introducing new regulations. Three patterns of network cooperation need financial activity of financial institutions: resource recovery networks without common investment, resource recovery networks with common investment, and energy cascading networks as a specific form of inter-company cooperation with common investment (Schiller et al., 2014). Consequently, the perspective of industrial organization and especially of industrial networks should be considered while identifying financial needs of implementing strategies to reduce the environmental impacts of products and processes associated with industrial systems.

New models of social and business analysis of material flows initiate the discussion on metabolic relationships in time and space which are produced and reproduced by social and business relationships (Ehrenfeld, 2004; Schiller et al., 2014). According to Ford and Håkansson (2006) the main feature of business relationships is interaction. The inherent characteristics of interacted network structures are interdependencies (Håkansson et al., 2009). In networks they are built mainly on technological, economic and resource dimensions. Jointness develops in many aspects: combined intentions, specific investments, mutual commitment, and common aims of network partners (Ford and Håkansson, 2002). The interactions evolve into temporal relationship with specific features typical for business. Håkansson and Snehota (1995) distinguished two main kinds of characteristics for business relationship: structural characteristics, as follows: continuity, complexity, symmetry and informality, and process characteristics, as follows: adaptations, cooperation and conflict, social interaction and rutinization. Mutual adaptations are a prerequisite of the development and continued existence of relationship between two companies. While business relationships are often complex and informal, they tend to become institutionalized over time. In

networks technical development within one company and in its relationships is dependent on other companies' technologies. Social bonds that arise among individuals in the two companies are important for mutual trust and confidence in interaction between individuals.

To sum up, the recent achievements of industrial ecology and industrial networks approaches could serve as a good ground for discussions and conceptualisations of modern industrial eco symbiosis since they provide knowledge and tools for holistic design of environmental and business relationships of networking participants.

MATERIALS AND METHODS

This research has been carried on the ground of analysis of the recent literature on industrial ecology and industrial networks. It is followed by concluding on business relationships in eco-industrial symbiosis and the need of including financial institution in it. The main methods of the research are descriptive and deductive. The industrial ecology and industrial network approaches have been interrelated and applied in the study for conceptualizing business relationships of eco-industry bank with eco-industry companies in eco-industry symbiosis.

RESULTS AND DISCUSSION

Nowadays, environment is a key focus amongst industrial actors including banks which are namely 'green banks', 'ethical banks' or 'sustainable banks'. According to the Coalition for Green Capital (2014) the green bank is a public or quasi-public financing institution that provides low-cost, long-term financing support to clean, low-carbon projects by leveraging public funds through the use of various financial mechanisms to attract private investment so that public money supports multiple moneys of private investment. Other definitions of green bank underlines its different activities like: pushing eco-innovativeness, expanding green investment, fostering environmentally responsible financing practices, introducing environmentally sustainable internal process, considering all the social and environmental issues, making this planet more habitable, promoting environment-friendly practices and reducing carbon footprint, protecting the environment and conserving natural resources (Habib, 2010; Schultz, 2010; Bai, 2011; Goyal and Joshi, 2011; Thombre, 2011; Azman, 2012; Bahl, 2012; Singh and Singh, 2012; Rahman and Barua, 2016).

Green banking is a concept of shifting banks' objectives from 'profit only' to 'profit with responsibility' (Rahman and Barua, 2016). Green banks are gradually coming to realize that there is a need for shift from the 'profit, profit and profit' motive to 'planet, people and profit' which in fact establishes the rationale for green banking (Verma, 2012). Therefore, 'green bank' which is wider considered as a 'sustainable bank' distinguish apart from conventional banks by concerning business, social and environmental impacts of all of its activities and business relationships by becoming a participant of different eco-industrial symbiosis. It is namely eco-industrial bank.

Eco-industrial bank is one of the three pillars of eco-industry (Fig. 1). It is assumed that it sets up long-lasting business relationships with all stakeholders of eco-industrial symbiosis and undertakes only these interactions with clients which increase their sustainability through ecological accountability of activities. Industrial networks facilitate the material end energy flow transformation in the course of industrial ecology. Likewise, eco-bank facilitates the financial flows transformation in the course of industrial ecology. As a result informal and formal eco-industrial symbiosis come into existence. The eco-industrial symbiosis are the way of reaching sustainable development nowadays in many areas, in particular in food and agricultural industries.

Applying the industrial network approach, the eco-industrial symbiosis is defined as a group of business actors which undertake activities in an attempt to reduce waste and pollution, efficiently share and exchange resources such as information, materials, water, energy, infrastructure and natural resources, and help to achieve sustainable development, with the intention of increasing economic gains and improving environmental quality.

As the business relationships of eco-industrial bank and eco-industrial symbiosis evolve three types

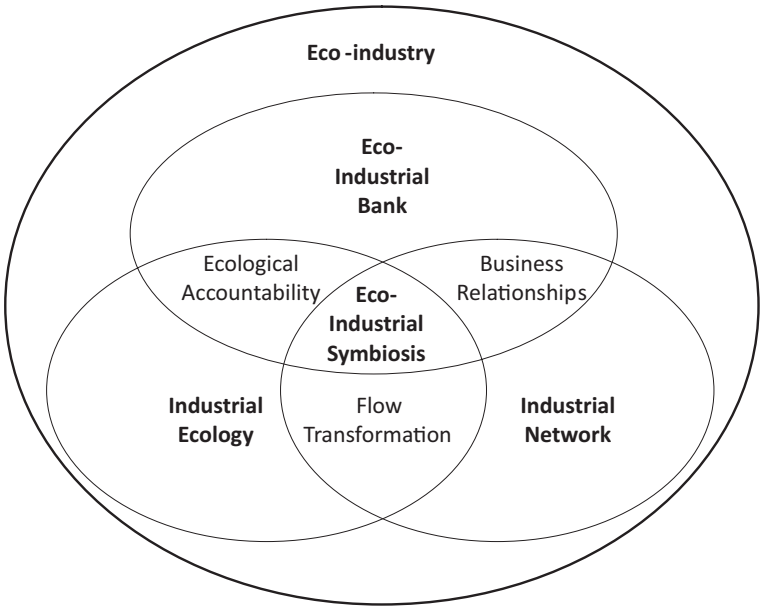

Figure 1. The role of eco-industrial bank in eco-industrial symbiosis

Source: own elaboration.

of effects could be observed. First of all, cost revenue payments for companies and bank from: infrastructure, marketing, transportation, and logistics development, efficient use of resources, effective emission and remedying pollution, appropriate management of waste water, solid waste, noise pollution, air pollution, efficient use of energy, eco-friendly processes, safety and health management, environmental monitoring, maintenance and improvement of the estate's management system, effective information and report management, and continuous improvement in the capability of personnel. Specialization reduces costs of bank's services and costs of stakeholders through adjustments and adoptions.

Secondly, the direct effect changing the potential of the relationship of eco-industrial bank as a lender and investor as a borrower. Bank and investors connect their resources. A relationship connects two heterogeneous collections of resources of the two parties – bank (takes deposits and sells securities or issues own securities) and investor (deposits money and buy securities). As it develops, the two companies direct and orient some of their resources towards each other. Adaptations are made in resource features and in the use combinations. A relationship between two companies can tie together more or less tightly some of their resources in a specific way.

The eco-industrial bank works to mobilize industrial actors to undertake activities and devote resources to implement network strategies of sustainable development. Therefore, the bank in eco-industrial network allows to develop activities, resources and actors combining business, society and ecology. In this way, the bank creates added value for the sustainable development playing the role of investor, financier, educator, adviser, promotor, and coordinator of eco-industrial symbiosis. It is a nexus of stakeholders' relationships. It is particularly noticeable in connection between lending and green investments. The bank has to assess the credit risk of investment and later has to monitor the process of investing. The bank and the investor are bounded with the credit contract. Both bank and investors in business networks are never independent, isolated or alone. They are formed in their perceptions, knowledge, capabilities and intents by others.

And the last but not least the effects in the overall eco-industrial network like: collaboration among stakeholders, new eco-funds, eco-industrial banks, eco-industrial symbiosis, new eco-technologies, in-

formation webs and trust and ethical, ecological and electronic money (E^3Money). In the network lending by bank interconnects stakeholders. It limits the freedom of stakeholders in using bank's money for another aim than sustainable business. These independencies provide a way for bank and stakeholders together to capitalize on the specific investments that they make in their own and each other resources. It serves for building of trust, commitment and reciprocity. Resource constellation overtime depicted as life cycle seems to be based on two basic features of the most resources of bank E^3 Money. This money is created in sustainable bank and is being lent to sustainable business of stakeholders. Sustainable business is ethical, ecological and economic. Interaction enables heterogeneity of bank's resources to be exploiting as a means of value creation for stakeholders and bank. Actor webs link to co-evolution and jointness. Co-evolution strengthens the trust, commitment, common motivation in solving problems for sustainable development. On the other hand jointness limits the autonomy of bank and stakeholders and requires interactions.

CONCLUSIONS

Separated fields of industrial sciences should work together more effectively on incorporating their achievements into common practice of sustainable development. More has to be done to explicate their structural and system aspects in common. The coalescence of all industrial knowledge into a unified whole is needed as well as more work is demanded to demonstrate the benefits of bringing industrial ecology into network practices. Up to day results, in form of the supply chain protocols for large-product oriented companies, required that suppliers to these companies carry out evaluation of environmental burdens associated with a product, process, or activity, are quite weak. To strengthen and accelerate the results of sustainable development joint academic and practical efforts should be undertaken within the frames of different considered industrial approaches. This broadening of industrial symbiosis requires new models of business and social relationships, finance flows, state regulations, and so on. This article applies to industrial ecology and industrial network theories and builds the model of eco-industrial symbiosis with the eco-industrial bank as an important participant transforming financial flows into sustainable development.

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