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Innovation and Cooperation in Smart, Sustainable and Inclusive Rural Regions

Editors:

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Introduction to the volume

This volume of the Rural Areas and Development Series, published by European Rural Development Network (ERDN), comprises the papers presented at the fifteenth ERDN conference held in Eisenstadt, Austria, on 3-4 October 2017. The conference was organised by the Institute of Agricultural Economics (AWI) in Vienna and was attended by around 50 researchers, practitioners and policy makers from Austria, the Czech Republic, Georgia, Germany, Hungary, Italy, the Netherlands, Poland, Romania, Slovakia, Slovenia and Ukraine. The papers explore several aspects of the topic Innovation and Cooperation in rural areas with the focus on social innovations, smart and sustainable approaches.

Efforts in previous Common Agricultural Policy periods have enabled agricultural development, but also promoted integration of other sectors of the rural economy and emphasised social and environmental concerns in rural development programmes. In the current period of the rural development policy one of the six EU priorities is dedicated to fostering knowledge transfer and innovation in a very broad sense.

Innovation does not only refer to technology, products or processes, but likewise to social, organisational and governance aspects, including any forms of horizontal and vertical cooperation and communication. This approach shall contribute to improving regional competitiveness in an increasingly challenging economic environment, while securing the sustainable use of resources, provision of eco-system services, food security, social and human capital. Innovation could arise from regional strengths and regional identities and should enable broad participation in the innovation process.

Papers of this volume comprise the manifold rural development aspects ranging from rather conventional analyses of competitiveness of agriculture and farm revenues among various topics of Rural Development Programmes up to social agriculture, social innovations and specific new types of cooperation.

ERDN has now been established for over 16 years and represents a ‘critical mass’ of high-quality research expertise covering a broad range of disciplines including (but not only) agricultural production and competitiveness, environmental resource management, agri-food supply chain management, markets and marketing, international trade, econometrics, rural economic geography, rural economy and sociology. The Network is uniquely placed to influence the various policy agendas to ensure that the needs of farming, the agri-food supply chain, rural areas and researchers in the regions are fully recognised. The annual ERDN conference is an opportunity for researchers in the region to ‘showcase’ their competences, not least to researchers in other parts of the EU and elsewhere, so that the region becomes fully integrated into the European Research Area.

The Editors

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Social agriculture as an example of social innovation emerging in rural areas and the role of public policy

Abstract: *Rural areas are faced with the rising demographic, economic and social challenges such as aging society, migration due to the attraction of cities, centralization of services or loss of jobs, in part triggered by the increasing mobility. It is argued that social innovation can support rural development and, therefore, it has become a very popular concept. Yet, its definition and understanding remain a highly debated issue. The paper presents the concept of social innovation as a vital element for supporting rural areas in facing their developmental challenges. The example of social agriculture shows how social innovation works and how it can contribute to both meeting social needs and efficient use of local resources. The methodology applied in the study consisted of both literature review and a case study. The literature review deals with the concept of social innovations, social agriculture as well as the importance of social innovations in rural development and the role of public policy in supporting social innovations in rural areas. The case study is part of a local project done in 2016/17 in the province of Bolzano, whereby the potential of social agricultural practices was analysed through a comparison between already existing social agricultural practices in Europe and interviews conducted with local farmers in the province of Bolzano. The paper argues that social innovations can support rural development and rural development policy has an important role to play in catalysing social innovations by creating empowering settings for rural communities.*

Keywords: *social innovation, social agriculture, rural areas*

Introduction

In recent decades, social innovation (SI) has become a very popular concept. Yet, its definition and understanding remain a highly debated issue. Due to the lack of clarity of its definition, a large number of different kinds of activities are named social innovations. They range from strictly technological innovations to new processes and institutions created to cover social needs observed in different communities.

Numerous parts of the EU rural areas have been struggling with phenomena such as depopulation, aging and weak economic performance. Given these developmental challenges faced by rural areas there is a need for new solutions and approaches to boost the speed of the cohesion processes and supporting inclusive growth.

The aim of the paper is to present social agriculture also defined as social farming (SF) as an example of social innovation in rural areas that can support local communities in making full use of their social, economic and environmental endowments to boost their development. The paper is divided into three main parts. The first part is devoted to the concept of social innovations and their necessity for supporting rural development. The second part presents the concept of social agriculture, concentrating on Italy and the province of South Tyrol. The third part analyses the role for public policy in supporting creation and implementation of social innovations in rural areas.

The methodology applied in the study consisted of both literature review and a case study. The literature study was done on the concept of social innovations, social agriculture as well as the importance of social innovations in rural development and the role of public policy in supporting social innovations in rural areas. The case study is part of a local project done in 2016/17 in the province of Bolzano, whereby the potential of social agricultural practices was analysed through a comparison between the already existing social agricultural practices in Europe and interviews conducted with local farmers in the province of Bolzano.

Social innovations in rural areas

a) Definitions and development of the concept

Social innovations (SIs) are currently a very popular concept. A simple explanation for it, is the fact that it encompasses one of the key recipes for growth of both regions and individual companies – innovations and the concept of the importance of social issues for the economic development. Yet, the concept of social innovations is not new. It can be traced back to the 1920s when it was used in various contexts of academic discourse relating to social change. The idea of SI became more widespread in the decade between 1965 and 1975 when it was part of an academic debate on social changes related to

environmental challenges and the survival of humankind (Edwards-Schachter and Wallace, 2017). In the 21st century the concept not only increased in popularity, but it also included a wider range of issues, both the earlier mentioned ones as well as the products, processes and services that are created with the use of modern IT solutions relating to social issues. This popularity of SI is accompanied by a diversity of academic disciplines that have taken interest in this concept. They include not only numerous fields of social sciences, but also, among others, environmental studies, agriculture and information sciences (Segarra-Oña et al., 2017).

Due to this plethora of meanings[1], the concept of SI lacks a unifying paradigm in social sciences. It is even argued that it is better to talk about "literatures" on social innovations (Caulier-Grice et al., 2012). Therefore, it is often contested and considered a quasi-concept. It seems that the high number of interpretations can result in the impossibility to generalise the phenomenon of SI. Yet, the effort to distinguish some general types and categories can help to fully present the complex nature of SI. The most general way of dividing the SIs is to categorise them into three groups based on their nature (Bock, 2012):

- Mechanisms – development, diffusion and use of innovations occur within a social context. In this approach innovations are a social phenomenon (Adams and Hess, 2010; Bonifacio, 2014).
- Objectives – taking into account innovation process, social preferences and values.
- Scope – social change.

As social innovations are defined in different ways and used in various contexts, for the purpose of this paper a social innovation is an innovation that results in a new form of functioning of social relations such as communication and coordination processes (Neumeier, 2017). It involves social change that translates into alteration of social practices, including both institutions and informal interactions. Social innovations can include products, services, markets, platforms, processes or business models (Caulier-Grice et al., 2012). Yet, only these changes can be considered as social innovations that are purposeful and orientated at a desired goal (Cajaiba-Santana, 2014). According to Neumeier (2012) there are three stages of a social innovation, including:

- Problematisation – identification of a need.
- Expression of interest – expansion of the group interested in implementing the innovation.
- Delineation and co-ordination – specification of the details of an innovation.

Based on the distinction of these stages three groups of factors influencing the social innovation process can be named. They include:

- Factors influencing the participation in the innovation process, such as social capital, existence of key actors/group leaders.

[1] Edwards-Schachter and Wallace (2017) identified 252 definitions of SI.

- Factors influencing the success of the social innovation, including consistence with existing solutions, foreseeability of result.
- Factors influencing the room to manoeuvre for the social innovation actor network that are external factors not under control of the innovation proponents.

The study shows that the concept of social innovations is still in a developmental phase, despite decades of intensive research. The theoretical background is generally based on the institutional and structuration theory (Cajaiba-Santana, 2014). Social innovations are characterised by their novelty and meeting a social need, efficiency and enhancement of society's capacity to act (Caulier-Grice et al., 2012).

Social innovations are undoubtedly a subcategory of the category innovations (Fig. 1). It seems that they also have some common elements with ICT innovations. Yet, the lack of a clarity concerning the concept makes it impossible to state exactly to what extent social innovations are part of ICT innovations.

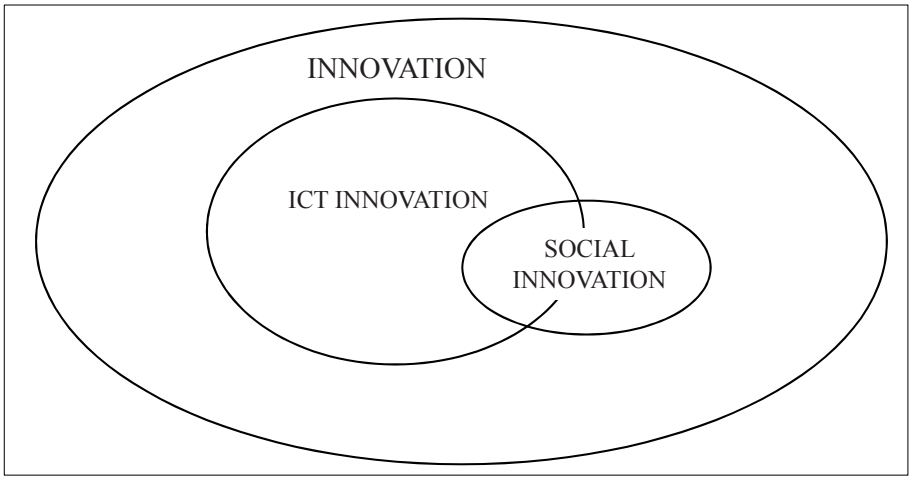

Figure 1. SI vs innovation

Source: Zambrano (2017).

Pisano, Lange and Berger (2015) proposed five core elements that should be presented to define a social innovation. They include:

1) Novelty,
2) Practical application that is financially sustainable in the mid- to long-term,
3) Meeting a social need,
4) Effectiveness,
5) Enhancing society's capacity to act.

These elements should be present in social innovations irrespective of their nature. Yet, as with other types of innovations, the fulfilment of some of these elements in a given case can be debatable.

The wide range of social innovations can be divided using a typology analogical to Schumpeterian innovations. We can distinguish between product, process, market, inputs and organizational innovations (Table 1).

Table 1. Schumpeterian approach to social innovation

Schumpeterian innovation	Social innovation
Product	New outcomes: new businesses, organisations, services or products
Process/methods of production	New approaches to value creation and policy/service delivery
Exploitation of new markets	Serving the breadth of society; responding to social needs (local demand)
Inputs	Maximising the use of local resources, including human and social capital
Organizational innovations	Network approaches and innovative partnerships

Source: Bosworth et al. (2016).

b) Role of social innovations in rural development

The need for innovations in the whole economy as well as in agriculture and rural areas is emphasized in numerous publications and policy statements (e.g. Ireland and Webb, 2007; European Commission, 2010 and 2013; Dudek, 2017). In the case of the agricultural sector, still an important part of rural economy, it is also seen as necessity for sustaining agricultural production in climate change reality (Rosenberg, 1992). Moreover, it is supposed to make the sector more sustainable in all aspects of sustainable growth (Pretty, 1995).

As numerous rural communities face different kinds of structural problems, such as demographic changes, below-average economic productivity, insufficient supply of technical and social infrastructures, and suffer from chronic austerity of state systems hampering developing approaches for such communities to be resilient (Manthorpe and Livsey, 2009), there is a need for new approaches and innovative solutions.

Within the neo-endogenous paradigm these are the inner forces that can lead to the development of a given territory. This means that the existing endowment has to be used more efficiently, which requires new ways of using the available resources. These new ways can only result from innovations. They can be both copied from other regions or created within the region. When it comes to social aspects of rural development the social needs can be specific as a result of local culture, traditions and institutions. Therefore, a direct, one-

to-one application of solutions created in other regions can be problematic, if not impossible. This is a way there is need for social innovations in rural areas (Neumaier, 2012).

As stated by Dax and Fischer (2018) social innovations together with local participation, and establishing trust are vital to effectively impact well-being dimensions of rural development as it is an important part of dealing with the challenges faced by rural communities. These researchers state that a comprehensive social transition process which would foster an altered narrative for these rural regions compared to the current and predominant focus on compensation and growth policies.

The so-called community-led local development (CLLD) initiatives have already entered rural policy in Europe. This approach can be a catalyst for social innovations in rural areas (Bosworth et al., 2016) as it shows the importance of social aspects in all of the projects implemented (Bosworth et al., 2015).

Social agriculture an emerging initiative

a) Background and development of social agriculture

Rural areas are faced with the rising demographic, economic and social challenges such as aging society, migration due to the attraction of cities, centralization of services in the centres, loss of jobs, in part triggered by the increasing mobility. These social transformation processes have a particular impact on the social system and the development of rural areas. These rural areas, which are the place of origin for food, culture, tradition and values, nowadays suffer from a lack of appreciation of their value and depopulation. Values and traditions, which were passed on at the time, today are threatened by the mobility, materialism and comfort of today's society. As a practical response to these pressing societal requirements, social agriculture or social farming (SF) has been introduced for some time in Europe.

Today an increasing number of farms, especially in the Netherlands, Germany, Austria and Italy, offer disadvantaged groups of people by means of the use of agricultural resources, animals and plants alike (Di Iacovo & O'Connor, 2009), new complementary social or care service to improve their health, personal quality of life as well as intellectual, educational and physical well-being. Thus, agricultural resources are used for developing new business fields for farms, social cooperatives or associations that aim at increasing benefit in rural areas by combining economic, environmental and social services. Practically, SF offers farmers the possibility to diversify and generate additional income through on-farm social and care activities in order to help supplement their low agricultural income. Contemporarily social agriculture responds to social needs in rural areas.

The emerging social farming initiatives have been driven by different factors:

- The farm as a traditional place where social activities have been provided due to the generational tradition of taking care of old people or people with special needs such to say the ethical and social responsibility of the providers of social farming service;
- Women farmers, who have attained a social education in the field of care, education or social assistance and want to offer their service on the farm combining their education and agriculture;
- The entrepreneurial spirit or interest of farms, mostly also small scale farms to expand their income and diversify their agricultural activity;
- Social responsibility or willingness to respond to the pressing social challenges such as depopulation and assistance for disadvantaged vulnerable groups.

These factors are not necessarily to be seen individually, but rather overlapping each other as one does not exclude the other. Besides the grass-root initiatives in the single countries, social farming initiatives have been driven by the EU projects as well as political initiatives. The most important EU projects promoting social agriculture were:

- 2006: The SoFar project, which analysed social agriculture in Italy, France, Germany, Ireland, Slovenia, the Netherlands and Belgium.
- 2009: A follow-up project was the Cost Action 866 on green care in agriculture, which scientifically analysed the health effects, economic efficiency and political framework of social agriculture.
- 2011-13: The DIANA (Disability in Sustainable Agriculture und MAIE (Multifunctional Agriculture in Europe)) project focused on the education and further qualification in social agriculture.
- 2013-15: In the INCLUFAR (Inclusive Farming) project the main topic was the quality assurance, whereby qualification in the field of social agriculture plays a major role.
- 2012-14: Study Wiesinger, Situation and Potential of Social Agriculture in Austria, South Tyrol and Trentino (Wiesinger et al., 2013).
- 2016-17: Regional South Tyrolean Study on Social Farming Potentials and Perspectives (Südtiroler Bäuerinnenorganisation, 2017).

At the European level, however, a clear definition, a framework and a common platform for social agriculture is missing. Nevertheless, there have been a few political initiatives, which at the EU level have contributed to raise awareness on the topic. Therefore, in 2007 as part of the SoFar project 7 countries drafted the Witzenhäuser position paper through a participatory approach (Van Elsen and Kalish, 2008). This position paper explains opportunities and challenges of social agriculture in Germany. Based on the "Witzenhäuser Position Paper on the Added Value of Social Agriculture" from Germany and the "Green Care Strategy in Agriculture and Forestry" from Austria, the "European Manifesto on the Added Value of Social Agriculture" was prepared and discussed in 2009. Three years later the European Economic and Social Committee on So-

cial Agriculture submitted an initiative opinion on "Social Agriculture: Green Care and Social and Health Policy" recognizing, inter alia, social agriculture as a social innovation (multi-functionality of agriculture and social services).

b) The main characteristics of social agriculture

All social farming initiatives differ according to client group, objective and length of the stay, the offer on the farm, clients, financial aspects, qualification of the service provider, certification, institutional support, cooperation, etc. However, all SF activities include material and immaterial resources of agriculture to promote or combine with therapeutic actions, rehabilitation, and social and working involvement of disadvantaged or marginalized people. There are four categories of social farming that often are interwoven and include various target groups ranging from children and young people, elderly, people with disabilities and disadvantaged individuals, or people with psychological distress such as ex-prisoners, drug addicts even immigrants to meet the special needs of these people (Gallis, 2013).

These SF practices are a complementary offer of social and care services besides the existing institutionalised ones that stimulate a positive, integrative development of the clients. SF simulates the people's autonomy, social and working skills. Activities can be part of the whole production process starting from the preparation of the land, sawing seeds, cultivating and caring for the plants, harvesting and even selling them on the farm shop or the farmers' market. Furthermore, all human senses are addressed as clients see, touch and eat the products they plant and care for, or the animals they work with, which corresponds to an integrative learning, experiencing and working process. Thus, these practices can be understood as innovative practice for delivering social services in remote areas, where public care services are often only supplied marginally or inadequately (Lanfranchi et al., 2015).

c) Social farming in Italy

In Italy social cooperatives emerged in the 1980s after many psychiatric institutes closed down (Hassink, 2013). Many of these cooperatives include agricultural activities. It is only possible to give an estimate number of social farms, as there are different regional networks and no common survey, in Italy it is estimated that there are over 2000 of which the majority practice organic farming (Südtiroler Bäuerinnenorganisation, 2017). Most initiatives are concentrated in the North and South of Italy and are mainly offered by social cooperatives, which mostly provide labour and social integration activities for socially excluded persons such as long-time unemployed, former drug addicts or dropout youth, so that they find employment and are able to re-integrate into the society (Giarè et al. 2014). Since 2015 Italy is the first country with a national law on social agriculture.

d) The legal framework of social agriculture in Italy

The rapid spread of social farming practices throughout Italy determined the need for a legislative regulation of this sector. Thus, the National Network of Social Farms (Rete delle fattorie sociali) and the National Forum of Social Agriculture (Forum nazionale agricoltura sociale) were responsible for the introduction of the national law (Zampetti, 2017). The new law promotes the diversification potential of farms and their multi-functionality by promoting offers for complementary social, socio-asylum, pedagogical and rehabilitation services. It specifies the minimum requirements for operators, the permitted activities and infrastructure requirements as well as cooperation with private and public bodies, funding possibilities and the establishment of a monitoring centre for social agriculture. It, therefore, provides a framework for the activities of social agriculture and must be implemented by the individual regions and provinces. Thus, a close cooperation between the responsible departments, especially agriculture and social affairs, but also the other institutions and stakeholders, is essential. This is certainly the greatest challenge in the implementation. Several regions have already passed a regional law with provisions on social agriculture or multi-functionality, or the law on agritourism has been supplemented: Lombardy, Tuscany, Veneto, Friuli Venezia Giulia, Emilia Romagna, Marche, Molise, Lazio, Abruzzo, Campania, Calabria as well as the province of Trento. Some (Campania, Veneto, Umbria) have already defined what social agriculture is and which target groups should be considered before the national law was adopted (Giarè, 2014).

In accordance with this, the Autonomous Province of Bolzano-Alto Adige is currently working on a draft law for social agriculture and a corresponding implementing regulation. In addition to the already regulated activities such as day-care and educational farms, further activities should be regulated with this law.

e) The case of social farming in South Tyrol

The case of social farming in South Tyrol is relatively young and the initiatives are the result of the social cooperative "learning – growing and living" with women farmers (*Mit Bäuerinnen lernen-wachsen-leben*), which was founded in 2006 after some women farmers had started day care for children aged 0-4 informally and needed some regulation. Consequently, in 2007 the service of day-care mothers was officially promoted and regulated by the social cooperative. The childcare service includes individually adapted care accommodating up to six children, with an annual average of 420 children[2], flexible care hours (a total of 248.000 care hours in 2016)[3], integration into the family structure, the passing on of traditional values, and the provision of environmental education. Currently, there are 106 qualified day-care mothers, who are active in the social cooperative. This service is highly responsive to lo-

[2] SBO Jahresbericht (2016).

[3] SBO Jahresbericht (2016).

cal demands, which is particularly important in peripheral areas. Meanwhile, the cooperative has expanded its services. Since 2008, it promotes educational farm activities on its website. Schoolchildren age 6 and older can spend 3-4 hours on the farm and learn how to bake bread, work with the animals, etc. Providing new forms of environmental education, by allowing children to participate in farm-related activities, has stimulated children's awareness for the sustainable use of agricultural resources – animals and plants alike. The number of schoolchildren participating in this practically orientated programme has increased from 5.700 in 2012 to 10.000 in 2016.4

In 2014, the cooperative initiated the pilot project of elderly care on farms as a reaction to the growing number of elderly people in South Tyrol from 43.500 in 1975 to 100.000 in 2015. This temporary, family orientated care service, actively integrates elderly people on farm life. At present, there are 33 women farmers offering elderly care services on request. Due to the valuable contribution the social cooperative offers society, it is planning to expand its current services to the entire South Tyrol area, and to develop new potential services such as rehabilitation for people with disabilities and special needs, horticulture and animal-assisted therapy for people or even labour inclusion of migrants.

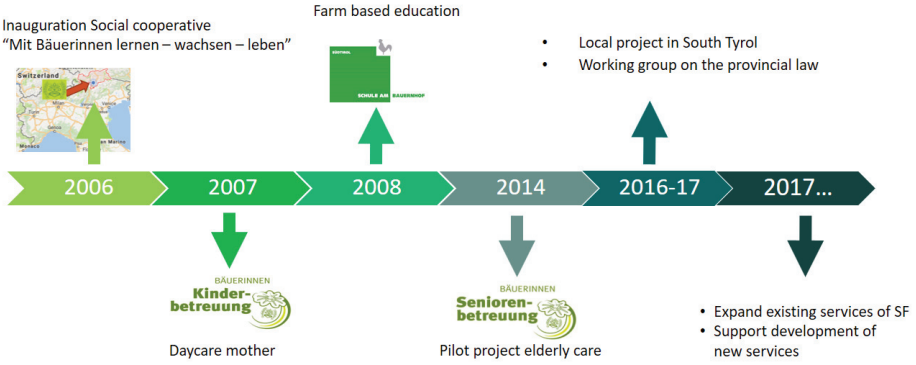

Figure 2. Social cooperative "Mit Bäuerinnen lernen-wachsen-leben"
Source: data of Bäuerinnengenossenschaft "lernen-wachsen-leben" (2016).

Moreover, based on the implemented national framework law No. 141/2015 on social agriculture, a working group of regional stakeholders (representatives of the farmer and women farmer association, the provincial department of agriculture and social department, the social cooperative, University of Bolzano including Eurac researchers), drafted a regional law for the province of Bolzano. It is evident, that the working group had to deal with many challenges in the elaboration of the regional law including the following questions: Which new services should be included and regulated? What are the

[4] SBO Jahresbericht (2012, 2016).

necessary requirements – e.g. training, qualification, infrastructure, number of people that can be cared for, level of the needs of candidates? How the financial aspect should be regulated between the agricultural and social sector?

Reflection on social farming initiatives has shown that these practices meet the objectives set forth in point 1 "Promoting Rural Prosperity" and point 3 "Investing in Rural Viability and Vitality" of the Cork Declaration 2.0 of 2016 (European Union, 2016). Whereby point 1 stresses that innovative, inclusive and sustainable solutions for social inclusion should be recognised and diversification and entrepreneurship fostered.

Point 3 stipulates that society should benefit from the investment in private services, self-sustaining initiatives and the promotion of competitiveness in agriculture (European Union, 2016). In fact, social farming has a twofold benefit. On the one hand, it responds to the needs of society, and stimulates the personal development and independence of vulnerable people through individual, client-orientated services. It also promotes modern, family-orientated and innovative social services, empowering women farmers and creating horizontal and vertical collaboration, in both the private and public sector. On the other hand, it provides an extra income for women farmers in peripheral rural areas, whereby economic, sustainable development is fostered and services are provided for people in these areas.

Normally, agricultural or rural development are primarily linked to business innovations, e.g. products, processes. According to Pol and Ville (2009), innovation in an economic way of thinking stimulates the ability to increase profit and economic development also in rural areas. One of the reasons for initiating social farming, was definitely also to increase farm income. This corresponds with the objectives set forth in point 1 "Promoting Rural Prosperity" as care services are offered decentralised and are a response to the changing circumstances of society and the growing concern about the availability and efficiency of these services. A further economic aspect is that social farming contributes to reducing public health expenditure by new models of cooperation between the different sectors (agriculture, social, health and education).

Moreover, referring to point 3 "Investing in Rural Viability and Vitality" of the Cork Declaration 2.0 of 2016, which stresses fostering diversification and entrepreneurship. Social farming is an opportunity for farmers, especially women farmers in marginalized peripheral areas, to increase their personal income through new employment possibilities. Consequently, this also stimulates the rural development and viability of these areas as new private services are offered which benefit social inclusion of vulnerable people groups.

Besides the economic aspect of social farming, there is also the socially responsible innovation that responds to important social problems. As Phills, Deilmeier and Miller (2008) state: "Social responsible innovations call upon

businesses to invest in society and to come up with socially relevant innovations, as part of their corporate responsibility for "people and planet" and not only profit. According to this the case of social farming, that provides alternative or better complementary initiatives for vulnerable groups of people (people with disabilities, migrants, ex-drug addicts, children with special needs, etc.) can be defined as a socially responsible innovation.

Social innovation is characterized by co-design, co-construction and collaboration and the involvement of multiple innovation actors, such as in social farming where the farmer meets the pedagogics, or doctor or social assistant to develop innovative assistance, therapy or activities for creative and social learning processes to stimulate and promote personal autonomy. Thus, there is a mix of different people that combine their knowledge and create something new, these can be practices, skills or products and they create new social relations (Oreszczyn et al., 2010; Fløysand and Jacobsen, 2011).

The role of public policy in social innovation processes on rural areas

Rural development policy is constantly looking for new policy instruments more effectively and efficiently targeting developmental needs of rural areas and their inhabitants. Innovations are currently seen as means dealing with challenges, which arise in the economic development. Innovations are generally associated with new technological solutions. Yet, the innovations can also relate to non-technical aspects of functioning of the economy. Therefore, also in the social reality we can implement innovations. The concept of social innovations has been researched in different fields relating to, for instance, management and entrepreneurship. Furthermore, the idea of social innovations as a way of achieving socio-economic development has been gaining in popularity in recent years and in the agricultural and rural contexts, it is seen as an essential part of innovations (Bock, 2012).

Based on the literature review, it can be concluded, that the role of a rural development policy should create an optimal environment for agents to develop and implement new ideas, so as to foster social innovation. Creating this specific environment, the policy designers have to bear in mind different initial conditions, especially differences in social capital, as well as variety of social innovations that require different environment settings. Moreover, policy should be opened to support prototyping that is putting ideas into practise in a form of pilot projects.

Naturally, the major role for policy is in the field of innovations' scaling and diffusion. This is the next step after pilot projects. Moreover, the knowledge gained by supporting prototypes and pioneering projects must be popularised to ensure an efficient use of public funds. This is also the cheapest way to ensure implementation of social innovations at a large scale.

Moreover, policy should support systemic change, i.e. create regulatory solutions that enable sustaining the innovations implemented, but at the same time, it must give room for further innovations. This means that the monitoring of the impact of regulations in force should be a permanent part of the policy.

There is still much need for further research on how to design an effective policy supporting social innovations. This is clearly shown by the experiences with the EU bottom-up approach for the development of rural areas. The LEADER approach is considered to be a right solution for supporting social innovations and increasing local communities' empowerment that plays a key role in catalysing social innovations. The experiences with the LEADER approach show that the key factor for the type and extend of results of using the bottom-up approach depend not only on the social capital already present in the targeted areas, but also on the exact procedures and extent of support offered. The EU LEADER approach is a right step into facilitation of social innovations. Yet, there is a threat that the mainstreaming of bottom-up approach is losing the power of this instrument (Dax and Oedl-Wieser, 2016) due to increasing administrative burden and growing intent of the European Union to concentrate in quantitative indicators in evaluating the results of the LEADER approach.

To sum up, it can be stated that social innovations are as important as other types of innovations to the development of rural areas. With the increasing number of challenges facing the socio-economic development of rural areas, it is necessary to take into account the issue of social innovations within the rural development policy and introduce effective and efficient measures to support such innovations.

Conclusions

Rural areas are faced with the rising demographic, economic and social challenges such as aging society, migration due to the attraction of cities, centralization of services in the centres and loss of jobs, in part triggered by the increasing mobility. The growing challenges facing EU rural areas require new approaches for rural development to address them. In recent decades the interests of both researches and policy makers have been shifting towards participation of local communities. One of the concepts gaining popularity is social innovation. Yet, this concept still lacks a clear definition, which results in vagueness, but at the same time in variety of initiatives named social innovations. A key feature that all the examples of social innovations have in common is the fact that they are a new, innovative way to address social needs.

One of the examples of social innovations, which is being popularized in the whole EU, is social agriculture also referred to as social farming. Social farming includes a wide range of different projects. All social farming initiatives differ according to client group, objective and length of the stay, the offer on

the farm, clients, financial aspects, qualification of the service provider, certification, institutional support or cooperation. Social agriculture practices are a complementary offer of social and care services besides the existing institutionalised ones that stimulate a positive, integrative development of the clients. Social farming stimulates the people's autonomy, social and working skills.

Social agriculture is an example of social innovation as a way of employing available resources in a new way to tackle an observed social need. It also uses the local resources and is a conduit for networking and cooperation. Moreover, as the examples presented in the paper show, social agriculture is an innovation that can be implemented in different rural settings, that it can be copied in other places as it tackles the needs that are common to all EU Member States and it requires resources that can also be found in many rural communities.

The research discussed in the paper also indicates that public policy has an important role to play at all the stages of social innovation process. This role focusses on empowering local communities and creating conditions for making use of the potential of local endowment. At the level of the EU rural policy, an important task for the policy is to support dissemination of good practices, that is of social innovations that have already been implemented in some of the EU rural communities.

The element of policy supporting social innovations in the EU rural areas are already in place. The LEADER approach is considered to be a catalyst for social innovations. The currently implemented community-led local development is also an approach that can support the social innovation process in rural settings. It seems that the EU rural policy will continue to encompass the bottom-up approach as the European Commission plans to centre its rural development policy around the emerging concept of "smart village" and reinforce support for capacity building in rural areas, which should help the process of social innovation (European Commission, 2017).

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Sustainable development in rural regions of Slovakia: the role of the National Rural Development Programm

Abstract: *Traditional farming systems and other activities such as craftsmanship (e.g. manufacturing activities, local food production), represent a sustainable example of human integration with the nature. Their maintenance and development, with opportune adaptations to the current socio-economic situation and cultural/ technological advancements are, therefore, valuable (Gobattoni et al., 2015). Agriculture has long been one of the main driving forces shaping landscape. However, since the 1950s, the role played by the agricultural sector in society has changed as a consequence of mechanization and technological advances, globalisation processes and new social needs (Randelli et al., 2014; Van Eupen et al., 2012). In post-war Europe, industrialization and new demographic trends have led to the Urbanization phenomenon (Schewenius et al., 2014), with the rapid growth of cities, soil sealing through intensified construction and the depopulation of rural areas (Crafts and Toniolo, 1996). The deep transformations experienced by agriculture have impacted not only the rural community economy, employment and social dynamics, but also the nature and the environment (Schouten et al., 2013; Hanley et al., 2012; McManus et al., 2012) and, in general, on the supply of the so-called ecosystem and landscape services (De Groot et al., 2010; Hermann et al., 2011; Zanten et al., 2014). The paper deals with the presentation of the role of the National Rural Development Programme 2014-2020 in the development of rural regions of Slovakia. The number of supported projects, allocation of resources, and their efficiency will be evaluated with respect to regional dispersion and innovative potential of supported projects.*

Keywords: *agricultural policy, rural development, regional development, Slovakia, support*

Introduction

With respect to the nature of the territory and population density, Slovakia is a rural country. The Eurostat methodology defines a rural region as an administrative unit structured according to the level of rurality, by the rate of the number of people living in rural villages and the total number of inhabitants in the region. The criterion for classification as rural settlement and urban settlement is population density per square kilometre, with a threshold of 150 inhabitants per square kilometre. The average population density in the Slovak Republic (SR) is 110 inhabitants per square kilometre (MARD SR, 2017). Rural regions are also generally characterized by the fact that the share of the population of the region living in rural municipalities is greater than 50%, prevailingly rural regions have a share of 15-50% and prevailingly urbanised regions have a share of inhabitants less than 15%. Altogether, 95% of the Slovak territory is covered by rural regions which are inhabited by 88% from 5.4 million of the Slovak residents.

In the past, Slovakia was also considered to be a typical farmland. However, the focus of the economy has been declining in the recent years. Nevertheless, Slovakia spreads over 49 036 km^2 and 88% of this areas is used by the agricultural sector (48% is covered by agricultural land and 40% by forest). The agricultural land is predominated by arable land (71%) and permanent grassland (28%). Moreover, 65% of agricultural land is classified as affected by natural constraints, which are strongly limiting its production potential. In consequence of this, 20% of the agricultural area is of high nature value, while NATURA2000 sites cover 16% of agricultural land and 46% of forests (EC, 2016). These facts greatly influence the production potential and population density mostly in mountain areas (Fig. 1).

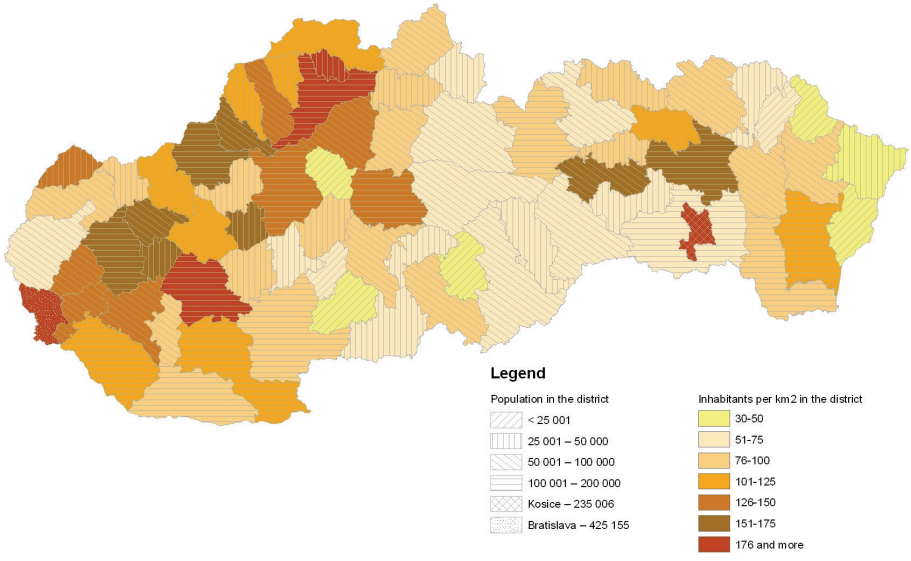

Figure 1. Population in Slovak districts

Source: European Environment Agency (2015).

The basic prerequisite for the harmonious coexistence in community is ensuring equality for all citizens. Slovakia has been a member of the European Union since 2004. However, ensuring equality of Slovaks and other Europeans is difficult, given that there are still various disparities within the country, which are visible mostly on the regional level. The citizens' standard of living, unemployment rate as well as availability of infrastructure varies among individual regions. Counterbalancing the disparities is one of the EU's priorities and, therefore, the competent authorities have developed a common system for classifying and evaluating the regions. The Statistical Office of the European Union created the NUTS (*La Nomenclature des Unités Territoriales Statistiques*) methodology to statistically monitor and analyse the social and economic situation in the regions. It is used to consider the needs of the regions as well as to determine the suitability of the individual EU regional policy instruments for specific regions (NSRR SR, 2017). The Ministry of Interior of the Slovak Republic regulated this by Act No. 221/1996, which divides Slovak regions into 5 classifications (NUTS I – Slovakia; NUTS II – 4 main regions: Bratislava Region, Western Slovakia, Central Slovakia, Eastern Slovakia; NUTS III – 8 regions: Bratislava, Trnava, Trenčín, Nitra, Žilina, Banská Bystrica, Prešov, Košice; NUTS IV – 79 districts; and NUTS V – 2890 municipalities) (Fig. 2).

Figure 2. NUTS II and NUTS III regions in Slovakia
Source: Government Office SR (2010).

According to the OECD (2016), Slovakia is on the 4th position out of 33 states with the biggest regional disparities. The indicators of economic development, based on the OECD data from 2014, consider the states with the largest regional disparity in income indicators (29th position among 32 countries, measured based on disposable income per household member in purchasing power parity) and jobs (21st of the 33 countries surveyed, measured on the basis of employment and unemployment rates). These disparities are manifested through several socio-economic indicators, mostly showing the differences

between Bratislava region and the rest of Slovak regions. Out of 263 EU regions, Bratislava region is on the 96th position in Regional Competitiveness Index and 3rd position in GDP per capita. Western Slovakia is ranked 196th (both on the basis of the Competitiveness Index and the GDP *per capita*), on average Slovakia is 211th (index) and 226th (GDP) and Eastern Slovakia up to 225th (index) and 241st (GDP) place (Goliaš, 2017). One of the biggest socio-economic problems in Slovakia is also the unfair distribution of job opportunities and the associated poverty-stricken areas. About half of the vacancies are in the Bratislava region, where nearly two-thirds of job-seekers come from Prešov, Košice and Banská Bystrica. Most people below the poverty line are in the regions of Banská Bystrica and Prešov. Poverty in Slovakia threatens mainly households with at least three children and incomplete families with at least one child. According to INECO (2017), there is evident high correlation (0.79) between the poverty rate and the share of the Roma population. In addition to these problems, systematic support for regional development in Slovakia is of considerable importance. Regional development should be supported by horizontal and vertical coordination, taking into consideration the diversity of Slovak regions. It is also the intention of the government to create and implement socio-economic instruments that will reduce regional disparities, increase the competitiveness of the regions and hence the quality of life (GO SR, 2017).

Material and Methods

The paper represents the system of funding rural development (RD) in Slovakia through Rural Development Programmes (RDP) in connection with the Common Agricultural Policy (CAP) funded by the European Agricultural Fund for Rural Development (EAFRD).

The research period between 2014 and 2020 was chosen according to planning periods of the EU. Close attention is paid to the allocation of the IROP budget into five priority axes and the selected time periods (before 2017, 2017 and 2018-2020). Moreover, the specific allocation into the following axes is examined based on the situation of calls announced as of 10.08.2017: 1. Safe and environmentally friendly transport in the regions, 2. Easier access to efficient and better public services, 3. Mobilization of creative potential in the regions, 4. Improving the quality of life in regions with a focus on the environment. Finally, rural development in Slovakia is explained on the case studies: "New places in preschools across Slovakia", "Ecological and faster public transport in Bratislava" and "Cycling in Nitra region".

Results and Discussion

This part presents the specific allocation of the ERDF and the IROP sources into priority axes of the Rural Development Programme in Slovakia.

Rural development (RD) is the term used to identify activities and initiatives aimed at enhancing living standards in areas out of urban areas. RD activities are mainly focused on the social and economic development of areas. Rural development policy, as part of the Common Agricultural Policy of the European Union, helps to achieve sustainable rural development. It is supported by the European Community countries from the European Agricultural Fund for Rural Development (EAFRD) connected with the rural development programmes in each country. Alongside the EAFRD, regional development is supported also by the Regional Development Fund (ERDF), the European Social Fund (ESF), the Cohesion Fund (CF) and the European Maritime and Fisheries Fund (EMFF).

There are three Operational Programmes (OP) connected to the three priorities of rural development in Slovakia: development of the regions, support for the district of Bratislava and cross-border cooperation (MARD SR, 2017). The main objective of the Regional Operational Programme (ROP) is to increase the availability and quality of civilian infrastructure and facilities in the convergence objective regions. The ROP provides for non-repayable financial contribution for local authorities, self-governing regions and municipalities (MARD SR, 2017). Special Operational Programme Bratislava Region pursues the objective of regional competitiveness and employment, aimed at strengthening the Bratislava region by developing a knowledge-based economy and building a region attractive for life. Support is determined for the capital city of Bratislava, municipalities and small and medium-sized enterprises from Bratislava region (NSRR SR, 2017). Operational programmes for cross-border cooperation are funded by the European Regional Development Fund. Cross-Border Cooperation (CBC) is a key element of the EU policy towards its neighbours. The CBC programmes are intended to promote the harmonious and balanced development of the EU territory. Programmes covered regions located at state borders to stimulate cooperation and exchange of experience between the regions (EC, 2017).

Support programmes are being prepared within the EU on the basis of intensive consultations between the EC, Slovak Republic and other competent authorities. In preparation for this process, the decentralization of key competences took place in Slovakia. In December 2001, in the context of the reform of the public administration, the regional level of self-government – the self-government of the Higher Territorial Units (HTC), was gradually established. In this process the HTC took over a range of competencies from the state administration (Act No. 416/2001). At this time, Act no. 503/2001 support for regional development was also adopted. This provided the framework for the harmonization of national legislation with the acquis communautaire – a basic law allowing for full application of the principles of regional policy in the Slovak Republic and the participation of the country in the Structural and Cohesion Policy of the EU.

The European Union supports RD activities through the Common Agricultural Policy (CAP). Rural development in Slovakia is, therefore, advanced through the measures of the Rural Development Programme of the Slovak Republic and the Operational Programme for Fisheries of the Slovak Republic. Individual parts of this scheme are direct payments designed as direct support for farmers.

In the next EU programming period of 2007-2013, Slovakia adopted the Rural Development Programme of the Slovak Republic 2007- 2013 (RDP SR 2007--2013). This includes support for modernization, innovation and efficiency of agricultural, food and forestry enterprises, preservation and protection of the country's environmental values, preservation of cultural heritage, job creation, increasing the rural population's expertise and improving the quality of life on rural areas. The RDP SR 2007-2013 was a tool for support of rural development policy as a part of the EU's second pillar of the CAP. According to the EC (2014), the programme was implemented through measures under five axes: Axis 1 – Increasing the competitiveness of the agricultural and forestry sector, Axis 2 – Improving the environment and landscape, Axis 3 – Quality of life in rural areas and diversification of the rural economy, Axis 4 – Implementation of the Leader approach, Axis 5 – Operations of technical assistance. The total amount of public funds (Table 1) for this seven-year period was EUR 2 597 053 717 (EAFRD: EUR 1 996 908 078, state budget of SR: EUR 600 145 639). The European Agricultural Fund for Rural Development (EAFRD) contributed to the Convergence regions in the amount of EUR 1 958 307 486 and EUR 38 600 592 to non-convergence regions (MARD SR, 2012)

The programme for the current period (Rural Development Programme for 2014-2020) was formally adopted by the European Commission in 2015 (EC, 2016) and it runs under the "new" Common Agricultural Policy (CAP), which gives preference to projects with a participative approach presented for funding covered by the Common Strategic Framework 2014-2020 programming. This outlined Slovakia's priorities for using EUR 2.1 billion of public money available for the 7-year period (EUR 1 545 million from the EU budget and EUR 534 million of national funding). The RDP is based on 6 priorities: 1. Fostering knowledge transfer in agriculture, forestry and rural areas, 2. Enhancing the competitiveness of all types of agriculture and enhancing farm viability, 3. Promoting food chain organization and risk management in agriculture, 4. Restoring, preserving and enhancing ecosystems dependent on agriculture and forestry, 5. Promoting resource efficiency and supporting the shift toward a low-carbon and climate-resilient economy in agriculture, food and forestry sectors, and 6. Promoting social inclusion, poverty reduction and economic development in rural areas (ENRD, 2017). Priority 1 is incorporated into remaining 5 priorities and priority 4 was considered as main priority in Slovakia. These priorities were combined into the Integrated Regional Operational Programme 2014-2020 (IROP SR) which consists of six axes: 1. Safe and environmentally friendly transport in the regions, 2. Easier access to effective and quality public services, 3. Mobilizing creative potential in the

regions, 4. Improving the quality of life in the regions with an emphasis on the environment, 5. Community-Led Local Development, and 6. Technical Assistance, which is incorporated into axes 1 to 5. The budget for these axes for 2014-2020 is 2.1 billion of public money (EUR 1 545 million from the EU budget and EUR 534 million of national funding). Figure 3 shows allocation of the European Regional Development Fund (ERDF) in the 2014-2020 programming period.

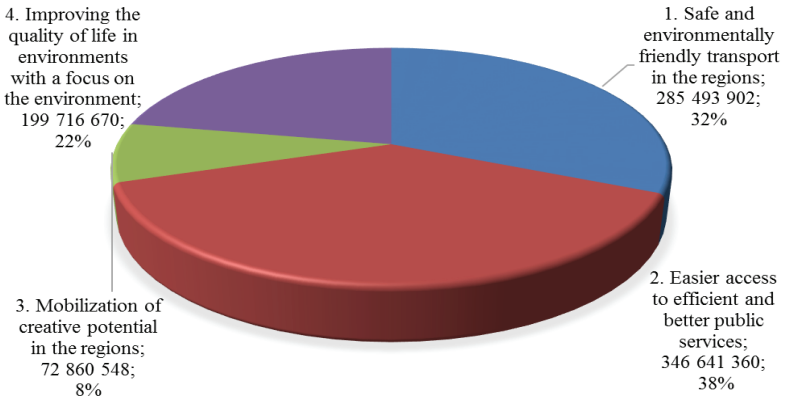

Figure 3. Allocation of the ERDF in the 2014-2020 programming period
Source: MARD SR (2017).

The biggest amount of ERDF budget in the Programming Period 2014-2020 will be directed to Axis 2. Easier access to effective and quality public services (38%) and Axis 1. Safe and environmentally friendly transport in the regions (32%). Allocation from this budget to Improving the quality of life in the regions (Axis 4) will be 22% and just 8% is intended for Axis 3. Mobilizing creative potential in the regions.

Table 1. Integrated Regional Operational Programme – IROP / Overview of announced and planned calls to 10.8.2017

Priority axis	IROP (EUR)	Announced calls (EUR)	%	Planned calls 2017 (EUR)	% 2017	Planned calls 2018-20
Axis 1	421 000 000	285 466 902	68	0	0	32
Axis 2	755 913 197	346 641 360	46	84 763 397	11	43
Axis 3	215 860 548	72 860 548	34	143 000 000	66	0
Axis 4	84 763 397	199 716 670	100	0	0	0
Axis 5	100 000 000	0	0	100 000 000	100	0
Total	1 754 490 415	934 003 419	53	327 763 397	19	28

Source: MARD SR (2017).

The total planned allocation of the IROP budget is slightly different. As shown in Table 1, more than 43% of this budget is intended to Axis 2 (EUR 755 913 197) while until October 2017 just 46% of this amount was announced. There is a plan of competent authorities to spend another EUR 84 763 397 in 2017 and the rest of 43% in 2018-2020. According to the past experiences, Slovakia is not very successful in obtaining money from the EU. In spite of the fact that the full amount of Axis 4 (EUR 84 763 397) was announced before October 2017, there seems to be a problem with the rest of the funds. There was a plan to obtain the full amount of Axes 3, 4 and 5 until 2018, while 66% of Axis 3 and 100% of Axis 5 would have to be used in the third quarter of 2017. Especially, obtaining funds for Axis 5 – Community-Led Local Development, seems to be the biggest problem since its full budget should be settled in 2017. Even if all these plans are filled, there will still remain 28% for 2018-2020. In the above-mentioned Axis 2, there will still remain 32% of budget for Axis 1 – Safe and environmentally friendly transport in the regions.

Specific allocation of the IROP to priority Axes – calls announced on 10.08.2017

The total allocation of resources to the individual priority axes described above is subdivided into sub-envelopes according to the objectives set for each priority. The biggest amount of the budget for priority Axis 1. Safe and environmentally friendly transport in the regions, has so far been (before 10.08.2017) referred to specific objective 1.1 Improving accessibility to TEN-T road infrastructure and class I roads (EUR 140 855 695). Figure 4 also shows EUR 81 830 693 for specific objective 1.2.2 Cycling whose practical use is described in one of the attached case studies.

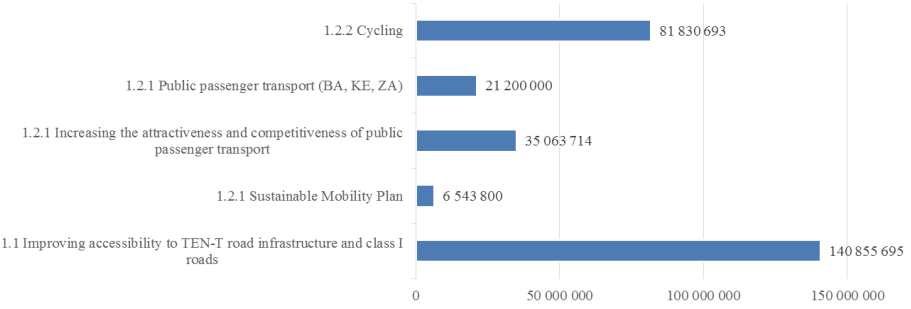

Figure 4. Specific allocation of the IROP to Priority Axis 1

Source: MARD SR (2017).

So far, Axis 2 – Easier access to efficient and better public services is relatively evenly distributed (Fig. 5), in which allocation to specific objectives is in the range fom EUR 37 billion (2.2.2 Primary schools) to almost EUR 95 billion (2.2.3 Secondary vocational schools). Specific allocation of EUR 77 157 690 for specific objective 2.2.1 Kindergartens, is described in the case study as well.

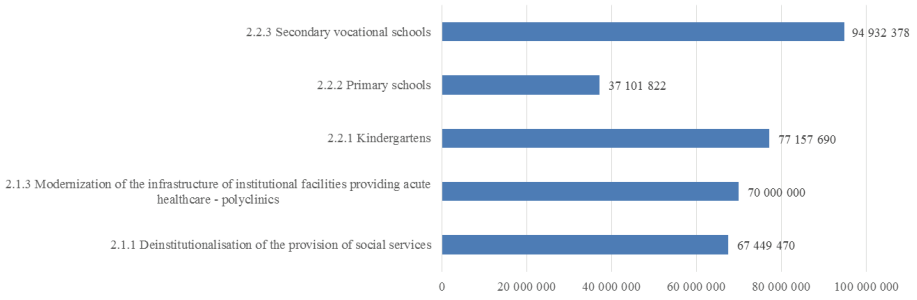

Figure 5. Specific allocation of the IROP to Priority Axis 2

Source: MARD SR (2017).

The budget for Axis 3. Mobilization of creative potential in the regions, is distributed to two separate objectives. Its major part was directed to the specific objective 3.1 Creation of jobs in the cultural and creative industries – decentralized support (EUR 67 860 548) and the rest in the amount of EUR 5 billion is intended to 3.1 Written invitation to submit a NFP application for the implementation of financial instruments (Fig. 6).

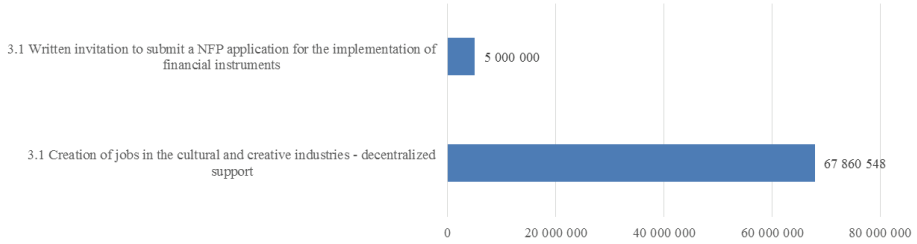

Figure 6. Specific allocation of the IROP to Priority Axis 3

Source: MARD SR (2017).

Although, the environmental aspect should be taken into consideration in all priority axes, it is especially focused on Axis 4 – Improving the quality of life in regions, with an emphasis on the environment. One of the highest amounts for separate specific objectives was earmarked for 4.1 Increasing the energy efficiency of apartment homes (EUR 111 388 554). The remaining two objectives of Axis 4 were supported by a considerably smaller amounts (Fig. 7): 4.2.1 Drinking water supply, public sewerage (EUR 55 000 000), and 4.3.1 Elements of Green Infrastructure and elements of reducing air and noise pollution (EUR 33 328 116).

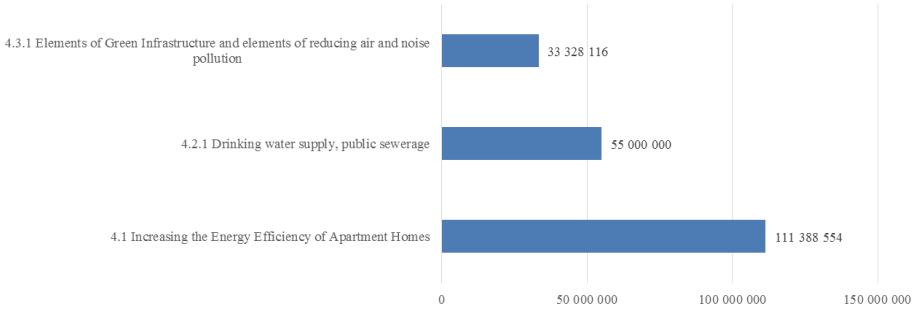

Figure 7. Specific allocation of the IROP to Priority Axis 4

Source: MARD SR (2017).

Case Studies

The case studies are presented to demonstrate the practical side of using the IROP resources. These link three projects which are contributing to the development of Slovak regions.

New capacities in preschools across Slovakia

In 2016, more than twelve thousand (12 486) applications for admission of a child to a preschool were not recorded across Slovakia. The lack of free spots in these facilities influenced also economic situation of thousands families that were stuck with the one source of income for the household as mothers could not work. State responded operatively and in relatively short time supported the construction of new facilities and the expansion of existing ones. In 2017, there were 4780 new spots in preschools across Slovakia, which were created through 152 projects for almost EUR 40 million to be paid from the EU funds. In addition, another EUR 37 million are available for the next years. In connection with this it is necessary to mention, that preferred were projects from cities and municipalities where there are at least 30% of inhabitants of the Marginaliza Roma Community. This was caused by the already mentioned link between poverty / unemployment and Roma Community, while this problem is visible mostly in less-developed regions. The IROP funds were in this case invested into building of new facilities for nursery schools, expanding of the capacities of existing buildings, constructing of buildings and premises and acquiring of material and technical equipment to increase the energy efficiency of buildings.

Ecological and faster public transport in Bratislava

The Dopravný podnik Bratislava – operator of transport services in Bratislava region plans to buy 18 new city electric buses at an estimated cost of EUR 11.29 million excluding VAT (EUR 13.55 million including tax). This green investment should be co-financed from the IROP under the priority Axis 2 Safe and environ-

mentally friendly transport in the regions. This investment is a part of a larger project implemented in cooperation with the public and private sector with the goal "to make public transport in the capital of Slovakia faster and cheaper than passenger transport". State-owned transporter, Slovak Railways, in connection with this build new bus and tram stops, which will speed up the crossings and in addition the City of Bratislava will modernize three whole tramlines. Public transport in the Slovak capital city could, thus, be brought closer to its efficiency through public transport systems in other developed EU metropolises.

Cycling in Nitra region

According to the Concept of Cycling in Nitra, strategic document approved by the City Council and City Parliament in 2015 and the projects designed in cooperation between the Municipality of Nitra departments and external staff planners, City of Nitra applied for the ERDF funding via the Integrated Regional Operational Programme with altogether 8 applications. Five projects have been approved so far, and another 3 are currently in evaluation with expected positive outcome. Thus in 2018, 20.5 km of new cycling routes within the cadastre area of the city will be constructed and put into use, out of the total allocation amounting to EUR 5 006 233, EUR 4 978 514 will be spend, which represents 99.45% effectiveness.

In July 2017, a new project of Bike sharing system as a result of cooperation between the Arriva Company (Nitra public transportation provider) and the City of Nitra was opened to the public. In total 7 bike sharing stations in the City Centre (locations approved by the City Architect Department in accordance to the Concept of Cycling in Nitra) with 70 bicycles equipped with GPS modules are daily available to the inhabitants and visitors of the City. The first feedback is very positive, during the first month of use, the bikes were borrowed more than 4000 times. As a result, ongoing discussion on the topic of new locations for the Bike sharing stations could be followed via the social media nowadays, where the provider is asking about the public opinion concerning the expansion of the service.

Conclusions

Slovakia is according to the nature of the territory and population density, a typical rural country. Altogether, 95% of the Slovak territory is covered by rural regions which are inhabited by 88% from 5.4 million of the Slovak residents. The country covers 49 036 km^2 and 88% of it is used by the agricultural sector. Although Slovakia entered the EU in 2004, there are still considerable regional differences. It is on the 4th position (out of 33 OECD countries) among countries with the greatest regional disparities, which are visible through several socio-economic indicators and it can be concluded, that there is a main difference between the Bratislava region and the rest of the Slovak regions. The main tool to mitigate these differences is to implement projects co-financed from the EU. Within the current 2014-2020 programming period EUR 1545 billion from the

EU budget and EUR 534 million from national funding are allocated for rural development in Slovakia. These funds are divided into six priority axes specified in the Integrated Regional Operational Programme 2014-2020 (IROP SR): 1. Safe and environmentally friendly transport in the regions, 2. Easier access to effective and quality public services, 3. Mobilizing creative potential in the regions, 4. Improving the quality of life in regions with an emphasis on the environment, 5. Community-Led Local Development, and 6. Technical Assistance. The budget for these Axes is 2.1 billion of public money (EUR 1545 billion from the EU budget and EUR 534 billion from national funding). As in the previous periods, Slovakia has reserves in the obtaining these resources, and actually there is also the risk, that some parts of these resources will remain unspent.

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Assessment of strategic factors for local administrative units

Abstract: *The main aim of the study was an assessment of the strategic factors (goals, tasks) for local administrative units (LAU). To solve this problem, the authors used the fuzzy analytic hierarchy process (FAHP) based on experts' opinions. The application of the FAHP extends the variety of the analytical tools used for constructing development strategies for administrative units and enables making more detailed plans for them. At the same time, it allows the assessed strategic factors to be arranged in a hierarchy of importance which should lead to a more realistic distribution of the planned activities over time, thus accelerating the development of the territorial units. The research was based on data from a survey with the councillors of the urban and rural municipality of Bogatynia in 2017.*

Keywords: *Keywords: strategic factors, development strategy, sustainable socio-economic development, local administrative units (LAU), fuzzy analytic hierarchy process (FAHP)*

Introduction

The complexity of problems emerging in local development studies often makes them difficult to overcome. The importance of issues involved in the assessment of local development requires a complex and methodological approach, which may be the foundation for planning the most desirable events and conditions of local administrative units (including rural areas) from the perspective of their future situation. However, there is no standard model used in the process of assessing the development of local administrative units. Analysts and decision-makers employ different assessment methods (cf. Cohon, 2003). Usually, classic statistical methods are applied, involving some limitations which often result in an excessive simplification of the actual course of phenomena. The main reason is the data that describes the development phenomena including qualitative and quantitative aspects. Also, it is often ambiguous, imprecise or uncertain in nature. In order to solve these problems, methods based on the fuzzy set theory could be proposed. This theory extends and supplements the classic set theory to describe complex phenomena, such as the sustainable socio-economic development.

The main aim of the study was to assess the strategic factors (goals, tasks) for local administrative units (LAU). The fuzzy analytic hierarchy process (FAHP) (Chang, 1996) based on experts' opinions was used to solve this problem. The essence of FAHP is to build a hierarchy which consists of the main goal, the sub-goals detailing it and the tasks enabling their achievement. The tasks may also be decomposed into secondary activities. The number of levels in the hierarchy depends on the expected degree of generalization in the study. At each hierarchy level, the importance of strategic factors is pairwise compared by experts. Experts' opinions are the basis for the assessment of each strategic factor.

The research was based on data from a survey with the councillors of the urban and rural municipality (*gmina*) of Bogatynia in 2017. The direct use of the FAHP requires making certain assumptions as to the elements of the hierarchy that impact the local administrative unit. The application of the FAHP extends the variety of the analytical tools used for building development strategies for territorial units and enables making more detailed plans for them. At the same time, it allows the assessed strategic factors to be arranged in a hierarchy of importance which should lead to a more realistic distribution of the planned activities over time, thus accelerating the development of the territorial units.

Research methodology

Assessment of the strategic factors based on FAHP and proceeds in the following steps (Chang, 1996; Łuczak, 2016a, b):

Step 1. Construction of the hierarchy of strategic factors influencing the development of a local administrative unit.
Step 2. Pairwise comparisons of relevance between strategic factors.
Step 3. Verification of the consistency of pairwise comparisons made by experts.
Step 4. Calculation of the local and global priorities of strategic factors.

The main strategic goal is placed at the top of the hierarchy (level 1), and is detailed with sub-goals (level 2). Each sub-goal includes packages of strategic tasks (level 3) which affect the achievement of sub-goals. The tasks may also be decomposed into sub-tasks.

The first step is a construction of the hierarchy which includes the main strategic factors influencing the development of a local administrative unit (Fig. 1.)

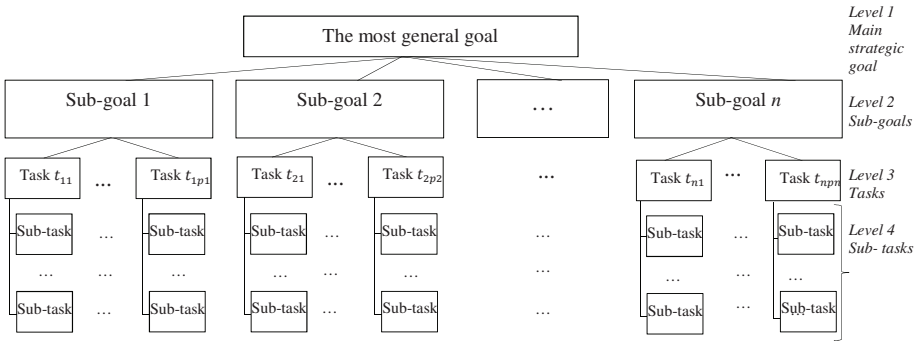

Figure 1. Hierarchy of strategic factors for a local administrative unit
Source: own study based on Saaty (1980).

Table 1. Nine-grade scale of preferences between two strategic factors compared

Intensity of importance	Numerical assessment – intensity of importance	Verbal description of preferences
Equal importance	$\tilde{1} = (1, 1, 1)$	Both factors contribute equally to achievement of the goal
Weak	$\tilde{3} = (1, 3, 5)$	The first strategic factor is slightly more important than the second
Strong	$\tilde{5} = (3, 5, 7)$	The first strategic factor is significantly more important than the second
Very strong	$\tilde{7} = (5, 7, 9)$	The first strategic factor is definitely more important than the second
Absolute	$\tilde{9} = (7, 9, 9)$	The first strategic factor is absolutely more important than the second
Compromise comparisons between the above values	$\tilde{2} = (1, 2,4)$; $\tilde{4} = (2, 4, 6)$; $\tilde{6} = (4, 6, 8)$; $\tilde{8} = (6, 8, 9)$	If the decision-maker is unable to choose between two neighbouring ratings, intermediate values are used
Transitiveness of grades	reciprocals of above	If strategic factor *i* has one of the above grades assigned to it when compared with strategic factor *j*, then *j* has the reciprocal value when compared with *i*

Source: Saaty (1980), Wang et al. (2009).

In the second step, strategic factors are assessed by experts through pairwise comparisons of importance at each level of hierarchy. The nine-grade scale of preferences between two strategic factors is used in the comparisons (Table 1). Verbal descriptions of preferences are converted into triangular fuzzy numbers in the FAHP. The results are written down in the pairwise comparison matrix:

$$\mathbf{A} = \begin{bmatrix} \tilde{1} & \tilde{x}_{12} & \text{K} & \tilde{x}_{1(\bullet)} \\ \dfrac{\tilde{1}}{\tilde{x}_{12}} & \tilde{1} & \text{K} & \tilde{x}_{2(\bullet)} \\ \text{M} & \text{M} & \text{K} & \text{M} \\ \dfrac{\tilde{1}}{\tilde{x}_{1(\bullet)}} & \dfrac{\tilde{1}}{\tilde{x}_{2(\bullet)}} & \text{K} & \tilde{1} \end{bmatrix},$$

where: $(\bullet)$ – number of sub-goals (tasks or sub-tasks), x_{ij} – intensity of importance of strategic factor i over strategic factor j, $\tilde{x}_{ij} = (l_{ij}, m_{ij}, u_{ij})$, $i, j = 1,...,(\bullet)$, where $\tilde{x}_{ij} = \tilde{1} / \tilde{x}_{ji} = (1/u_{ji}, 1/m_{ji}, 1/l_{ji})$ and $\tilde{x}_{ii} = \tilde{1} = (1,1,1)$.

In the third step, the pairwise comparisons are validated. If the pairwise comparisons are consistent in matrix A composed of elements m_{ij}, then the pairwise comparisons are also consistent in the fuzzy matrix $\tilde{\mathbf{A}}$ (Csutora and Buckley, 2001). For that purpose, the inconsistency ratio *CR* (Saaty, 1980) may be used. The inconsistency ratio *CR* should not exceed 10%. Otherwise, the information on preferences obtained from the experts needs to be verified as it suggests an excessive incoherence of pairwise comparisons between strategic factors. In that case, it is recommended to repeat the pairwise comparisons (Saaty, 1980).

The purpose of the FAHP the calculation of local and global priorities (step 4). The values of local priorities are calculated as follows (Chang, 1996):

Step 1b. Calculating the fuzzy sum for each row of the fuzzy pairwise comparison matrix $\tilde{\mathbf{A}}$ and normalizing them based on fuzzy number operations:

$$\tilde{Q}_i = (l_i, m_i, u_i) = \frac{\sum_{j=1}^{(\bullet)} (l_{ij}, m_{ij}, u_{ij})}{\sum_{i=1}^{(\bullet)} \sum_{j=1}^{(\bullet)} (l_{ij}, m_{ij}, u_{ij})}, \quad i = 1, 2, \ldots, (\bullet).$$

Step 2b. Calculating the degree of possibility $\tilde{Q}_i \geq \tilde{Q}_g$ ($i, g = 1, 2, \ldots, (\bullet), i \neq g$), as per the following formula:

$$V\left(\tilde{Q}_i \geq \tilde{Q}_g\right) = \mathrm{hgt}\left(\tilde{Q}_i \cap \tilde{Q}_g\right) = \begin{cases} 1, & \text{for } m_i \geq m_g \\ 0, & \text{for } l_g \geq u_i \\ \dfrac{l_g - u_i}{(m_i - u_i) - (m_g - l_g)} & \text{otherwise,} \end{cases}$$

and selecting the minimum of the above values: $w_i^S = \min V(\tilde{Q}_i \geq \tilde{Q}_g)$. Upon normalization, the values w_i^S are the local priorities of elements on the level considered: $w_i = w_i^S / \sum_{i=1}^{(\bullet)} w_i^S$.

Local priorities w_i for each level of hierarchy are calculated similarly. Local priorities of levels 2, 3 and 4 represent the contribution of the strategic factor (sub-goal, task and sub-task) concerned to the goal of the immediately higher level. Local priorities are the basis for calculating global priorities w_i^g which represent the contribution of each strategic factor (of specific levels) to the main goal. The global priority is calculated by multiplying the local priority value of the strategic factor at a specific hierarchy level by the global priority value of the related strategic factor at the immediately higher level.

Results of empirical studies

Usually, the development strategy for territorial units means a forward-looking plan setting out the strategic development goals, action targets defined as operating tasks and goals, and funds necessary to implement the goals and tasks together with funding sources. In Poland, many basic territorial units (municipalities) have their development strategies in place, which are periodically updated. As shown by the analyses, these usually include a diagnosis of the socio-economic development of a municipality, a SWOT analysis, missions, strategic goals and implementation tasks, as well as the allocation of funds. However, what is missing is the quantification of the importance of identified strategic factors (goals and tasks) (Łuczak, 2016a). One of the methods for determining the importance of priority development factors for local government units is the fuzzy analytic hierarchy process (FAHP). It was used to assess the development potential of a basic local government unit, illustrated by the example of Bogatynia – an urban and rural municipality located in the Zgorzelec district (powiat), Dolnośląskie Voivodeship in Poland. Bogatynia

is one of Poland's wealthiest municipalities[1]. The Turów lignite mine and the Turów power plant, with a total of over 5,500 employees, are located there. Despite a good financial standing, in the recent years, Bogatynia has demonstrated a relatively high negative migration balance compared to other local government units, and a negative natural growth per 1000 population (Local Data Bank, accessed on November 25, 2017). This could become a barrier for the sustainable socio-economic development of the municipality. Therefore, it is important to identify the importance of strategic factors of sustainable socio-economic development.

In the first stage of this research, based on a SWOT analysis of the socio-economic situation of the municipality, a hierarchic structure was created. This study assumes that the main strategic goal is the sustainable socio-economic development for the urban and rural municipality of Bogatynia, while the sub-goals involve: the improvement of standard of living, the economic development and the environmental protection according to the principles of sustainable development. As the goals are defined quite broadly, they are not easy to implement. This is why, for each sub-goal, task sets were defined which will contribute to the sub-goals. The strategic tasks and sub-tasks defined as a part of sub-goals are:

Sub goal 1: Development of the economy: expansion and modernization of the technical infrastructure (expansion and modernization of the technical infrastructure, expansion and modernization of road infrastructure, expansion and modernization of the water supply network)[2], spread of labour market (development of employment agency, raising and changing the qualification of the unemployed, increasing the availability of entrepreneurs to employees), development of entrepreneurship (cooperation with local business, obtaining external investments, development of small business).

Sub goal 2: Raising living conditions of residents: development of sports and recreational functions (modernization of sports and recreation infrastructure, promotion of sport and recreation), development of social welfare and education systems (formation of civic attitudes, improvement of material base of education, modernization and extension of education), development of public safety systems (provision of flood safety, provision of personal safety, provision of fire safety).

Sub goal 3: The use of local resources in accordance with the principles of sustainable development: development of environmental protection systems (reducing pollutant emissions, reducing water pollution, prevention of ecosystem degradation), development of environmental management systems (expansion and revitalization of greenery, renewal of ecosystems or their frag-

[1] In 2016, own income showing the level of financial autonomy, amounted PLN 4855 *per capita* in the municipality of Bogatynia, while in the average municipality in Poland it was less than PLN 2368 *per capita* (Local Data Bank, accessed on November 11, 2017).

2 Sub-tasks are given in brackets.

ments, promoting individual pro-ecological solutions), development of environmental information management systems (improvement of selective waste collection, minimizing the volume of waste entering the environment).

When setting the main goal, sub-goals, tasks and sub-tasks for the Bogatynia municipality, an attempt was made to assess the strategic factors with the use of the FAHP. The first step of the fuzzy analytic hierarchy process was to establish the hierarchy of elements that affect the development of the municipality. By confronting the three strategic goals with nine specifically identified tasks and twenty-five sub-tasks, the hierarchy of strategic factors was established (Fig. 1). This was the basis for assessing their importance by local experts, i.e. councillors of the Bogatynia municipality. Also assessed was the importance of sub-goals in relation to the main goal and to tasks covered by each sub-goal, and of sub-tasks in relation to each strategic task. The qualitative assessments made by experts were converted into fuzzy numbers. The Saaty's nine-point scale was used for comparisons (Satty, 1980). The results were averaged using the geometric mean. Afterwards, the (local and global) priorities were calculated for specific strategic elements (sub-goals, tasks and sub-tasks).

As shown by empirical studies (Fig. 1), two sub-goals related to economic development (a global priority of 0.438) and to improvement of the population's living conditions (0.438) have the largest contribution to the main goal which is to ensure sustainable development of the Bogatynia municipality. Ranked third in terms of importance was the goal related to the use of local resources in accordance with sustainable development principles (0.124).

For the Bogatynia municipality, the key task for implementing the main goal is the development of technical infrastructure. The global priority of this task is 0.230, which means it contributes as much as 23% to the main goal. Meanwhile, the local priority of this task reaches the highest value under the sub-goal related to the modernization and enhancement of road infrastructures (0.382) and under the goal related to the modernization and enhancement of water supply infrastructures (0.320). This means these tasks, when combined together, may contribute over 70% to the goal related to the development of technical infrastructure (Fig. 1).

For the municipality, another important task enabling the attainment of the main goal is the development of public security systems[3]. The global priority of this task is 0.177, which means it contributes nearly 18% to the main goal. As a part of the task considered, three sub-tasks were identified. The most important among them, according to the councillors, is to ensure personal security and reduction of flood risks. The global priorities of these sub-tasks were 0.087 and 0.078, respectively; their local priorities were 0.493 and 0.440, respectively. Therefore, these sub-tasks contribute almost 9% and 8% to the main goal while contributing over 93% to the task of developing security systems (Fig. 1).

[3] This task in the Bogatynia municipality is extremely important due to the occurrence of the flood in the area in 2010, which caused many costly losses.

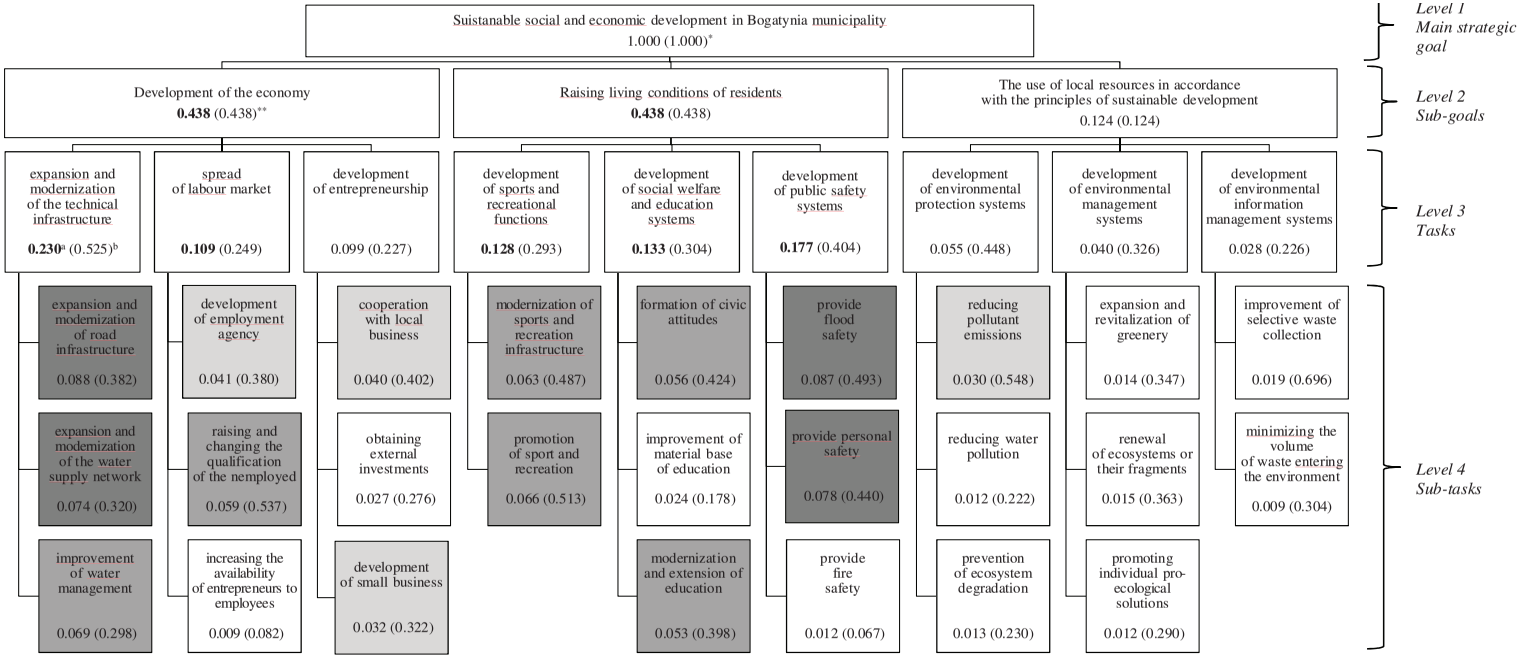

Figure 2. Hierarchy of strategic factors affecting the development of Bogatynia municipality

[a] Global priority. The sum of global priorities at each hierarchy level is equal to 1.

[b] Local priority. * At the level 1 local and global priorities are equal to 1. ** At the level 2 the local and global priorities are the same. Global priority values for the most important sub-goals and tasks are highlighted in bold.

The highest values of global priorities for sub-tasks (0.07; 0.09> are highlighted in dark grey; the important sub-tasks (0.05; 0.07> are highlighted in medium grey; the medium important tasks (0.03; 0.05> are highlighted in light grey; sub-tasks <0; 0,03> which are not required to be implemented are highlighted in white.

Source: own study based on the results of a survey with the councillors of the Bogatynia municipality (2017).

Also worth mentioning are two tasks covered by the sub-goal defined as "improving the population's living conditions" which contribute considerably to the main goal. They are related to the development of sports and leisure functions, and care and education systems. The first of them contributes nearly 13% to the achievement of the main goal (a global priority of 0.128) and almost 30% to the improvement of the municipality population's living conditions (a local priority of 0.293). In turn, the second task involves the development of care and education systems, and may contribute over 13% to the main goal (a global priority of 0.133) and over 30% to the sub-goal (a local priority of 0.304) (Fig. 2).

Table 2. Importance hierarchy of sub-tasks for Bogatynia municipality

Development of the economy	expansion and modernization of the technical infrastructure	expansion and modernization of road infrastructure	+++
		expansion and modernization of the water supply network	+++
		improvement of water management	++
	spread of labour market	development of employment agency	+
		raising and changing the qualification of the unemployed	++
		increasing the availability of entrepreneurs to employees	0
	development of entrepreneurship	cooperation with local business	+
		obtaining external investments	0
		development of small business	+
Raising living conditions of residents	development of sports and recreational functions	modernization of sports and recreation infrastructure	++
		promotion of sport and recreation	++
	development of social welfare and education systems	formation of civic attitudes	++
		improvement of material base of education	0
		modernization and extension of education	++
	development of public safety systems	provision of flood safety	+++
		provision of personal safety	+++
		provision of fire safety	0
The use of local resources in accordance with the principles of sustainable development	development of environmental protection systems	reducing pollutant emissions	+
		reducing water pollution	0
		prevention of ecosystem degradation	0
	development of environmental management systems	expansion and revitalization of greenery	0
		renewal of ecosystems or their fragments	0
		promoting individual pro-ecological solutions	0
	development of environmental information management systems	improvement of selective waste collection	0
		minimizing the volume of waste entering the environment	0

*** Importance: +++ means the most important sub-task; ++ means an important sub-task, + means medium important sub-task; 0 means the sub-task does not urgently need to be implemented.**

Source: own study based on Figure 1 data.

The experts believe that the tasks related to the use of local resources in accordance with sustainable development principles have the smallest contribution to the main goal in the municipality under consideration. According to the councillors, the global priorities of these tasks are 0.124 which means they may contribute as little as 12% to the main goal. The most important among them are those related to the development of the environmental protection system, which contribute nearly 45% to the sub-goal (a local priority of 0.448), while contributing only 5.5% to the main goal defined as sustainable socio-economic development of the Bogatynia municipality (a global priority of 0.055) (Fig. 2).

In Bogatynia municipality, four of the most important sub-task were identified (with a global priority value $w_i^g \in (0.07; 0.09\rangle$) together with six important tasks ($w_i^g \in (0.05; 0.07\rangle$), four medium important tasks ($w_i^g \in (0.03; 0.05\rangle$) and eleven tasks which do not urgently need to be implemented ($w_i^g \in \langle 0; 0.03\rangle$) (Table 2). The proposed importance hierarchy of sub-tasks for the municipalities (Table 2), as supplemented with information on funding sources and operators charged with the performance of specific subtasks, may be used when drawing up the development strategies for the municipalities.

Calculations

The fuzzy analytic hierarchy process (FAHP) enabled the assessment of strategic factors with the use of qualitative preferences of local experts which were quantified. The use of the FAHP allowed to assess the importance of strategic sub-goals, tasks and sub-tasks for municipality based on expert's opinions. In Bogatynia municipality, the most important sub-goals, tasks and sub-tasks are related to Development of the economy and raising living conditions of residents. Furthermore, based on sub-task importance assessments by local experts, the hierarchy of their importance was established to identify the most important sub-task, important sub-task, medium-important sub-tasks and those that do not urgently need to be implemented. In summary, it must be emphasized that the proposed approach to the assessment of strategic factors for local administrative units is a universal tool. Therefore, it may become useful for elaborating the development plans or programmes for local administrative units (including on rural areas). Also, it could be used for regional development programming.

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The role of the Institute of Agricultural Economics and Information in the Czech Agricultural Knowledge Information System

Abstract: *Recent calls of society to farmers are more and more focused on the protection of nature and providing public goods. At the same time, the development of climatic change emphasizes a need for environmentally friendly farming. These requirements are reflecting in the numbers of new regulations and other restrictive and motivating measures. The farmers should be prepared to react to these challenges by acquiring an appropriate skill set and seeking for innovation. In order to support them, there is a need to provide a system where the farmer could get such skills and cooperate with research. This system has existed for years, and the EU started to call it the Agricultural Knowledge Information System. The quality of the services provided by the system depends on the innovation potential of each actor in this system. The Institute of Agricultural Economics and Information (IAEI) is one of the actors, and it is interesting for us to know: What is the innovation potential of the IAEI?. In this paper, we are mapping the current position and innovation potential of the IAEI by using desk research and semi-structured interviews. According to the desk research, the IAEI plays a significant role in the process of AKIS in the Czech Republic. It represents a position of a mediator and a coordinator in the whole range of activities. According to the semi-structured questionnaires, the description of the innovation potential of the IAEI is meaningful when it is divided into several categories. In general, the ability to react to actual challenges depends on the research interest of a few individual researchers. The Institute supports this ability by providing access to several information channels. The ability to use modern technologies is impro-*

ving thanks to new young employees. The recently established set of changes is the encouraging shift towards higher flexibility. Unfortunately, the administrative burden is still the primary barrier to innovation potential of the IAEI.

Keywords: *innovation potential, AKIS (Agricultural Knowledge Information System), advisory services, innovation in the institution*

Introduction

The recent calls of the society and development of climate change emphasize the need for environmentally friendly farming (Ministry of Agriculture, 2014). In addition, the EU strongly emphasized the need for the knowledge and information transfer of innovation to the farmers (agricultural enterprises). This trend is conceptualised in the AKIS (Agricultural Knowledge Information System), a construct which was developed by academics specifically interested in agricultural knowledge and communication. It is rooted in extension studies, science communication, interdisciplinary research and a range of social science disciplines (Roling and Engel, 1991; Hall et al,. 2006). The term is widely used in European policy documents, in the agricultural extension literature, and by international institutions (OECD, World Bank).

Also the Standing Committee on Agricultural Research AKIS (SCAR AKIS) uses the Röling and Engel (1991) definition of the AKIS in the recent report: "a set of agricultural organizations and/or persons, and the links and interactions between them, engaged in the generation, transformation, transmission, storage, retrieval, integration, diffusion and utilization of knowledge and information, with the purpose of working synergistically to support decision making, problem solving and innovation in agriculture" (Röling and Engel, 1991).

The PRO AKIS project described the AKIS in the Czech Republic in 2014. Regarding several changes during the last three years, we have to slightly adjust the scheme. The main change is the dissolution of the Agricultural Agencies, which were the interlinks between the Ministry of Agriculture (MoA), the agrarian NGOs, the National Rural Network and commercial bodies operating in the agricultural sector. The IAEI plays a significant role in the process of the AKIS in the Czech Republic (see the picture) as mediator and coordinator of a whole range of activities.

This position has been developing since 2002, when the MoA established the first regulation about the Accreditation of Advisors and the maintaining of their database. One year later in 2003, the MoA delegated the part of the accreditation rights on the Institute of Agricultural and Food Information (lately integrated under the IAEI). The delegated rights consist of control services[1], maintaining

[1] Innovation Union is an initiative of the EU which elaborates the aims of the strategy Europe 2020 in research, development and innovation section.

the database of the Accredited Advisers, and providing administration regarding accreditation by 1 January 2007. The aim of these changes was to ensure readiness for the obligated request of the established complex system of agricultural services at least for obligated GAEC (good agricultural and environmental condition) and requirements on cultivation. The next year the MoA established the National Council of Advisory Services for Agriculture and Rural Development.

The national support of advisory services terminated in 2007 and instead the support from the Rural Development Programme 2007-2013 started. Since approaching the new measure Advisory Services in RDP 2014-2020, no call for subsidies has been organized so far. Money allocated for the measure M2 (Article 14) – Advisory Services, were shifted to the measure M1 (Article 15) – Education.

Survey

Further in the paper, we would like to present the opinion of the main stakeholders to the Innovation potential of the Institute of Agricultural Economics and Information (IAEI) as a significant actor in the AKIS.

In the paper, we define the innovation potential of the IAEI as the ability to create, execute or provide the innovation and crucial information to the Czech AKIS. For mapping the current position and the innovation potential of the IAEI, we used desk research and semi-structured interviews.

The desk research was chosen in hope to receive a suitable methodology for evaluation innovation potential of an organisation. Unfortunately, the recent literature does not mention the Innovation potential of an institution. There are sources for the Innovation potential in a company (Žižlavý, 2009; Pittner and Švejda, 2004; Innovation Union[2], 2010) or in a region (Šavelová, 2010).

In spite of the lack of papers related to the Innovation potential in the institution, several papers refer to a similar concept. The closest concept of them is the National Innovation System also known as the National System of Innovation (thereby NSI), which tackles different approaches to support innovation in different states. Although the external international relationships play increasing role, mainly due to globalisation trend, the essential factor is also the influence of national education system, industrial relationships, technical and research institutions, government policy, cultural traditions and other national institution, as Freedmann (1995) claims. Similarly, Boulding (1985) states that the NSI is a social system related to the relationships among actors. Despite a large number of writings, the concept of the NSI is too vague to be used for particular methodology (Edquist, 2005).

Based on the literature, to create the innovation stimulation environment, the following common characteristics and features are:

[2] Innovation Union is an initiative of the EU which elaborates the aims of the strategy Europe 2020 in research, development and innovation section.

- Promoting excellence in education and skills development,
- Delivering the European Research Area,
- Focusing the EU funding instruments on the Innovation Union priorities,
- Promoting the European Institute of Innovation and Technology (EIT) as a model of innovation governance in Europe,
- Enhancing access to finance for innovative companies,
- Creating a single innovation market,
- Promoting openness on Europe's creative potential and capitalising it,
- Spreading the benefits of innovation across the EU,
- Increasing social benefits,
- Pooling forces to achieve breakthroughs: the European Innovation Partnerships,
- Leveraging our policies externally,
- Reforming research and innovation systems,
- Measuring Progress.

The final evaluation criteria come from the standing key initiatives (action points) of a Europe 2020 Initiative (Innovation Union, 2010). On the basis of the action points and the common characteristics and features, we selected the criteria for the **semi-structured interviews**. (See Box 1).

Respondents included in the research have consisted from advisors, coordinator of the advisory services, head of the institute, inner and external researchers of IAEI. The 17 relevant actors were asked to fulfil the questionnaire, only 11 actors responded fully, one respondent was dismissed due to incorrect values in the questionnaire, and 5 actors did not reply to our request.

The respondents were asked to set two values (in the range from -7 to 7) in each of selected criteria (see Box 1: Evaluation criteria). Firstly, they evaluated the current state of the criteria in the IAEI. Secondly, they evaluated the likely situation after five years. Above all, we ask the respondents to comment on their decision (to describe their premises or their point of view).

The desk research supports that the main parts of the AKIS in the Czech Republic are the Division of Education and Advisory services of the Ministry of Agriculture (MoA) of the Czech Republic, the Institute of Agricultural Economics and Information (IAEI), the National Rural Network of Paying Agency (NRN PA), research and educational institutions, non-governmental non-profit organisations (for example Agrarian Chamber) and advisors.

As shown in Figure 1, the IAEI plays a considerable role in this process since 1992 (Ministry of Agriculture, 2014). Agrarian NGOs and universities supporting agriculture by different means (mainly transfer of information) are upheld by the IAEI (see linkages a) and b) in the Figure) in information (software and database) in the form of professional assistance. The Ministry of Agriculture delegated a part of its implementing power, in the field of the AKIS to the contributory organisation of the IAEI (see linkage c) in the Figure). The duties of the IAEI are accredited by private advisory bodies that will operate in the Farm Advisory Sys-

tem (FAS) (see linkage d) in Figure 1. Other duties cover also providing basic information accessible for free to users about technological standards, methods and working instructions, norms and table data about sectors of agricultural production, marketing information, estimated developments of domestic and foreign markets, and other information which is important for decision-making by entrepreneurs in the market environment (see linkage e) in Figure 1.

Box 1. Evaluation criteria (Structure of the questionnaire)

1) Capacity of employees:
   - E-capability (using of cutting-edge communication tools),
   - Education policy of the IAEI (employee development),
   - Mobility (preparedness of employee for international cooperation and exchange stages);
2) Work conditions:
   - Rate of administration burdens,
   - Trust rate among employees,
   - Financial support of projects,
   - Technical equipment of employees (including software),
   - Rate of political influence;
3) Motivation to produce and present the outcomes:
   - Appeal of the job on the IAEI,
   - Evaluation system of research (external factor);
4) Services:
   - Information service for advisors / agricultural entrepreneurs,
   - Education system for advisors / agricultural entrepreneurs,
   - Capability of fast response to actual challenges.

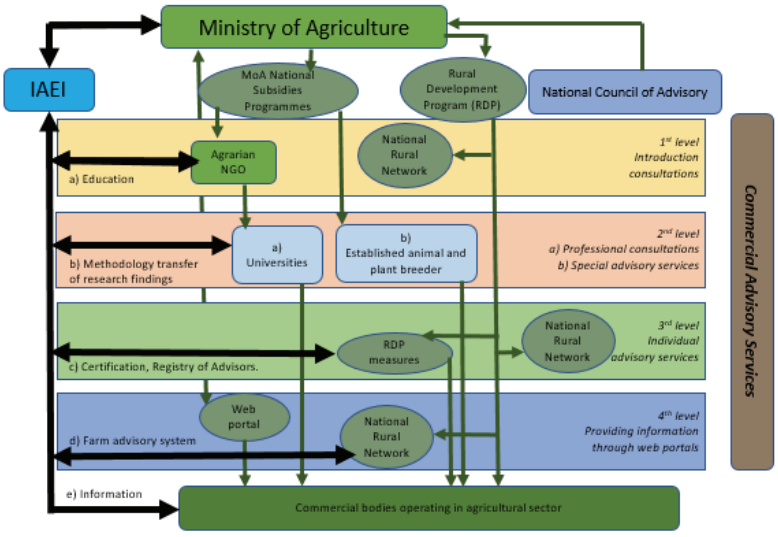

Figure 1. Advisory and Knowledge Information System in the Czech Republic

Source: actualisation of Pulkrábek and Pazdera (2014).

The missing methodology for evaluation of the Innovation potential of the research organisation as the IAEI leads to adopting the criteria of the Innovation Union (see Box 1). Our respondents estimated the level of the selected factors as follow:

Table 1. Research outcomes

Group	Factors		Current state	Future estimate
1) Capability of employee	E-capability	Max	5	7
		Min	-2	-3
		Average	**2**	**3**
	Education	Max	4	7
		Min	-2	0
		Average	**1**	**3**
	Mobility	Max	5	6
		Min	-5	-4
		Average	**-2**	**1**
2) Work condition	Administration	Max	0	2
		Min	-7	-4
		Average	**-4**	**-2**
	Trust	Max	6	7
		Min	-5	-5
		Average	**1**	**2**
	Finance	Max	6	6
		Min	3	2
		Average	**4**	**4**
	Equipments	Max	5	6
		Min	-5	-3
		Average	**2**	**3**
	Political influence	Max	3	5
		Min	-7	-5
		Average	**-1**	**0**
3) Motivation	Attractiveness	Max	3	5
		Min	-6	-3
		Average	**0**	**1**
	System of research evaluation	Max	5	7
		Min	-2	-1
		Average	**1**	**2**
4) Services	Providing information	Max	4	7
		Min	-7	-6
		Average	**1**	**2**
	Education services	Max	3	5
		Min	-6	-5
		Average	**-1**	**1**
	Flexibility	Max	5	7
		Min	-3	-5
		Average	**1**	**2**

Source: own survey.

The capability of employees: E-capability has increasing trend thanks to the new young employee. Education and mobility are related to the individuals who are willing to self-develop. Generally, the current employees have middle/low level of language skills.

The work condition: Administration is perceived as the most influential negative factor diminishing energy and time to develop and spread innovation in the IAEI. Unfortunately, there is low chance to improve this factor due to direct linkage to the MoA. Trust among researchers is different according to respondents' experience. Someone feels the trust among few persons while the rest of the Institute is taking precautions to defence themselves. The other perceived trust as sufficient for cooperation among employees. Financing is sufficient according to our respondents. This factor was evaluated as the factor with the highest contribution to the potential of the IAEI to spread innovation in the AKIS. The respondents remark that the equipment should be improved especially for the research department to be able to fast react and analyse. The diffident evaluation was in case of political influence, on the one hand, the IAEI is funded by the MoA, on the other, it has sovereignty to lead its research and services.

Motivation: Low wage in the public institutes (especially in the first year) keep low attractiveness of the IAEI job for the high quality new young employee. Global press on numbers of publications instead of quality is not supporting the spreading of innovation. The respondent marked the factor of research evaluation by low value.

Services: Spreading information by web, publications and seminars are getting better in last months. Providing education is influenced by low interest of advisor due to low financial support. Stress on flexibility causes obvious improvement and increase in the IAEI potential.

For numeric evaluation, please see Table 1 with maximum, minimum and average values for each factor.

Conclusion and Recommendations

The IAEI keeps an essential role in advisory services mainly regarding compulsory and administration requirement. The capability of the IAEI employees is mainly related to the individual workers who are active and willing to use the possibility to keep up with the new research trend. In general, the capability of employees is increasing. Working condition and motivation have been improving thanks to the interventions made by the current chief of the Institute. New activities established in the last year are also supporting an increasing level of provided services. Enormous potential for development and transferring information and innovation in AKIS in the close cooperation among all IAEI departments (Advisory Services Department, Research Department and Agriculture Library and Information Services).

Acknowledgement

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Competitiveness of Polish agriculture compared to the agriculture of the selected EU countries under the CAP

Abstract: *The aim of the research was to assess the changes of competitiveness of Polish agriculture compared to other European countries with similar structure of production: Denmark, Germany, the Czech Republic, Slovakia, Hungary, Estonia, Latvia and Lithuania. With Poland's accession to the EU, these countries became the competitors for Polish food producers and exporters on the Single European Market. Competitiveness of agriculture was indicated by the potential of production (i.e. resources of factors of production, relations between them, area and economic structures of farms) and productivity of production factors. The research was conducted for the years 2005-2013 and was based on Eurostat data. The results showed the persistence of a relatively low competitiveness of Polish agriculture against the agriculture of the selected countries.*

Keywords: *competitiveness, competitive potential, agriculture, factors of production, relation between factors of production, productivity.*

Introduction

Competitiveness is a multifaceted aspect without a clear definition, as it shifts between dimensions depending on the perspective adopted (Misala,2011). On the one hand, competitiveness may refer to a certain condition of relationships while, on the other, it may mean a process of changes; it may involve a macro dimension, when used in the context of the national economy, a micro dimension, when considered at the level of economic operators, or a meso dimension, when referring to a selected sector of the economy (industry, agriculture) (Banterele, 2005; Bojnec and Fertő, 2009; Adamkiewicz-Drwiłło, 2010).

When discussing competitiveness, a distinction needs to be made between two terms: the competitive position and the competitive capacity[1]. The competitive position, also referred to as ex post competitiveness, means primarily the share of a country's economy in international trade. It specifies the ability to compete at a given time. In turn, the competitive capacity is a long-term characteristic with a much broader definition than competitive position; it also reflects the ability to attain, maintain and improve the existing competitive position. It is seen from the perspective of its determinants: the amounts, structure and efficient use of production factors, the economic system, economic policy or international aspects (Bossak and Bieńkowski, 2004; Bukowski, 2006; Kita, 2014; Latruffe, 2010).

The research on competitive capacity[2] of agriculture is primarily focused on resource competitiveness (Woś, 2001) seen from the perspective of resources of production factors, their mutual relations and their efficiency, and the direction and dynamics of the structural changes (Poczta, 2003). "(…) efficiency are often cited as indicators or measures of competitiveness, and the European Commission considers it as the most reliable indicator for competitiveness" (Latruffe, 2010, p. 18). Currently, the efficient use of production factors is one of the basic factors of decisive importance for the competitive capacity at international level. The research on the evolution of production structures is a major part of the research on changes in competitive capacity.

The competitive capacity has been of special importance to the Polish agricultural sector since Poland entered the Single European Market and was covered by the Common Agricultural Policy regulations. In addition to significant financial support and better foreign trade opportunities of agri-food products, the Polish agricultural producers and exporters have to cope with foreign competitors.

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[1] Buckley et al. (1988) distinguished a competitive potential relating to resources or factors of production, *competitive performance* understood as a result of competition and *management process*, which presents an optimal use of the first one (potential) to gain the second one (performance). There are feedback loops between all of these three aspects of competitiveness.

[2] In the paper competitiveness is identified as competitive capacity based on resources of factors of production and their productivity.

Therefore, the purpose of this paper is to assess the competitiveness of the Polish agricultural sector compared to that of countries with a similar production range structure. The research on resource competitiveness of the Polish agriculture is an important topic not only in the context of the national economy where the agriculture represents a major component (2.3% of GDP, 16% of workforce), but also because of its significant share in the Union agricultural sector. The Polish farms represent around 13% of all the EU-28 farms, have a share of 8% in utilized agricultural area and a share of as much as 1/5 in the Union's agricultural resources (Eurostat).

In the context of one of the objectives of the EU's CAP which is to improve the European agriculture's competitiveness both on a general and national level, the evolution of this aspect represents an interesting field of study, and the outcomes could stimulate the development of Union's future policies.

Methodology

The countries with a similar agricultural production range structure were selected based on the results of cluster analysis. This method is a multidimensional analysis which takes simultaneous account of multiple features to cluster the objects which are as similar as possible to each other (Kaufman and Rousseeuw, 1990). The clustering was based on the crop and livestock production structure. Account was taken of the share of cereals, industrial crops, vegetables and fruit in the crop production value, and the share of pigs, cattle, poultry and eggs in the livestock production value in 2005. The reason for selecting the above variables is the fact that in Poland, these crops represent over 75% of the crop production value; and the selected lines of livestock production account for more than 98% of the total livestock production value. Similar production structures were identified in the following countries: Germany, Denmark, Hungary, the Czech Republic, Slovakia, Lithuania, Latvia and Estonia (Table 1). The potential competitiveness of the Polish agriculture was assessed against the background of the above countries based on:

1. The assessment of resources of production factor, including: utilized agricultural area (ha of UAA), labour in Annual Work Unit (AWU), inputs of capital in EUR (fixed capital consumption and total intermediate consumption, in constant 2005 prices);
2. The assessment of relationships between production factors:
   - utilized agricultural area / Annual Work Unit,
   - value of capital inputs / Annual Work Unit,
   - value of capital inputs / utilized agricultural area;
3. The assessment of productivity of production factors (in constant 2005 prices):
   - value of agricultural output / Annual Work Unit,
   - value of agricultural output / utilized agricultural area,
   - value of agricultural output / EUR 1 of capital inputs;
4. The assessment of the farm's area and economic structure (based on Standard Output).

Table 1. Agricultural production structure in the selected EU countries in 2005

Specification	Czech Republic	Denmark	Germany	Estonia	Latvia	Lithuania	Hungary	Poland	Slovakia
Agricultural production value (EUR billion)	3.3	7.4	37.1	0.5	0.6	1.5	5.5	14.6	1.5
share of crop production (%)	51.2	33.5	48.8	42.4	53.4	51.4	59.8	47.9	49.6
share of livestock production (%)	48.8	66.5	51.2	57.6	46.6	48.6	40.2	52.1	50.4
Structure of crop production value (%), including:									
Cereals	40.2	38.8	23.3	35.9	37.5	40.8	48.5	36.3	45.2
Industrial crops	25.8	8.5	13.1	10.7	15.3	12.6	17.2	14.0	22.9
Vegetables	8.3	21.1	23.7	12.2	10.7	11.4	16.0	15.9	10.7
Fruit	2.7	1.0	4.5	3.7	4.5	1.0	7.4	10.3	4.0
Structure of livestock production value (%), including:									
Bovine livestock	11.4	6.5	15.8	10.2	11.1	17.5	5.7	10.4	15.1
Porcine livestock	25.9	48.6	28.5	21.3	18.2	21.3	30.6	33.6	26.5
Poultry	13.5	3.8	6.6	6.0	3.2	8.2	26.1	14.7	12.0
Milk	44.8	27.6	42.8	56.0	53.3	46.0	22.9	32.4	32.1
Eggs	4.0	1.6	2.7	3.5	8.7	5.1	6.7	7.6	6.3

Source: own calculations based on Eurostat data.

Due to Poland's accession to the EU and reasons of data availability, the period covered by this study was 2005-2013. Eurostat data was used in this study.

Results

The production potential of the agricultural sector is mainly developed by the resources of production factor (labour, land and capital) whose interrelations, in specific economic conditions, determine the efficiency of production processes (Poczta, 2003; Rzeszutko, 2014; Woś, 2001).

Compared both to the entire European Union and to specific countries (competitors in the Single European Market) covered by this study, Poland owns large resources of agricultural production factors.

Poland has the largest share in labour resources among all the countries covered by the analysis. In the total number of 3.3 million agricultural employees across these countries, the Poland's share was nearly 58% (Table 2). Meanwhile, similarly to Denmark and Hungary, Poland demonstrates the relatively

smallest decrease in labour resources compared to 2005 (Table 2), and the highest share of agriculture in the structure of national employment. In 2013, that share was around 12% in Poland, whereas in Germany, Denmark, the Czech Republic and Slovakia, it ranged from 1.5% to 3.3%; in Hungary and Estonia, it fluctuated around 4.5%; in Lithuania and Latvia, it was approximately 8% (http://stat.gov.pl)[3] following a decrease ranging from around 20% to as much as 50% compared to 2005 (Table 2). The differences in the share of agricultural employees and the different scale of decline in these figures in specific countries are caused both by non-agricultural conditions (such as the level of the country's economic development or the socio-economic policy) and by factors inherent to the agricultural sector, including the area structure which differs across countries due to historical background (Schiff and Montenegro, 1997). Because of the low rate of decrease in employment in the Polish agricultural sector, it continues to absorb one eighth of the active population. This situation perpetuates the unfavourable relationships between production factors and the low productivity of labour, which will be addressed later in this paper. The reduction of agricultural labour resources is a long-term process underpinned by multiple factors, including the agrarian structure, mechanization level, concentration of agricultural production or the previously mentioned general level of the country's economic development which makes it possible to find a job in other sectors of the national economy (Poczta, 2003; Zegar, 2009). However, this is a necessary condition for improving the competitiveness of the Polish agriculture.

Poland also owns large resources of land which, in 2013, extended to 14.5 million ha of UAA, accounting for nearly 30% of agricultural land resources in the entire group of countries covered by this study (Table 2). While providing grounds for a high degree of flexibility in the production structure, this enables less intensive production patterns which, due to environmental concerns and growing trends in organic food consumption, becomes increasingly desired (Kwasek, 2013; Poczta, 2003). Larger land resources (16.7 million ha) existed only in the German agriculture, representing over 1/3 of the total land resources in the group under consideration. Meanwhile, both Germany and Poland (as well as Denmark and the Czech Republic) witnessed a small decline (around 2-3%) in their land resources compared to 2005. In turn, other countries reported an increase in their agricultural land area. The highest growth was recorded in Estonia (over 15%) and Latvia (over 10%). However, Estonia continues to have the smallest land resources in the group of countries covered by this study. In 2013, the total utilized agricultural area in Estonia, Latvia and Slovakia did not exceed 10% of utilized agricultural area of the group concerned (Table 2).

[3] Employment by Kinds of Activity According to Isic Rev. 4 Classification (http://stat.gov.pl/).

Table 2. Resources of production factors in the agriculture of the selected EU countries in 2005-2013 (in constant 2005 prices)

Specification	Utilized agricultural area			Labour (Annual Work Unit)			Capital (EUR million)		
	2013		2005=100(%)	2013		2005=100(%)	2013		2005=100(%)
	thousand ha	%		AWU	%		EUR million	%	
Czech Republic	3,491.5	7.1	-1.9	105,080	3.2	-30.8	2,898.6	4.4	0.3
Denmark	2,619.3	5.3	-3.3	53,170	1.6	-12.0	7,894.3	12.0	15.5
Germany	16,699.6	33.8	-2.0	522,730	15.7	-18.7	36,137.5	54.7	9.1
Estonia	957.5	1.9	15.5	22,060	0.7	-40.2	513.9	0.8	38.4
Latvia	1,877.7	3.8	10.3	82,090	2.5	-40.2	718.5	1.1	35.1
Lithuania	2,861.3	5.8	2.5	144,770	4.3	-34.7	1,339.9	2.0	14.6
Hungary	4,656.5	9.4	9.1	433,700	13.0	-6.3	4,305.9	6.5	-8.4
Poland	14,409.9	29.1	-2.3	1,918,550	57.6	-15.6	10,849.7	16.4	5.2
Slovakia	1,901.6	3.8	1.2	50,600	1.5	-48.8	1,380.7	2.1	-3.1
Group	49,474.9	100.0	-0.1	3,332,750	100.0	-18.4	66,038.9	100.0	7.6

a: fixed capital consumption and total intermediate consumption (in constant 2005 prices)
Source: own calculations based on Eurostat data.

In the group of countries covered by this study, the Polish agriculture has a relatively large share (though definitely smaller than in the case of labour resources) in capital input, measured as the total of intermediate consumption and fixed capital consumption (depreciation). The German agriculture accounts for almost 55% of total capital input (over EUR 36 billion). In turn, Poland reports a level of nearly EUR 11 billion which means around 16% of total capital input in the group of countries considered (Table 2). In the 2005-2013 period, there was a small increase (slightly over 5%) in the level of capital input in Polish agriculture (expressed in constant 2005 prices), whereas in Denmark and Germany (where the levels of capital input are by far higher than other production factors; see Table 3), the corresponding growth rates were around 15% and 9%, respectively. By far the greatest growth of capital input (in excess of 35%) was experienced in the Estonian and Latvian agriculture. However, these countries have a negligible share in the capital input of the group of countries covered by this study (Table 2).

In addition to the quantity and quality of production factors, the international competitiveness of the agricultural sector is also determined by their interrelations which affect the efficiency of production processes (Pawlak, 2013). Unfortunately, in Poland, these interrelations are unfavourable compared to other countries, especially as regards the ratio of labor to the other two inputs (land and capital). This demonstrates the weakness of the competitive potential of the Polish agriculture. In 2013, the utilized agricultural area per AWU in Polish agriculture was the lowest (barely 7.5 ha of UAA) of all countries considered, whereas the Estonian and Danish agricultural sectors recorded a ratio of 43-49 ha of UAA per AWU. The Czech Republic and Slovakia reported around 35 ha of UAA (Ta-

ble 3). Furthermore, compared to other countries, no major improvements of the land-to-labour ratio were observed over the 2005-2013 period in Poland.

Table 3. Relation between production factors in the agriculture of the selected EU countries over the 2005-2013 period

Utilized agricultural area per employee(ha/AWU)			Capital input per AWU			Capital input per ha of UAA		
Country	2013	2005=100 (%)	Country	EUR thousand	2005=100 (%)	Country	EUR	2005=100 (%)
Denmark	49.3	10.0	Denmark	148.5	31.3	Denmark	3,014	19.4
Estonia	43.4	93.2	Germany	69.1	34.3	Germany	2,164	11.3
Slovakia	37.6	97.5	Czech Rep.	27.6	44.9	Hungary	925	-16.0
Czech Rep.	33.2	41.9	Slovakia	27.3	89.2	Czech Rep.	830	2.2
Germany	31.9	20.6	Estonia	23.3	131.5	**Poland**	753	7.7
Latvia	22.9	84.5	Hungary	9.9	-2.2	Slovakia	726	-4.2
Lithuania	19.8	56.8	Lithuania	9.3	75.4	Estonia	537	19.8
Hungary	10.7	16.4	Latvia	8.8	125.8	Lithuania	468	11.9
Poland	7.5	15.7	**Poland**	5.7	24.7	Latvia	383	22.4
Average	14.8	22.5	Average	19.8	32.0	Average	1,335	7.8

Source: own calculations based on Eurostat data.

Polish agriculture also reported the lowest value of capital input per work unit. The relevant ratio was EUR 5,700 per AWU (in constant 2005 prices), i.e. 4 times less than the group average level and as much as 26 times less than in Denmark, 12 times less than in Germany and around 4-5 times less than in the Czech Republic, Slovakia and Estonia (Table 3). Although Poland experienced a nearly 25% growth of capital input per AWU, it resulted more from the increase in capital input than from the reduction of labour resources (Table 2). Meanwhile, a clear reduction of labour resources was the reason behind the improvement of the capital-to-labour ratio in other countries. This reflects the perpetuation of unfavourable relationships between production factors in Polish agriculture and is caused by the persistent excess of agricultural labour resources. While the reduction of agricultural employment (movement of the agricultural population to non-agricultural sectors of the national economy) is the key and the greatest challenge for the Polish agricultural sector[4], it also is the necessary condition for the improvement of its competitiveness. This is because the employment level directly affects the sectoral productivity and efficiency of labour; in Poland, the values of these ratios are the lowest of all countries covered by this study (Table 4). Therefore, a reduction in employment will not only enable improving the relationships between production factors. It will also help increase the productivity and, thus, the competitiveness of the Polish agriculture both on the domestic and international market.

[4] As shown by the research, these processes are very slow even though the Polish rural areas are part of the EU structures.

Table 4. Output value and productivity of production factors in the selected EU countries over the 2005-2013 period (in constant 2005 prices)

Agricultural output				Productivity of:								
2005		2013		Annual Work Unit			Utilized agricultural area			EUR 1 of capital inputs		
Country	EUR million	Country	EUR million	Country	EUR	2005=100 (%)	Country	EUR	2005= 100 (%)	Country	EUR	2005= 100 (%)
Germany	38,648	Germany	41,345	Denmark	141,274	9.7	Denmark	2,868	-0.3	**Poland**	**1.52**	**4.9**
Poland	**14,928**	**Poland**	**16,475**	Germany	79,094	31.6	Germany	2,476	9.1	Lithuania	1.45	8.7
Denmark	7,787	Denmark	7,512	Czech R.	33,151	50.2	Hungary	1,239	-11.3	Hungary	1.34	5.7
Hungary	5,955	Hungary	5,767	Estonia	29,544	120.8	**Poland**	**1,143**	13.0	Estonia	1.27	-4.6
Czech R.	3,352	Czech R.	3,483	Slovakia	28,610	78.0	Czech R.	998	5.9	Latvia	1.27	0.7
Slovakia	1,588	Lithuania	1,947	Lithuania	13,451	90.7	Slovakia	761	-9.9	Czech R.	1.20	3.6
Lithuania	1,562	Slovakia	1,448	Hungary	13,298	3.3	Estonia	681	14.3	Germany	1.14	-2.0
Latvia	670	Latvia	911	Latvia	11,100	127.3	Lithuania	681	21.6	Slovakia	1.05	-5.9
Estonia	494	Estonia	652	**Poland**	**8,587**	**30.8**	Latvia	485	23.2	Denmark	0.95	-16.5
GROUP	74 985	GROUP	79 540	GROUP	23 866	30.1	GROUP	1 608	6.2	GROUP	1.20	-1.5

Source: own calculations based on Eurostat data.

The ratio of capital input to agricultural land resources is slightly better, though still lower by nearly half than the average level in the group of countries considered. However, with a value of EUR 750 per ha of UAA, Poland is close to the levels recorded in Slovakia or the Czech Republic. The largest capital input per ha of UAA was observed in Denmark (over EUR 3,000) and Germany (over EUR 2,100), accompanied by a relatively high growth compared to 2005 (Table 3). In Polish agriculture, the relatively low capital input per hectare of UAA suggests that the production is relatively extensive and the technological development remains at a lower level, especially compared to "old" Member States. These are the determinants of competitiveness of the Polish agricultural sector.

The disadvantageous relationships between production factors in Polish agriculture affect their efficient use measured by the agricultural output value[5]. Therefore, in 2013, labour productivity in Polish agriculture was the lowest of all countries considered, reaching barely EUR 8,500, nearly 3 times less than the group average level. The highest productivity of labour was recorded in Danish (over EUR 141,000 per AWU) and German agriculture (nearly EUR 80,000 per AWU). In other countries, the value of agricultural output per AWU ranged from over EUR 11,000 in Latvia to over EUR 33,000 in the Czech Republic. The unfavourable condition of the Polish agriculture is also reflected by the growth ratio of labour productivity which remains low compared to other countries (Table 4).

The productivity of land resources and, primarily, of capital input is at a slightly higher level. In Polish agriculture, the relatively favourable ratio of capital input to land resources results in a relatively favourable productivity of land resources compared to other countries. With a relatively low production intensity, the productivity of land resources in Poland is above EUR 1,100 per ha of UAA which amounts to 70% of the average level in the group of countries concerned. Land productivity is significantly higher (ranging from EUR 2,500 to EUR 2,900 per ha of UAA) only in the Danish and German agriculture characterized by high levels of production intensity (Tables 3 and 4). The lowest efficiency of land use was recorded in the Latvian, Lithuanian and Estonian agriculture (Table 4).

In 2013, Poland was the country with the highest productivity of capital input on agricultural production processes. In Poland, a capital input of EUR 1 contributed to the creation of agricultural output worth EUR 1.52 (Table 4) while the average level in the countries covered by this study was EUR 1.2. Above-average productivity ratios of capital input were mainly reported in the agricultural sectors of countries where capital input remains low compared to other production factors (labour and land) (Tables 3 and 4). This is related to the production theory which states that capital input is more efficient at lower levels, whereas the unit productivity ratio tends to decrease as the amount of capital input grows (Debertin, 2012).

[5] The agricultural output value is expressed in 2005 constant prices.

Table 5. Area structure of farms in the selected EU countries in 2013

Specification	Farms larger than 50 ha of UAA				Average farm size	
	Number of farms		Utilized agricultural area			
	Thousand	% of group	thousand ha	% of group	ha of UAA	(2005=100)
Czech Rep.	7.1	27.0	3,236.9	92.7	133.0	58.0
Denmark	13.3	34.6	2,195.5	83.8	68.4	30.6
Germany	85.4	30.0	13,064.3	78.2	58.6	34.1
Estonia	2.9	15.3	784.7	82.0	49.9	67.0
Latvia	5.6	6.8	1,183.5	63.0	23.0	73.6
Lithuania	9.8	5.7	1,687.6	59.0	16.7	50.9
Hungary	14.2	2.9	3,458.9	74.3	9.5	58.8
Poland	31.5	2.2	4,437.0	30.8	10.1	69.2
Slovakia	3.1	13.2	1,775.1	93.3	80.7	194.0

Source: own calculations based on Eurostat data.

Table 6. Economic structure of farms in the selected EU countries in 2013

Specification	Farms with SO above EUR 15,000				Average economic size of farms	
	Number of farms		Standard Output value			
	thousand	% of total in the country	EUR million	% of total in the country	SO (EUR thousand)	(2005=100)
Czech Republic	13.0	49.4	4,360.6	98.1	169.4	95.9
Denmark	28.4	74.1	9,502.3	99.2	250.3	86.3
Germany	220.8	77.5	45,710.2	98.8	162.3	42.5
Estonia	3.8	19.6	634.3	93.8	35.2	102.6
Latvia	8.5	10.4	805.9	81.4	12.1	166.2
Lithuania	16.9	9.8	1,419.7	74.0	11.2	82.3
Hungary	40.2	8.2	4,700.6	84.3	11.4	64.9
Poland	298.3	20.9	17,049.7	78.2	15.3	134.9
Slovakia	4.7	19.8	1,740.9	96.1	76.9	298.6

Source: own calculations based on Eurostat data.

The area and economic structure of Polish farms (specified based on the value of standard output in euro) is disadvantageous, too, and adversely affects the competitiveness of the Polish agriculture (Tables 5 and 6). Specifically, the area structure is characterized by a high fragmentation of farmland. Compared to other countries, despite a relatively dynamic evolution, Poland and Hungary continue to report a very low average area of farms (around 10 ha of UAA). In theCzech Republic, the average utilized agricultural area per farm is over 130 ha, while in Germany, Denmark and Slovakia, it ranges between 60 ha and 80 ha (Table 5). Each of the countries covered by this study experiences

growth of the absolute and relative number of development farms, defined as farms with over 50 ha of UAA. However, in Poland, despite the growth trend, they still represent a negligible share of 2.2% of the total number of farms on a countrywide basis. This is the smallest share of all the countries in the group. A similar, though slightly larger, share of farms with more than 50 ha of UAA was recorded only in Hungary (barely 3%). Conversely, the largest shares (ranging from 27% to nearly 35%) were reported in Denmark, Germany and the Czech Republic (Table 5). While not being a decisive factor, the significant fragmentation and small average area of farms largely determine the production potential, and therefore adversely affect the competitive position of Polish agriculture (Poczta, 2003). Also, fragmented farmland contributes to a series of economic and income-related problems for the farms.

When considering the competitiveness of the production potential, the structure of land use is a highly important factor as it affects the average economic production conditions in the country (Poczta, 2003). Polish agriculture is disadvantaged in this category, too, as the farms larger than 50 ha of UAA currently own only 30% of land resources, which is the reason for the poor efficiency of capital and labour resources (Tables 5 and 4). Such a small share means that only a minor part of utilized agricultural area is owned by commercial farms[6] while a major part of agricultural production is not fully commercial. This, in turn, contributes to the relatively poor competitiveness of a large part of the Polish agriculture. The shares observed in other countries, ranging from around 60% in Lithuania to over 93% in Slovakia, enable a more efficient use of land, labour and capital resources (Table 5).

Similar conclusions may be drawn from the analysis of the economic structure of farms, which is based on the economic size of the farm expressed in EUR, determined in function of Standard Output[7]. The economic size is a measure enabling a relatively synthetic assessment of the farms' economic potential which determines their competitive capacity.

Although Poland experienced a relatively high increase in the average economic size of farms over the 2005-2013 period, the average figures are still low (an SO of around EUR 15,500) and are among the lowest in the group of countries considered (Table 6). The average economic size of a farm in Denmark is 16 times larger than in Poland. In the Czech Republic and Germany, the farms are approximately 11 times larger in terms of average economic size. A smaller average economic size of farms (an SO of around EUR 11,000) was recorded only in the agricultural sectors of Lithuania, Latvia and Hungary. The same patterns are observed when it comes to the share of farms capable of renewing their production potential (i.e. competitive farms), defined as those with an

[6] Farms whose production is dedicated mostly for the market.

[7] Standard output means the 5-year average value of a specific agricultural production per hectare or per animal during a year under average production conditions for the region concerned (http://ec.europa.eu/eurostat/statistics-explained/index.php/Glossary:Standard_output_(SO)).

SO above EUR 15,000 (Michna, 2011). In Poland, their share is around 21% which is far below the figures for such countries as Germany, Denmark (above 75%) or the Czech Republic (around 50%). The economic size of farms reflects the output volume and, indirectly, the commercial production volume. A small share of farms with large commercial production volumes means a smaller capacity to make efficient use of labour and capital, and is therefore decisive for the relatively low competitiveness of the Polish agriculture.

The disadvantageous situation of the Polish agriculture compared to other countries is also manifested by the fact that farms with an SO beyond EUR 15,000 (competitive farms) contribute less than 80% to the standard output value, whereas in the Czech Republic, Slovakia, Germany and Denmark, that share is above 96% (Table 6). Once again, this indicates a much smaller degree of linkage between agricultural output and market, and confirms the above conclusions.

Conclusions

The Polish agricultural sector, compared to the other European countries with a similar structure of production/product mix structure (Denmark, Germany, the Czech Republic, Slovakia, Hungary, Lithuania, Latvia, Estonia) owns large resources of agricultural production factors which results in its large production potential.

Labour resources in the Polish agriculture amounting to almost AWU 2 million constitute more than half of the labour resources of the countries included in the research. As far as capital inputs are considered similar tendencies are observed. In turn, land resources in Poland account for almost 30% of the agricultural land resources of these specific countries. Only German agriculture owns more land resources.

Competitiveness of production potential, both just after Poland's accession to the European Union and in 2013, is still relatively low, which is indicated by unfavourable relations between production factors and their low productivity in the countries included in the research. The level of equipping the labor factor with land and capital is the lowest among these countries. Similar findings can be drawn from work productivity analysis. And although the Polish agriculture is characterized by the highest productivity of capital inputs, such situation results mainly from a relatively low level of them.

Although these ratios have slightly improved, the rate of these changes is small and insufficient. And the low competitive capacity of the Polish agricultural sector persists as a consequence. The weakness of the competitive potential of agriculture is mainly related to the persistent excess of labor resources. Reduction of the agricultural employment is therefore the key and, at the same time, the most difficult task in the process of improving the competitiveness of this sector both on the domestic and international market.

Results shows that these processes are very slow even though the Polish rural areas are part of the European structures. The area and economic structure of Polish farms also indicate the weakness of competitiveness of the production potential of Polish agriculture. The area structure is characterized by very large fragmentation. Only 30% of the land resources is owned by commercial farms which means that a major part of agricultural production is not fully commercial. And this contributes to the low competitiveness of a large part of the Polish agriculture. Similar conclusions can be drawn from the analysis of the economic size of farms.

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Resident's opinion about the quality of life in the commune of Opalenica

Abstract: *The aim of the study was an assessment of the quality of life in the urban-rural commune of Opalenica based on the opinion of its residents. The article makes references to local development dilemmas and presents the results of a questionnaire survey conducted in the commune. The respondents had the highest opinion about social aspects of life, especially the functioning of the private sector. They found the economic conditions, especially their salaries, to be the biggest drawbacks. The more concerned a particular issue was with the direct functioning of a household, the more unequivocal the respondents' opinions were.*

Keywords: *quality of life, local development, commune, Opalenica*

Introduction

Quality of life[1] is defined by the WHO as "a manner of perception by individuals of their position in life in the context of culture and the system of values in which they exist, in connection with their own goals, expectations, standards, and fears" (Masik, 2010). Apart from one's own activity, quality of life depends on a large number of exogenous factors related to the local and global economic situation as well as policy implemented at different levels. In this context, it is important to consider the role of the commune (*gmina*), which is the smallest administrative unit where local development takes place. There are at least a few causes of this status quo. Above all, the political system of the Republic of Poland gives local governments (especially at the lowest level) extensive rights to develop their social, economic and natural space. According to Chapter 7 of the Constitution of the Republic of Poland, the local government performs public tasks which are not reserved by the Constitution or laws to other public authorities and the commune is a basic local government unit (Constitution of the Republic of Poland, 1997). Apart from that, local governments have their own sources of income, which enable them to create and implement their local policy freely. It is equally important to remember that due to the fact that the commune is a relatively small unit it should relatively easily identify and define the most important social needs. In the latter aspect, the commune is understood as a community of its inhabitants[2] rather than an administrative unit. The democratic mandate of the authorities considerably facilitates the definition and practical implementation of the tasks which the local community considers to be particularly important. Nevertheless, there are relatively serious limitations in this respect. First of all, in spite of possessing its own finances, which are supported with national and the EU subsidies, the commune budget is not sufficient to satisfy all social needs. Economics is primarily understood as the science which teaches rational management of limited finances for unlimited needs. When it comes to consumers' individual choices, the most optimal choice of a set of desirable goods (at least according to theoretical econometric models) is the intersection of the indifference curve and the budget line (Begg et al., 2014). The matter becomes complicated if the choice of the right "basket" of goods concerns the whole community. Therefore, the second main drawback in the creation of the local policy (interpreted much more broadly than trends in expending public funds) is the multitude of preferences of individual social groups. These groups might either compete for limited budget funds or express contradictory preferences and visions of the common socio-economic space[3]. The lines of conflict may run along different directions, e.g. the old vs the young, employers vs employees, the poor vs the rich, etc. Social dialogue might be an

[1] Hadyński (2014) says that due to the fact that quality of life refers to many walks of life, it is not defined by socio-economic sciences. Nevertheless, it should be the subject of reflections and scientific research due to its importance.

[2] According to Article 1 of the Commune Government Act of 1990, commune inhabitants are a legal local government community.

[3] Problems of public choice dilemmas were broadly discussed by Kiryluk-Dryjska (2014).

antidote to this and other drawbacks of the local policy. The smaller the commune is, the easier the dialogue should be. There may be various forms of the dialogue. One of its important elements is the opportunity to find out about the community's opinion about different aspects of life in a particular place. Therefore, the inhabitants of the commune of Opalenica were surveyed to hear the local community's opinion about selected aspects of life4. This article is based on the results of a survey conducted among the commune inhabitants. The aim of the study was to indicate diversification in the inhabitants' subjective feelings concerning individual areas under analysis.

Data and methods

The urban-rural commune of Opalenica is situated in the west of Wielkopolskie Voivodeship and it is part of the County of Nowy Tomyśl (*powiat nowotomyski*). According to the Local Data Bank of the Central Statistical Office (Table 1), there were 16,303 inhabitants in 2015. The budget income per capita amounted to 3,290 zlotys, including 1,701 zlotys (about 52%) of the commune's own income. The unemployment rate in the commune is low, i.e. 2.4% of the working-age population, whereas the average unemployment rate in Wielkopolskie Voivodeship is 4.3%. The commune exhibits relative stability in basic socio-economic parameters and their values are similar to the average values in the region.

The questionnaire survey was conducted on a sample of 210 people inhabiting the commune (Table 2). More than 70% live in urban areas. Less than 30% live in rural areas. The urban areas were overrepresented in comparison with the total distribution of the population in the commune, which was inhabited by 16,303 people, including 6,693 (41%) rural inhabitants. The respondents were grouped according to their place of residence to show differences in their perception of local reality. On the one hand, the commune is a community of its residents and an administrative unit, where individual services provided in urban and rural areas complement each other. A large number of roads and places of recreation are located outside the administrative limits of the town, but they influence the inhabitants' lives. Most facilities providing services to urban and rural inhabitants are located in Opalenica. On the other, there are potential differences between urban and rural areas in numerous aspects of life, especially those related the infrastructure. The number of cars is constantly growing and there are more inhabitants with access to the Internet, which should level these differences. However, there is still lower access to the Internet in rural areas, if we take the whole country into consideration (Wrzochalska, 2015). Apart from that, according to Kuźnik (2016), economic development is still influenced by locality and distance, also in the geographic sense.

[4] A full report on the survey results (in Polish) can be found in the Internet resources of the School Complex in Opalenica (http://www.zsopalenica.pl/index.php?option=com_content&view=article&id=2095:konferencja-naukowa&catid=103:lowydarzenia&Itemid=185_).

Table 1. Basic parameters of the Commune of Opalenica vs Wielkopolskie Voivodeship

Specification		2010	2011	2012	2013	2014	2015
Total population	Opalenica [by thousand]	16.0	16.1	16.2	16.3	16.3	16.3
	Wielkopolskie V oivodeship* [by thousand]	2,642.2	2,653.9	2,664.2	2,673.2	2,682.4	2,689.7
	Wielkopolskie Voivodeship = 100	0.6	0.6	0.6	0.6	0.6	0.6
Total budget revenue *per capita*	Opalenica [PLN]	2,484	3,216	3,101	3,481	3,406	3,291
	Wielkopolskie Voivodeship [PLN]	2,615	2,820	2,949	3,026	3,165	3,307
	Wielkopolskie Voivodeship = 100	95.0	114.0	105.1	115.0	107.6	99.5
Own budget revenue *per capita*	Opalenica [PLN]	1,349	1,688	1,655	1,892	1,867	1,702
	Wielkopolskie Voivodeship [PLN]	1,297	1,410	1,477	1,559	1,672	1,760
	Wielkopolskie Voivodeship = 100	104.0	119.7	112.1	121.4	111.7	96.7
Percentage of registered unemployed in working-age population	Opalenica [%]	2.9	3.3	4.7	3.7	2.6	2.4
	Wielkopolskie Voivodeship [%]	6.0	6.1	6.7	6.6	5.3	4.3

*** communes without cities with county status**

Source: the author's calculations based on https://bdl.stat.gov.pl.

Table 2. Respondents' characteristics

Criterion	Specification	Number	%
Sex	Male	103	49
	Female	107	51
Place of residence	Town of Opalenica	150	71
	Rural areas	60	29
Total		210	100

Source: the author's calculation based on the survey (n=210).

The research referred to a wide range of aspects concerning the functioning of the commune, e.g. social aspects, infrastructure, economy, environment and the quality of exercising power (Table 3). There were individual closed questions. The options of responses were arranged as ranks with numerical equivalents. This enabled assessment of diversification of the respondents' opinions about a particular issue by calculating mean values of their responses.

Apart from the analytical assessment of individual, precisely defined aspects of life, they were also synthesised into categories. Individual questions were grouped into the following five basic categories:

- **Social aspects** – these included questions about living conditions, attractive appearance of the commune, relations with neighbours, the activity of non-governmental organisations, the offer of cultural and sports events, safety on roads and general safety;
- **Infrastructural aspects** – the quality of roads and pavements, accessibility of transport, availability of parking spaces and cycle routes;
- **Economic aspects** – the conditions of running a business, employment opportunities, salaries, general employment conditions;
- **Environmental aspects** – the quality of air, urban green space, noise, general quality of the environment in the commune, waste disposal system;
- **Quality of governance** – the activity of the commune authorities, competence of the staff employed at the commune council, time of handling matters at the commune council.

Results

Among the aspects of life under analysis social conditions were rated the highest (Fig. 1), chiefly due to the highest ratings given in response to the question about living conditions (Table 3). There were also relatively high ratings given to relations with neighbours. Altogether, these responses might indicate that social capital in the commune is chiefly built through informal relations based on good family and social life[5]. Although the activity of non-governmental organisations was also rated relatively high, the respondents were rather sceptical in their opinions about the offer of cultural events.

The economic conditions were definitely rated the lowest, despite the relatively low unemployment rate in the commune. This situation may have been caused by various reasons. They mostly concern every person, regardless of their employment situation. It is also important that these reasons directly affect the living standard and quality of life in their most essential (or simply existential) aspects. Therefore, the respondents tended to express more radical opinions. Another reason for the situation might be one's job and salary. When the unemployment rate is relatively low, it is easy to find a job, but people might not be employed according to their education and qualifications, nor might they receive sufficiently high salaries.

When we look at the problem from the local point of view, we can see that the local government's influence on the economic situation is rather limited.

[5] According to Kamiński (2010), it is most likely that opinions about rural inhabitants' relatively lesser tendency to be self-organised result from distinct forms and traditional methods of building relationships and cooperation, which do not always match the framework of official statistical surveys. These comments are directly related to the reality of life in rural areas, but they can be extrapolated more broadly, taking the specific character of "provincial" life in Poland into consideration.

It usually consists in appropriate promotion of the region and skilful indication of areas of economic activation. However, above all, both the possibility to run a business and finding a well-paid job depend on the current situation and the national or even global economic policy.

The situation of infrastructural conditions is different[6]. Here the local government's activity is of primary importance, especially when we realise that a large number of new investments is co-financed from the EU funds. It requires local governments to take a wide range of intentional actions to acquire these funds. Most of the aspects under analysis were rated average (the responses were between "average" and "good"). The access to cycling routes received the lowest ratings although in recent years there were some investments in this respect when the bypass of the town was built. The rating was low because the inhabitants' needs may not have been satisfied. On the one hand, their requirements might be high due to the need for a healthy lifestyle, which is trendy at the moment. On the other hand, the inhabitants' expectations might have resulted from the need to travel safely at short distances, for example, when commuting to work.

Likewise, the local government's activity also affects people's perception of the quality of power exercised at the local level. The respondents rated it average. It may have been caused by the fact that an inhabitant's contact with representatives of local authorities is mentally perceived as a form of administrative coercion. Therefore, the respondents' opinions may have tended to be more critical. This interpretation also seems to arise from the fact that the average ratings given to the quality of power exercised tended to be lower whenever a particular question was related to one's direct contact with the local authorities.

The environmental aspects were also rated average. This fact may be interpreted from at least two points of view. One of them results from the actual, objective view of the state of the environment, including the terrain and particularly valuable elements of animate and inanimate nature. The rating, in a way, indicates the level of local patriotism, which is manifested by one's affection to local natural resources. The other point of view results from the respondents' opinions about actions taken to prevent deterioration of the environment or from their concern to improve its quality. Here the respondents chiefly rated the activity of the local authorities and the community as a collective user of nature. It is obvious that the adequate quality of the natural environment is necessary for normal function of individuals and communities. If the state of the environment does not exceed some extreme parameters and it is free from negative elements (e.g. smog), its direct influence on the quality of life is less noticeable than economic and infrastructural factors. Therefore, due to the absence of serious environmental threats the respondents' average rating seems to be justifiable. The waste disposal system was rated particu-

[6] Janiszewska and Ossowska (2015) and Standar and Bartkowiak-Bakun (2014) mention the significance of infrastructure, which is important both for business activity and households.

larly high. In contrast to the other aspects, this element is directly related to the normal function of households. Changes in the waste disposal system, which also resulted from national regulations, facilitated this activity and resulted in the respondents' high subjective rating.

Table 3. The average ratings of the current living conditions in the commune of Opalenica – the respondents' opinions according to their place of residence

Aspect of life	Considerations	Respondents' place of residence		
		town	rural areas	total
Quality of roads and pavements	infrastructural	3.1	2.8	3.0
Transport accessibility		3.4	3.1	3.3
Availability of parking spaces		3.3	3.1	3.2
Cycle routes		2.9	2.5	2.8
Business activity conditions	economic	3.0	3.2	3.1
Employment opportunities		2.3	2.6	2.4
Salaries		2.4	2.6	2.5
General employment conditions		2.9	3.0	3.0
Living conditions	social	4.2	4.1	4.2
Attractive appearance of the commune		3.3	3.4	3.3
Relations with neighbours and other inhabitants		3.6	3.7	3.6
Activity of NGOs		3.9	3.7	3.8
Cultural offer		2.9	2.8	2.8
Sports offer		3.4	3.2	3.3
Safety on roads		3.3	3.2	3.3
General safety		3.3	3.6	3.4
Air quality	environmental	3.1	3.4	3.2
Urban green space		3.3	3.2	3.3
Noise		3.0	2.9	3.0
Overall quality of the environment		3.3	3.3	3.3
Waste disposal		4.0	3.7	4.0
Activity of the commune authorities	quality of governance	3.4	3.2	3.4
Competence of the commune council staff		3.2	3.1	3.2
Time of handling matters in the commune council		3.1	3.0	3.1
Overall assessment of living conditions		3.5	3.5	3.5

Grading scale: 1 – very bad; 2 – bad; 3 – medium; 4 – good; 5 – very good.

Source: the author's calculation based on the survey (n=210).

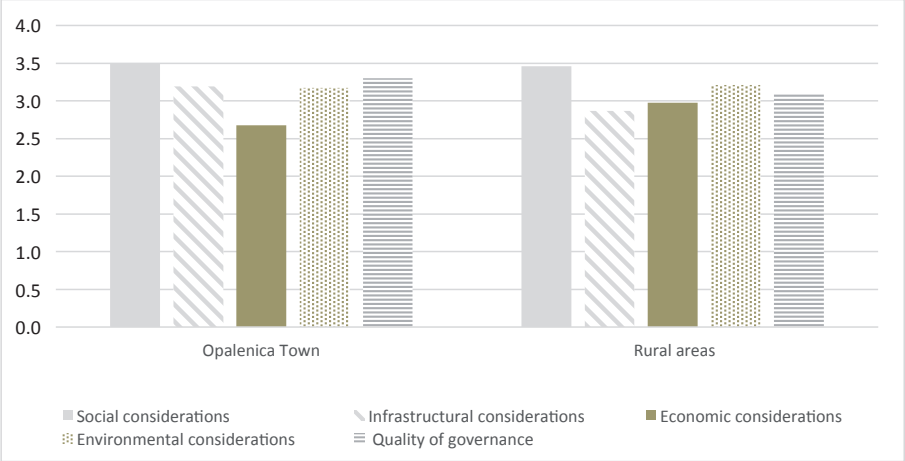

Figure 1. The respondents' opinion about the average quality of life in the commune of Opalenica

Grading scale: see Table 3.

Source: the author's calculation based on the survey (n=210).

In each aspect there were minimal differences of opinion between urban and rural inhabitants. They concerned emphasis on different items rather than a different vision of the commune. It is surely a positive phenomenon from the point of view of social integrity. In spite of this fact it is noticeable that rural inhabitants had a slightly more critical attitude to most of the aspects under analysis. It might have been caused by their subjective assessment of the surrounding reality as well as objective conditions. In spite of the fact that considerable funds were allocated to rural development (both national funds and the EU funds under the Cohesion Policy and Common Agricultural Policy), there are still numerous differences between urban and rural areas, although the distance between them is decreasing gradually[7] (Wilkin and Nurzyńska, 2016). It is particularly interesting to note that the rural inhabitants rated all economic aspects slightly higher than the urban inhabitants despite the fact that at the national level rural areas are still characterised by income disparity. The rural respondents' ratings may have been caused by the fact that they had slightly lower expectations than the urban inhabitants. It may also have resulted from the specific character of business activity in rural areas. There are mostly farms in rural areas. Although they do not guarantee high income, they might provide some employment stability, especially if the economic situation becomes worse. Apart from that, due to the progressing servility of economy rural areas may be a good location for businesses which require vast spaces rather than direct presence of large numbers of clients, e.g. building enterprises, wholesale warehouses or online shops. As far as social aspects are

[7] Although the disproportions between urban and rural areas are decreasing gradually, there are still noticeable differences in the income of different groups within rural communities (Kalinowski and Łuczka-Bakuła, 2007) and individual regions (*Monitoring rozwoju*…, 2014; Stanny, 2011).

concerned, the rural inhabitants had slightly better opinions about attractive appearance of the commune, the activity of non-governmental organisations and general safety. They also rated the quality of air higher. However, these differences were minimal, so it is necessary to take due care when trying to find the causes of this situation. It seems that these differences point to the specific character of rural areas, which are slightly calmer and more integrated, e.g. through the activity of organisations such as rural housewives' clubs.

Conclusions

The research proved a moderately positive assessment of the quality of life in the commune under study. On average, most of the respondents rated various aspects between average and good. On the one hand, this diversification indicates the status quo. On the other, it also shows that individual aspects were directly related to the functioning of households. The closer this relation was, the more extremely positive or negative the responses were. It was particularly noticeable in the responses concerning the economic conditions, which were rated the lowest, as well as the living conditions and waste disposal system, which received the highest ratings. The infrastructure, the environment and the authorities' activity, i.e. the elements of public space which indirectly affect the quality of life, were rated average. If we regard a commune as a community of its inhabitants rather than an administrative unit, the ratings of the social capital are particularly important. The responses showed that the inhabitants saw it through the prism of their personal relations rather than the building of institutions. However, it is noteworthy that these personal relations may be used as a significant basis for building a more formalised civil society based on the activity of non-governmental organisations. What might be helpful here is the fact that individual social groups[8] do not have different visions of the commune. The economy may be a significant drawback limiting local development. Salaries and the conditions of business activity may discourage a lot of people from being a member of the local community. Although local actions are limited in this case, it does not mean that they should not be taken. Potential investors should be encouraged and workers should be offered support to gain qualifications.

[8] This publication makes a distinction between urban and rural inhabitants. The report on the survey includes more analytical aspects, such as age and sex.

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Determinants of farm revenues in the EU-15 countries[1]

Abstract: *The main purpose of this paper was to identify the determinants of farm revenues in the EU-15 countries. The study was based on FADN regional data for 2011-2013. Factor analysis was used to address the above issue. Based on this study, it may be concluded that the key determinants of farming revenues in the EU-15 countries are as follows: size of the farm (measured both with the production potential and with the production value), operating subsidies, production intensity and plant production yields.*

Keywords: *revenue, farms, EU-15, FADN, factor analysis*

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Introduction

Despite multiple transformations in the functioning of the European Union (EU), its agricultural sector enjoys sustained interest from social and political stakeholders (Poczta, Czubak and Pawlak, 2009). In particular, attention is focused on the outcomes generated by that sector, including revenues. The performance of the agricultural sector is a derivative of microeconomic performance, i.e. of that recorded by farms (Poczta, 2010). The problem of low revenues earned by agricultural producers remains unsolved, despite the progress, new manufacturing techniques and the shift from agricultural to non-agricultural economic activity (Gołaś and Kozera, 2003). Revenue disparities are experienced in virtually all countries around the world. Even the broad set of intervention instruments deployed under the Common Agricultural Policy (CAP) fails to eliminate that issue in most of the EU countries, as noted by many authors, including Baer-Nawrocka (2015). Low revenues reported by a part of the farming population definitely affect the development levels of specific countries by lowering the domestic demand for products of other sectors of the economy, thus becoming an obstacle to the development (Niezgoda, 2009b).

The level of the farmers' revenues is important not only from the perspective of the national economy as it is a fundamental determinant for the development of farms (microeconomic level). In a situation where supply exceeds demand, which is typical of agricultural products, it is desirable to attain such revenue levels that will enable the farmers at least to maintain their competitive edge (Niezgoda, 2009a). While the farms' competitiveness is primarily determined by revenues, the revenue level is also decisive for the performance of both the consumption and production functions. Therefore, it decides not only about the consumption level of the farmers' households, but also the development (investment) capacities of farms defined as production units (Poczta, 2010).

The determinants of farming revenue include endo- and exogenous parameters. According to Poczta (2010, p. 208), the first group includes the volume, scale and technical efficiency of production while subsidies and financial burdens are covered by the second group. Runowski (2014) cites the entrepreneurship of agricultural producers as an example of endogenous factors. The relevant literature provides several classifications of the determinants of farming revenue, as described by many authors, including Zawadzka, Ardan and Strzelecka (2011). However, other authors emphasize the key importance of endogenous factors (e.g. Rembisz, 2006; Gołębiewska, 2008; Poczta and Siemiński, 2009). At the same time, many researchers note the fundamental role of direct payments (including Baer-Nawrocka, 2015; Runowski, 2014; Mądra, 2010). Based on the literature review and on previous research[1], this analysis addresses endogenous factors and operating subsidies. The main purpose of this paper was to identify the determinants of farm revenues in the EU-15 countries.

[1] Poczta, Średzińska and Mrówczyńska-Kamińska (2009), Średzińska and Poczta (2012) and publications prepared for printing.

Methods of studies

The study was based on FADN (Farm Accountancy Data Network) regional data for 2011-2013. Choosing the three-year time scope was a deliberate decision as it allowed to mitigate the impact of unpredictable random factors on the results[2]. Also, it enabled more cases to be covered by the factor analysis. The study was based on data for 312 FADN macro-regions in the EU-15 countries.

The socio-economic development results in strengthening the relations between operators, regions and countries, and in intensifying the globalization and integration processes. As a consequence, the performance of operators, the dynamics of business processes, etc. are concurrently impacted by several various factors. Under these circumstances, there is a growing importance of multidimensional methods which enable taking into consideration more than one variable in economic research (Kisielińska and Stańko, 2009). An interesting review of applications of the selected methods of multidimensional data analysis in agricultural economics was performed by Kisielińska and Stańko (2009). One of their findings was that the factor analysis, although very useful, is relatively rarely employed. And therefore, this is the approach to be used in this paper. Similar research was already carried out for another group of the EU countries, i.e. 11 Central and Eastern European (CEE) countries who joined the EU in 2004, 2007 and 2013[3]. For a greater comparability of results, the same methodology and the same dataset are used in this analysis.

Based on substantive and statistical grounds and available FADN data, this study covers 11 variables considered to be determinant for the revenue of family farms. The selected characteristics reflect the production potential (Z1-Z6), production intensity (Z7-Z8), production value (Z9), plant production yields (Z10) and operating subsidies (Z11). For these variables, descriptive statistics were computed, i.e. the minimum, median and maximum values, and the coefficient of variation (based on median and quartile deviation)[4]. In this paper, factor analysis was performed with the use of Statistica 12. The use of factor analysis is justified if at least a part of variables are correlated (Poczta-Wajda, 2010). The higher is the correlation between some of them, the more sense it makes to carry out a factor analysis. Therefore, the first step of this study was to analyse the variables correlation matrix, which allowed for concluding that the above postulate was complied with. Next, the fulfillment of the factor analysis assumptions was carefully checked using the methods designated for this. The rationale behind the use of factor analysis was confirmed by the Bartlett's sphericity test. The correlation matrix was validated with the Kaiser–Meyer–Olkin (KMO) coefficient. Afterwards, the number of factors was

[2] The agriculture, more than other sectors of the national economy, depends on atmospheric conditions and other exogenous factors, resulting in a high variation of prices and production volumes.

[3] Cf. Średzińska and Standar (2017).

4 As the classic coefficient of variation exceeded 50%, positional measures were used. The formulas are as provided in a paper by Wysocki and Lira (2005).

set. For that purpose, the authors adopted the Kaiser's criterion5, the Cattells' Scree Test, the one-half criterion6 and the sufficient proportion7 criterion. The factors from the correlation matrix were selected based on the principal component analysis (Stanisz, 2007). Afterwards, the factors were rotated, i.e. a linear transformation of factors was performed using varimax normalized rotation. This is an orthogonal rotation which enables identifying non-correlated factors (Stanisz, 2007; Bartkowiak and Poczta, 2012).

Results of the study

Table 1 shows the basic descriptive statistics of factors considered to be the key determinants of farming revenues in the EU-15 countries. In one half of the farms covered by this study, the input in the manufacturing process was 1.6 AWU[8] or more. The highest labour inputs were reported in German regions. This feature was highly equalized in the group considered: the coefficient of variation was barely 21% and the maximum value was only around 10 times higher than the minimum. The area of agricultural land showed a much higher dispersion (with a coefficient of variation above 73%) and ranged from 2.7 ha to over 540 ha in the period considered. The smallest area was usually reported by farms located in Mediterranean countries, such as Spain, Italy and Greece. The largest farms with more than 400 ha of agricultural land were located in German regions. Their large area was accompanied by high capital levels, because these very regions demonstrated the highest value (beyond EUR 1 million) of assets less the value of land, permanent crops and production quotas. At the other end of the spectrum, the assets of Portuguese, Greek, Spanish and Italian farms were worth up to EUR 100,000. The median of this value was nearly EUR 260,000.

In addition to resources of productive inputs, the revenue levels also depend on proper relationships between them. Therefore, this analysis included the technical equipment of labour and land, measured as fixed assets per full-time employee and per hectare of agricultural land, respectively. The land-to-labour ratio was also taken into account. In this study, the population demonstrated an average equalization level of the aforesaid characteristics, as showed by the coefficient of variation ranging from 46% to around 66.5%. Half of the farms recorded a technical equipment of labour at the level of EUR 178,600 per AWU or more. The highest fixed-assets-to-labour ratios were reported by Danish and British farms. The value of fixed assets per hectare of agricultural land ranged from EUR 1,300 to almost EUR 140,000. The agricultural land area per full-time employee varied from 1.2 ha to nearly 178 ha, with a level of 32.1 ha reported by half of the farms.

[5] Therefore, the factors with eigenvalue above 1 were used.

[6] It was assumed that the number of factors should be less than half of the number of variables, and each of the identified factors should explain at least 10% of the total variance.

[7] The percentage of variance explained was assumed to be 80.

[8] The Annual Work Unit is equivalent to 2120 working hours per year (*Wyniki standardowe*…, 2014)

Table 1. Basic descriptive statistics of determinants of farm revenues in the EU-15 countries in 2011-2013

Specification	Symbol	Min	Median	Max	Coefficient of variation (%)
Total labour inputs (AWU)	Z1	1.0	1.6	10.3	20.7
Agricultural land area (ha)	Z2	2.7	51.5	541.5	73.3
Value of assets less the value of land, permanent crops and production quotas (EUR thousand)	Z3	31.7	257.9	2,018.8	51.8
Technical equipment of labour (EUR thousand/AWU)	Z4	23.1	178.6	1,292.2	46.0
Technical equipment of land (EUR thousand/ha)	Z5	1.3	7.5	139.0	66.6
Land-to-labour ratio (ha/AWU)	Z6	1.2	32.1	177.9	59.8
Current assets (EUR/ha)	Z7	230.5	1,361.1	29,012.2	35.1
Fixed assets (EUR/ha)	Z8	4.4	336.1	4,849.5	37.0
Total production (EUR thousand)	Z9	19.1	108.7	1,299.9	73.4
Plant production (EUR/ha of agricultural land)	Z10	36.8	1,180.8	46,335.9	70.4
Operating subsidies (EUR thousand)	Z11	0.9	19.1	209.0	76.3

Source: own calculations based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm.

In addition to productive inputs and their mutual relations, another important co-determinant of family farming revenues is the production intensity. In this analysis, it was reflected by two variables, i.e. current and fixed assets per hectare of agricultural land. It was assumed that the current and fixed assets expended are represented by intermediate consumption and by depreciation, respectively. For both of these features, the coefficient of variation was relatively low (35% and 37%, respectively). However, their range was relatively high. This was particularly noticeable when it comes to the consumption of fixed assets per hectare, as the maximum value was several times higher than the minimum. The highest levels of extensive farming were recorded in Spanish and Portuguese regions whereas the highest levels of intensive farming were characteristic of one of the German regions. The production strategy, adopted more or less knowingly, is reflected by plant production yields which were 1,180 EUR/ha or more in half of the farms covered by this study. Both the variation and the range of this feature were very high.

An important factor contributing to the revenue is the production scale. Therefore, the set of variables under analysis also includes the production value which demonstrated high dispersion levels in the period surveyed (with a coefficient of variation beyond 73%). That feature is related to the size of farms, measured as the area of agricultural land and as the availability of other productive inputs. A relationship also exists between the area farmed and the value of operating subsidies. The highest production and subsidy values were reported by farms with large resources of productive inputs, i.e. those located in German regions. In turn, the lowest values were observed in Portuguese, Greek, Italian and Spanish regions.

Based on Table 1 data, it may be concluded that the level of determinants of family farms' revenues in the EU-15 countries is highly diversified. The relationship between the elements discussed in this paper are complicated, ambiguous and difficult to interpret. Some farms with high rates of productive inputs develop improper relationships between them. Others, although having a smaller production potential, seem to use it in a more reasonable way. Also, different outcomes are provided by the adopted (extensive or intensive) production strategies, irrespective of whether they are determined by objective reasons beyond the farmer's control or are selected by the farmer. Note also that many of the factors listed above are strictly interrelated. Due to the complexity of this issue, it seems reasonable to use the factor analysis. It enables reducing the set of independent variables and finding the factors of relevance for the identification of the essence of the issue covered by this study (Kisielińska and Stańko, 2009, as mentioned by Aczel, 2005).

The first step of the research procedure was the analysis of the variables correlation matrix. High, statistically significant correlation levels were identified. To fully assess the rationale behind the use of the factor analysis, the Bartlett's sphericity test was performed. Chi^2 was 5,435 with a near-zero level of significance (p). The calculated KMO coefficient was 0.7 which allowed us to confirm the sufficient adequacy of the selected variables. The next step was to specify the number of factors with the use of the criteria referred to above. In accordance with the Kaiser's criterion, the factors with eigenvalues above 1 are used. Thus, three factors should be identified (Table 2). Each of them explained at least 10% of total variance, and the total variance explained by them was 88.3%, which is above the pre-established threshold. The decision to select three factors was confirmed by the scree plot. On the right side of factor C_3, a smooth decrease of eigenvalues is noticeable, which may be referred to as the "factor scree" (Fig. 1).

Table 2. Results of the factor analysis: variance explained by specific factors (identified with the principal component method)

Factors	Eigenvalue	Percentage of the total population	Cumulative eigenvalue	Cumulative percentage
C_1	5.09	46.24	5.09	46.24
C_2	3.32	30.21	8.41	76.46
C_3	1.31	11.86	9.72	88.32
C_4	0.70	6.38	10.42	94.70
C_5	0.28	2.51	10.69	97.21
C_6	0.10	0.94	10.80	98.15
C_7	0.08	0.77	10.88	98.92
C_8	0.04	0.38	10.92	99.29
C_9	0.03	0.31	10.96	99.61
C_{10}	0.03	0.29	10.99	99.89
C_{11}	0.01	0.11	11.00	100.00

Source: own calculations with the use of Statistica 12, based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm.

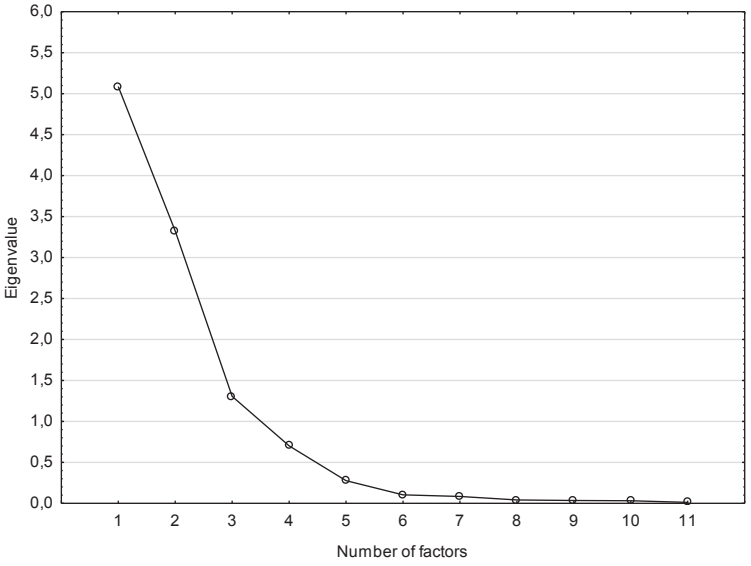

Figure 1. Scree plot

Source: own work based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm, processed with Statistica 12.

Figure 2 and Table 3 show the post-rotation values of loads of variables for the identified factors. Values beyond 0.7 are marked in bold. A summary of variables describing the identified factors is shown in Table 4.

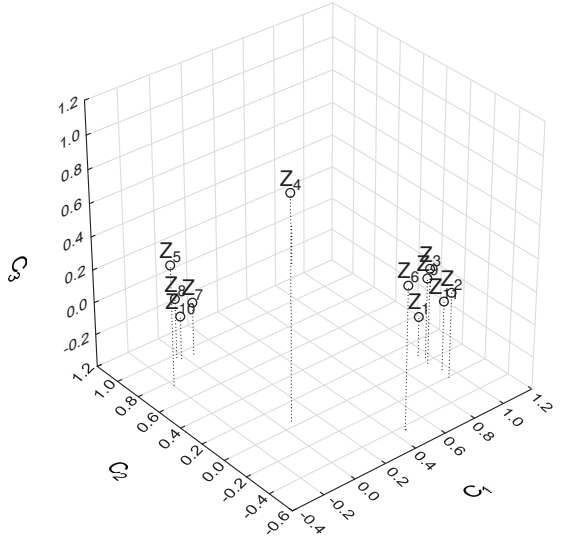

Figure 2. 3D load plot

Source: own work based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm, processed with Statistica 12.

The first of the identified factors (C_1) explains over 46% of the extent of common variation, and is represented by five variables (Z_1, Z_2, Z_3, Z_9 and Z_{11}). The features represent the farm's size as they reflect its production potential, production value and the largely related level of production subsidies. Variables Z_9 and Z_{11} have the highest factor loads, and therefore it may be concluded that the production scale and subsidy level had the highest importance for the size of farms in the EU-15 countries in 2011-2013. Note that the loads of other variables covered by this factor are also very high, especially in the case of land resources (0.95).

The next of the identified factors (C_2) explains more than 30% of the total variation, and is represented by four variables. Three of them (Z_5, Z_7, Z_8) inform of the farm's production intensity as they reflect the resources and consumption of fixed and current assets per hectare of agricultural land. A component of that factor, Z_{10} is (to a large extent) a derivative of the value of characteristics discussed above as it demonstrates the efficiency of plant production. The values of factor loads allow to conclude that inputs of fixed assets (with a load of 0.972) contributed the most to the levels of that factor in the EU-15 countries in the period under consideration. The inputs of current assets and the plant production yields were slightly less important.

Table 3. Factor load matrix (varimax normalized rotation; loads s > 0.700000 are highlighted)

Specification	Variable symbol	Factor C1	Factor C2	Factor C3
Total labour inputs	Z_1	**0.950**	0.078	-0.156
Agricultural land area	Z_2	**0.942**	-0.205	0.126
Value of assets less the value of land, permanent crops and production quotas	Z_3	**0.941**	-0.019	0.190
Technical equipment of labour	Z_4	0.069	0.047	**0.962**
Technical equipment of land	Z_5	-0.198	**0.757**	0.340
Land-to-labour ratio	Z_6	0.463	-0.432	0.474
Current assets expended per ha	Z_7	0.055	**0.937**	-0.076
Fixed assets expended per ha	Z_8	-0.033	**0.972**	-0.030
Total production value	Z_9	**0.967**	0.033	0.096
Plant production per ha of agricultural land	Z_{10}	-0.020	**0.945**	-0.134
Operating subsidies	Z_{11}	**0.960**	-0.121	0.026
Value of variance explained		4.796	3.542	1.377
Share		0.436	0.322	0.125

Source: own calculations with the use of Statistica 12, based on http://ec.europa.eu/agriculture/rica/database/database_en.cfm.

Table 4. Determinants of farm revenues in the EU-15 countries in the light of the results of factor analysis

Factor	Variable
C_1	Z_1: total labour inputs Z_2: agricultural land area Z_3: value of assets less the value of land, permanent crops and production quotas Z_9: total production value Z_{11}: operating subsidies
C_2	Z_5: technical equipment of land Z_7: current assets expended per ha Z_8: fixed assets expended per ha Z_{10}: plant production per ha of agricultural land
C_3	Z_4: technical equipment of labour

Source: own study based on Table 3.

The third and the last factor is represented by only one variable (Z4) which supplements the information on relationships between productive inputs, some of which are included in the second factor. This factor is the value of fixed assets per full-time employee. The role of this aspect seems to be important for the farm revenue levels in the EU-15 countries, having in mind that it explains nearly 12% of the total variation.

Summary and conclusions

The purpose of this paper was to specify the determinants of farming revenue in the EU-15 countries. Based on the research, it may be concluded that the key determinant of family farm revenues in the 2011-2013 period was the size of the farm. This means not only the area of agricultural land or other resources of productive inputs. What seems to be particularly important is the production scale, measured with production value. Indirectly, this also suggests that an important role is played by business operations, quite strongly linked to production volumes. This was directly confirmed by the results of this study because the subsidies turned out to be a component of the first factor which explained the largest extent of the total variation. Moreover, they also had a high factor load.

Another factor that largely contributed to the level of revenues earned was the production intensity and its derivative, plant production yields. The technical equipment of labour and land seems equally important. The latter was actually a separate factor.

Note that the results of factor analysis of the EU-15 countries are largely consistent with those obtained in previous studies for Central and Eastern European countries of the EU[9]. Therefore, irrespective of how long a country is a member of the Union structures and is covered by the CAP instruments, the set of revenue determinants and their mutual relationships seem to be similar.

[9] Cf. Średzińska and Standar (2017).

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Differences in accessing Rural Development Programme (RDP) funds. The impact of financial factors on the support level. The example of municipalities in the Wielkopolska region[1]

Abstract: *The objective of this paper is to assess the absorption level of funds disbursed under the 2007-2013 RDP to municipal government units and the impact of financial determinants on the amount of funds accessed. Intensive investment activities were have been taken in the Polish rural areas over the recent years. Many of them were implemented with the use of the EU subsidies, including those disbursed under the 2007-2013 RDP. The purpose of the RDP was to support transformation not only in the agriculture sector, but also on rural areas, especially as regards technical and socio-economic infrastructure.*

In the Wielkopolskie Voivodeship, a total of 463 projects were implemented, amounting to PLN 722 million. Environmental infrastructure projects represented the largest share in the total amount although socio-economic projects were much more numerous. The municipalities under consideration differed in levels of the EU funds accessed. This means the beneficiary's financial autonomy is a crucial determinant, especially if the EU funds are disbursed as a refund.

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In less wealthy municipalities, that solution may effectively constrain access to large amounts of aid. Also, by allocating funds to other investments, the municipalities restrict their investment potential and often become unable to implement subsequent investment projects.

Keywords: *discriminant function analysis, financial factors of allocating the RDP funds, municipalities, RDP funds, rural areas*

Introduction

In Poland, municipalities (*gminas*) are the basic local government units (Article 164 of Constitution of the Republic of Poland) charged with most of the public tasks assigned to local government authorities (Article 7 of the Local Government Act). The Polish local government sector consists of urban, rural and urban-rural municipalities, with rural areas extending to rural municipalities and to the rural part of urban-rural municipalities. In 2015, Polish rural areas represented 90% of the national territory and were inhabited by more than 30% of the total population, demonstrating a growth trend. This results from suburbanization, a phenomenon which has been experienced in recent years (Local Data Bank, accessed on August 12, 2017).

What is characteristic for these municipalities is not only their fundamental agricultural function but also, especially recently, the fact that they are shifting from this function towards service and residential functions, which are typical of other administrative types. Due to the progressing suburbanization processes, they are the most convenient places to live in and run a business. Thus, they become an area with residential, production and logistics facilities. But then, municipalities with valuable environmental features are often transformed into specialized tourism and recreation resorts. Usually, for the municipalities with natural resources, the development of non-industrial functions does not make sense. Industry often becomes the main source of income for the local community. The shift in the importance and roles of rural municipalities results in a larger number of investments addressing the needs of new residents, investors and tourists. However, the performance of these tasks requires considerable funds. Today, the municipalities feel that they have a unique opportunity to access the EU funds and make many capital-intensive investments with a minimum contribution of their own funds (Standar and Kozera, 2017). Currently, in addition to problems faced by rural areas, attention is also paid to their potential and development outlooks (cf. Bański, 2014; Hadyński, 2015; Heffner and Klemens, 2016).

The European rural areas are highly diversified. The differences result from historical, social and economic aspects. Supporting the development of rural areas is one of the main lines of action of the European Union as they play an extremely important role (Dudzińska and Kocur-Bera, 2014). According to Fayolle (2014) rural areas constituted 91% of the European Union territory. They were inhabited by more than 56% of all the EU citizens (Marlow et al., 2014),

and they are responsible for 56% of all employment and they generate 49% of the gross added value within the European Union (Rural Development…, 2011). Policy of rural development is corresponding to the Lisbon Strategy for jobs and growth and Strategy for sustainable development in the EU and it is implemented through rural development plans like RDP 2007-2013 (Stawicki, 2015).

In Poland, the EU funds are sourced from structural and regional funds. The main goal of the RDP is to boost the competitiveness of the Polish agriculture, to implement sustainable management of natural resources and climate-oriented measures and to ensure a sustainable territorial development of rural areas. The Polish rural areas are supported with the following RDP instruments: improvement of the quality of life in rural areas and diversification of rural economy and the LEADER pogramme. Polish rural municipalities use both of them. A number of investments were financed under the RDP, especially as regards the water supply and sewerage infrastructure, waste management and cultural heritage (2007-2013 RDP).

Aim, data and methods

The objective of this paper is to assess the absorption level of funds disbursed under the 2007–2013 RDP to municipal government units and the impact of financial determinants on the amount of funds accessed. The geographical scope of this research includes the area of the Wielkopolskie Voivodeship[2]. The basis for this research is unpublished data from the Ministry of Agriculture and Rural Development (RDP projects), data published by the Ministry of Finance (Indicators for the Assessment of the Financial Situation of Local Government Units) and data from the Local Data Bank of the Central Statistical Office of Poland. In the first part of this research, basic methods of descriptive statistics were used to process empirical data retrieved from the database so as to analyse the access to the RDP funds by rural and urban-rural municipalities in the Wielkopolska Voivodeship. First of all, attention was paid to the degree of differentiation of access to these funds. The results are shown in box plots. In the second part of the research, taxonomic methods (discriminant analyses) were used to develop a model that allows to predict the access to the RDP funds in rural and urban-rural municipalities and to identify key financial factors that result in allocating the funds.

Characteristics of measures targeted to municipalities under the 2007-2013 RDP and of the aid granting procedure

The local government units covered by this study were eligible for the RDP aid under Axis 3 "Quality of life in rural areas and diversification of the rural

[2] In this paper, the regional scope of study was narrowed to the Wielkopolskie Voivodeship because of an ongoing research project on that region's local government units. The analysis of funds accessed under the 2007-2013 RDP by all urban-rural and rural municipalities in Poland was presented in an expert report prepared by Standar and Bartkowiak-Bakun (2015) for the Ministry of Agriculture and Rural Development and the Foundation of Assistance Programmes for Agriculture.

economy", Measure "Basic services for the economy and rural population" and "Village renewal and development", as well as under Measure "Implementation of local development strategies" of Axis 4 (LEADER). "Basic services for the economy and rural population" covered the following project[3] areas: supply of water and treatment of wastewater; development of a system for the collection, segregation and transport of municipal waste; production or distribution of renewable energies; building of the broadband Internet infrastructure; and building or upgrade of marketplaces. The projects could only be implemented in a town located in a rural municipality, an urban-rural municipality (except for cities with a population over 5,000), an urban municipality (except for towns with a population over 5,000); or (in the case of projects related to building or upgrading marketplaces) in a town with a population of up to 50,000. As regards Measure "Village renewal and development", aid was disbursed[4] to support investment efforts in multiple areas, including: construction, reconstruction, repair or equipment of facilities (public, socio-cultural, leisure and sports facilities; or facilities intended to promote rural areas, including by promoting and preserving the historical heritage, tradition, art and culture). Aid was targeted at legal entities (municipalities, cultural institutions) organized by a local government unit, a church or another religious organization, or a non-governmental organization with a public-benefit status. The projects could be implemented in a town located in a rural municipality, an urban-rural municipality (except for cities with a population over 5,000); or an urban municipality (except for towns with a population over 5,000). In turn, support provided under the "Implementation of local development strategies" was allocated to projects compliant with the Local Development Strategy (LDS) adopted by Local Action Groups (LAG). These were projects eligible for aid under measures of Axis 3[5]. Also, small projects[6] addressing the following areas were accepted (the list is non-exhaustive): organization of trainings and other educational events or workshops for the residents of an area covered by LDS; promotion and development of local activities, development of agri-tourism and tourism in rural areas. The beneficiaries of this Measure were units specified as eligible for Measure 3, if the project was eligible for aid under the Measures of this Axis (2007-2013 RDP, 2011, p. 331).

Note that the procedure for accessing the EU aid (including under the RDP) is not simple and comprises several steps. To begin, the beneficiary must fill out an application with the required attachments, as available on the website of the

[3] Within the duration of the Programme, the maximum amount of aid allocated to projects in a single municipality cannot exceed: EUR 1,024,642.7, for projects related to the supply of water and treatment of wastewater; EUR 51,232.1, for projects related to developing a system for the collection, segregation and transport of municipal waste; EUR 768,482.0, for projects related to the production or distribution of renewable energies; and EUR 256,160.6, for projects related to building or upgrading marketplaces (2007–2013 RDP, 2011, p. 314-315).

[4] Within the duration of the Programme, the maximum amount of aid allocated to projects in a single town is EUR 128,080.3.

[5] In this case, the grant of aid is conditioned upon meeting the access and selection criteria applicable to projects with a total value from EUR 1,152.7 to EUR 25,616.1.

[6] The amount of aid cannot exceed PLN 50,000.

Managing Institution. Once the application submission deadline has passed, the experts start to review the applications. Aid is granted to applications with the highest scores. Upon receipt of the decision of the Agency for Restructuring and Modernization of Agriculture to award the grant under the RDP, the beneficiary may start implementing the investment. With very few exceptions, the Polish system of accessing the EU funds is based on the refund principle. This means the beneficiary must implement the project first in order to obtain a partial refund of eligible costs, whether at once or in several tranches. The refunding principles depend on the programme and on the institution who signed the financing agreement. Then, the beneficiary submits the payment application together with relevant invoices. The documents must be validated first in order for the expenses to be refunded. The refunding principle referred to above may contribute to restricting the access to funds because less wealthy municipalities find it problematic to guarantee funding for the entire investment.

Results of the study

Level of aid accessed under the 2007-2013 RDP by local government units considered

In the Wielkopolskie Voivodeship, a total of 463 projects were implemented, accounting for PLN 722 million disbursed by the European Agricultural Fund for Rural Development (EAFRD). These were socio-economic and environmental investments. The socio-economic projects represented 37% of total funds with a 77% share in the number of projects. This suggests that relatively small amounts of expenditure are involved in such projects. Focus was placed primarily on the renovation of rural community halls, general renewal of villages, other cultural infrastructure and sports and leisure facilities. In turn, as regards the environmental area, the greatest number of projects and the largest amounts of funds were allocated to sewage construction. Projects related to water supply networks and sewage treatment plants were somewhat less numerous and had slightly lower values (Table 1). In total, environmental objectives were supported with the implementation of 353 projects accounting for PLN 456 million, which is 23% of the number of projects and 63% of the total support disbursed under the 2007-2013 RDP. Such a concentration of resources suggests a capital-intensive nature of the corresponding investments.

The highest numbers of projects under the 2007-2013 RDP were implemented in Wierzbinek, Obrzycko, Łubowo and Jarocin municipalities (over a dozen in each of them). Therefore, the largest amounts of the EAFRD support, reaching up to PLN 9 million, were allocated to these local government units. The average (median) is 9 projects per 10,000 population accounting for PLN 386 per inhabitant. As regards both the number and the value of projects implemented, rural municipalities proved to be more effective implementing on average more projects with average higher amounts (Fig. 1).

Table 1. The level and number of projects implemented by municipalities in the Wielkopolskie Voivodeship under the 2007-2013 RDP by nature of the project

Project	Detailed nature of the project	Average funds (PLN thousand)	Number of projects		Total funds	
			(items)	structure (%)	(PLN million)	structure (%)
Socio--economic projects	playgrounds	225	116	10	26	10
	sidewalks	143	44	4	6	2
	Internet	117	1	0	0	0
	culture	219	117	10	26	10
	lighting	68	9	1	1	0
	renewal of villages	230	126	10	29	11
	parking lots	124	15	1	2	1
	play areas for children	102	58	5	6	2
	cycling paths	220	59	5	13	5
	sports and leisure	242	205	17	50	19
	community halls	222	436	36	97	36
	marketplaces	563	19	2	11	4
Total for socio-economic projects		**220**	**1,207**	**77**	**266**	**37**
Environmental projects	other	214	4	1	1	0
	renewable energy	249	6	2	1	0
	waste management	182	29	8	5	1
	sewage treatment plant	1,431	26	7	37	8
	sewage	1,433	154	44	221	48
	sewage and treatment	2,144	12	3	26	6
	water supply	1,054	57	16	60	13
	water and sewage	1,610	46	13	74	16
	water and wastewater networks	1,606	19	5	31	7
Total for environmental projects		**1 292**	**353**	**23**	**456**	**63**
All projects (socio-economic and environmental)		**463**	**1,560**	**100**	**722**	**100**

Source: own study based on unpublished data from the Ministry of Agriculture and Rural Development (accessed on January 15, 2015).

As many as 6 out of 10 local government units provided with the highest amounts of support are located in the Konin macro-region. Meanwhile, 3 municipalities out of 207 units covered by this study failed to access any RDP funds under the considered programme. In the case of 16 local government units, the subsidy did not exceed PLN 100 per inhabitant. It turns out that the smallest amounts of relevant aid were absorbed by municipalities of the Poznań macro-region, located in the immediate vicinity of the city of Poznań. Note that the municipalities surrounding large urban centres are among those that demonstrate the highest development levels and the best financial standing. Despite

their rural nature, their infrastructural needs and financial capacities are similar to those reported by urban units of local government. Their relatively poor rate of absorption of the EU funds results, on the one hand, from less interest shown in small investments and, on the other, from the fact that the system of obtaining funds promotes smaller municipalities at lower development levels. Examples include the pre-financing loans which enable implementing the investments in municipalities that lack sufficient resources. Because the granting of loans is subject to restrictions, preference was given to less wealthy local government units at lower development levels.

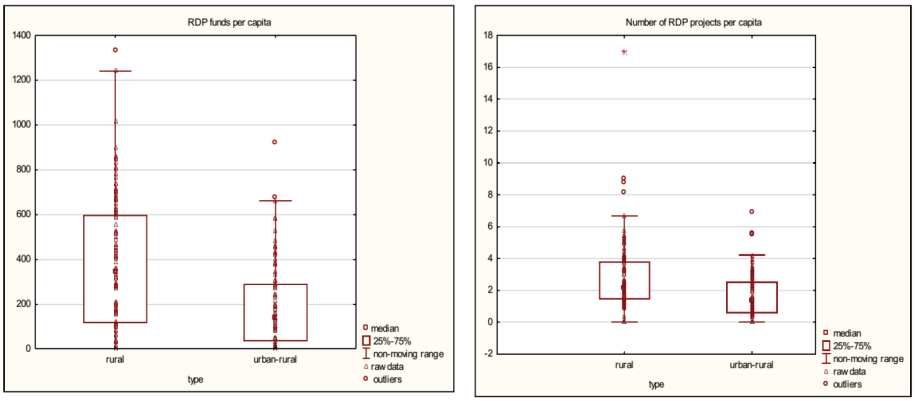

Figure 1. A box plot for the RDP funds *per capita* and the number of the RDP projects *per capita* in rural and urban-rural municipalities in the Wielkopolskie Voivodeship

Source: author's compilation based on unpublished data from the Ministry of Agriculture and Rural Development (accessed on January 15, 2015).

Financial determinants of differences in the local government units' access to funds under the 2007-2013 RDP: grounds for the study and methodological assumptions for the construction of a discriminant model

With very few exceptions, the Polish system of accessing the EU funds is based on the refund principle. This means the beneficiary must implement the project first in order to obtain a partial refund of eligible costs, whether at once or in several tranches. Also, as per the regional policy, the EU funds must supplement, rather than replace, the beneficiary's resources. Therefore, a part of the funds disbursed will not be refunded as it represents the beneficiary's own contribution. As a consequence, the local government unit that wants to be able to finance an investment with the Union's subsidies must demonstrate a relatively strong financial standing. For that purpose, the municipality may use its own resources as well as repayable funds which cannot be accessed without a positive bank rating. This is why, later in this paper, an attempt was made to develop a discriminant model to verify the financial factors that affect the level of funds accessed under the RDP.

The discriminant model was built in four steps. The first was to specify the research objective and the classification criteria for the selection of a group of units. The objective of the research was to develop a discriminant model that enables forecasting the level of the RDP funds accessed. The survey covered all of the rural and urban-rural municipalities of the Wielkopolskie Voivodeship (*N=207*). Because three of them did not use the funds at all, it was impossible to classify the units into two groups (accessed / failed to access)[7]. Therefore, it was decided to divide the local government units as follows: those that access significant funds and those who access modest funds. According to the study, the first group is composed of 17 municipalities in the Wielkopolskie Voivodeship demonstrating the highest absorption of support at a level beyond PLN 1,000 per inhabitant. The second group covered 17 municipalities with relatively lower support levels during the period under consideration. As a consequence, 34 municipalities were used as the basis for the discriminant model.

The next step of this research was to select the discriminant variables based on substantive and statistical grounds. For the initial calculations, 17 financial indexes were selected[8]. They were determined as the mean (median) values in the 2011-2015[9] period, and represented the financial standing characteristics of local government units in the following areas: revenue, expenditure, financial independence, financial liquidity and indebtedness. Once selected based on substantive criteria, the discriminant variables were subject to a statistical verification. Their discriminatory capacity (variability in objects covered by the study), mutual correlation (information potential) and the difference between the average levels of indexes characteristic of municipalities exposed (and those not exposed) to the risk of overindebtedness[10] were taken into account in the statistical selection of variables for this research. Due to low discriminatory capacity (a coefficient of variation < 30%), 3 variables were eliminated from further studies. In turn, to eliminate excessively correlated variables, the inverse matrix of correlation coefficients between the selected variables was calculated. Based on the analysis of diagonal entries of the matrix, 4 variables were excluded from further studies. As a consequence, 10 variables (financial indexes) with a high discriminatory capacity were used to develop the model, including: the self-financing index[11] (*WS*), share of own revenue in total revenue (*DWwDO*), operating surplus per inhabitant (*NOM*), the EU funds per

[7] The municipalities were split into two groups by levels of aid accessed under the RDP.

[8] This study assumes that only financial determinants will be taken into consideration. In the relevant literature, the analysis was extended to cover other factors. The importance of innovation and entrepreneurship is reflected in research performed by many authors, including Kaufmann and Wagner (2005) and Novosák et al. (2017). In turn, the impact of location and the agglomeration effects were analyzed by Tatar (2010), Iatu and Alupului (2011) and Modranka (2015).

[9] Municipalities of the Wielkopolskie Voivodeship accessed the largest amounts of funds under the RDP in 2011-2015 (Local Data Bank). Therefore, median financial indicators from that period were used in the analyses presented in this paper.

[10] The conventional "distance" is a relation between the difference of the average level of indexes between the 1st and the 2nd group and the average standard deviation of these indexes.

[11] Which represents the share of the operating surplus and property revenues in property expenditures (Ministry of Finance, 2015).

inhabitant (*UEM*), total liabilities to total revenue (*ZOwDO*), debt servicing to total revenue (*OZwDO*), investment expenditure per inhabitant (*WIM*), payable liabilities to total liabilities (*ZWwZO*), share of investment expenditure in total expenditure (*WIwWO*), and own income per inhabitant (*DWM*).

Analysis of financial determinants of differences in the local government units' access to funds under the 2007-2013 RDP: results of the discriminant model

The next step of this study was to specify the discriminant function with the use of STATISTICA 12 and the progressive stepwise analysis[12]. In the first step, *UEwDO* was introduced to the model. This variable demonstrated the highest discriminatory capacity due to the highest *F* value of 38.93 (Table 2). However, upon entering the first variable to the model, the Wilks' lambda was 0.7197 which suggests a quite low discriminatory capacity of the entire model[13]. Subsequently, *UEM* (step 2) and *WIM* (step 3) were introduced. Upon entering the last variable to the model, the Wilks' lambda markedly declined to 0.4609 and subsequently to 0.4448 which suggests a significant increase of the model's discriminatory capacity. Step 3 turned out to be the final step as other variables proved to be statistically insignificant.

Table 2. Results of the discriminant function analysis (progressive stepwise method)

Step	Variable	Wilks' lambda	F
Step 1	DWwDO	0.7197	38.93
Step 2	UEM	0.4609	6.60
Step 3	WIM	0.4448	4.59

Source: author's own calculations based on data from the Ministry of Finance (Indexes for the financial assessment of local government units, 2011-2015, accessed on July 22, 2016) and from Local Data Bank of the Central Statistical Office of Poland, accessed on August 12, 2017.

Table 3 shows the characteristics of variables included in the model. The critical significance level p suggests their important role in the discrimination of municipalities as operators accessing the RDP funds. The partial Wilks' lambda indicates that the highest discriminatory role in the model is played by *DWwDO*.

[12] To ensure a high discriminatory capacity of variables introduced to the model, the *F* value (as the criterion for the inclusion of specific variables in the model) was assumed to be 4. The *F* statistic values measure the discriminatory capacity of variables and indicate the order of entering input variables to the model (Panek, 2009).

[13] The Wilks' lambda specifies the discriminatory capacity of the entire model. In turn, the partial Wilks' lambda shows the contribution of specific variables to the discrimination of a group. The lower is their value, the higher is the contribution of the variable to the total discrimination. Zero means ideal discriminatory capacity while one means the absence of discriminatory capacity (Stanisz, 2007).

Table 3. Summary of the discriminant function analysis

Variable	Partial Wilks' lambda	Tolerance	p
DWwDO	0.567092	0.7245	0.0000
UEM	0.885482	0.8751	0.0132
WIM	0.917511	0.6469	0.0371

Source: as in Table 2.

The canonical analysis enabled the specification of coefficients for the discriminant function. The results were raw and standardized coefficients. Raw coefficients are best suited for classification purposes. The estimated discriminant functions with raw coefficients was as follows:

$$Z = 1{,}450163 + 7{,}27209\,DWwDO - 0{,}00333\,UEM - 0{,}464158\,WIM$$

When interpreting the assessment of parameters of the estimated model, it may be concluded that the higher is the level of own revenue, and the lower is the share of the EU financial resources *per capita* and the share of investment expenditure *per capita*, the better are the chances for accessing relatively higher amounts of the RDP funds. Therefore, this study demonstrated that the group likely to be provided with significant support in the Wielkopolskie Voivodeship primarily includes local government units which demonstrate higher levels of financial independence while implementing smaller EU projects and allocating less resources to investments.

The main sources of the municipality's own revenue are taxes and local fees. These are resources earned through the municipality's own activity which, rather than being allocated at the discretion of any authority, largely depend on measures taken by the local government to attract residents, investors or tourists. Their indisputable advantage is that they may be used for any purpose and, therefore, they reflect financial independence. Having in mind the need to guarantee enough funds to cover the entire investment at an early stage, and in view of the above-mentioned system of partial refunds of invested resources, the municipality's own revenue is a necessary condition. Otherwise, the local government may only rely on state budget transfers which are largely beyond its control.

In turn, accessing the EU funds or allocating large amounts of money to investments results in a natural restriction of investment capacities. Also, when making their investment decisions, municipal authorities should address the local government's actual needs and consider its current and future financial standing, primarily in order to assess the rationale of the investment and to take the costs into account. Thus, local government units should assess whether their investments are reasonable because high implementation costs and maintenance costs to be incurred in subsequent years could become a barrier for the socio-economic development.

Summary and conclusions

Intensive investment activities have been taken in the Polish rural areas over the recent years. Many of them were implemented with the use of the EU subsidies, including those disbursed under the 2007-2013 RDP. The purpose of the RDP was to support transformation not only in the agricultural sector but also on rural areas, especially as regards technical and socio-economic infrastructure.

Authorities of the urban-rural and rural municipalities covered by this study were accessing the RDP funds, however, their level of absorption were differentiated in terms both of the number and value of projects. When it comes to the number of projects, measures taken to develop the socio-economic area were prevalent. But the largest amounts of subsidies were allocated to environmental projects. This is related to the capital-intensive nature of such investments.

Having in mind, on the one hand, the system for accessing the EU funds where the beneficiary's financial standing plays a major role and, on the other, the ability to implement capital-intensive projects, financial factors were analysed to verify whether they had affected the amount of subsidies granted under the 2007-2013 RDP. This is why an attempt was made to develop a discriminant model to verify the financial factors that affect the level of funds accessed under the RDP. When interpreting the assessment of parameters of the estimated model, it may be concluded that the higher is the level of own revenue, and the lower is the share of the EU financial resources *per capita* and the share of investment expenditure *per capita*, the better are the chances for accessing relatively higher amounts of the RDP funds. Therefore, this study demonstrated that the group likely to be provided with significant support in the Wielkopolskie Voivodeship primarily includes local government units which demonstrate higher levels of financial independence while implementing smaller EU projects and allocating less resources to investments.

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Rural households in Ukraine: their types, role in agricultural production and rural development, perspectives

Abstract: *This article provides a description of Ukrainian rural households, their classification, role in rural economy and development of rural territories. It presents their importance for preserving Ukrainian village, their sustainability character, difficulties and weak points, but also positive tendencies in the state policy and society aimed to support small producers, as households can belong to this category, and to preserve rural areas. We consider also challenges and opportunities for Ukrainian households in the context of the implementation of the Association Agreement between the EU and Ukraine. This analysis provides perspectives of households and proposes some ways for saving rural area.*

Keywords: *households, rural areas, rural development, state support, cooperatives, sustainability, employment, rural tourism.*

The aim of this contribution is to show that nowadays households are an integral part of the agricultural production in Ukraine, at the same time they play an important role in the rural development by creating jobs in villages, preventing disappearance of villages, preserving historical heritage, developing rural landscape, etc. An the same time, they create a high added value in the agricultural production. Giving their types and characteristics we try to defines the future perspectives for different types of small producers including households. The article defines problems and obstacles threatening small producers and households, and proposes the ways for their overcoming. Several successful cases given in the article show that in spite of the pessimistic forecasting of some politicians and researchers, households can set out on the path of the civilized entrepreneurship activity and can be transformed into more powerful economic units in future.

Introduction

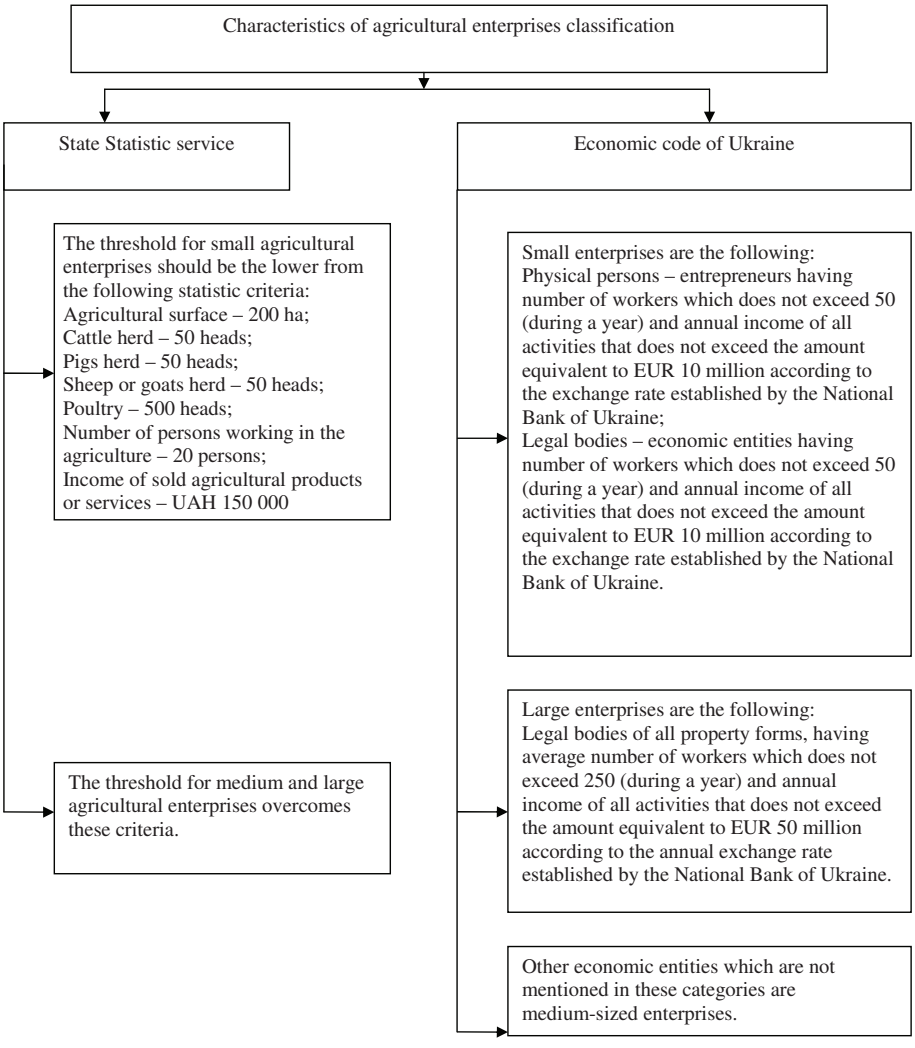
The transition to the policy of rural development is an answer to increasing external pressure on rural communities conditioned by the globalization and competition for natural resources. Thus, farmers, especially from small family farms, and people living in rural areas should apply new strategies based on mobilization and interrelationships of different fields of rural life. It would contribute to involvement of rural population in production and entrepreneurship activity, to fair distribution of incomes received from local natural and productive resources, to development of villages based on participation of rural population in elaboration and implementation of local development programmes, to keeping human resources, traditional knowledge, soils, water resources, biodiversity and social networks.

Among Ukrainian researchers there is no single understanding of the notion of rural development. In some cases it is interpreted as development of a village, in other – as development of a rural area or rural territories. The most relevant interpretations were done by Borodina who explains rural development as a process providing harmonic social and economic progress of rural areas based on rural communities' self-governance with a maximum use of endogenous development factors together with external opportunities (Borodina, 2009).

But one thing is obvious: rural development is not possible without economic activity on rural area. A special role in the achievement of rural development objectives falls to family and small farms. They are closely related to domestic and global food security, they keep traditional products, contribute to a well-balanced nutrition, preservation of agro-biodiversity and natural resources. The family farming creates real opportunities for enhancing local economies especially in relation with concrete measures aimed at social protection and welfare of rural communities (Ukrainian association of village communities, 2016).

Place of rural households in the classification of agricultural producers in Ukraine

Before discussing the role of households in the rural economy and rural development we should specify what kinds of agricultural producers are defied in Ukraine, where households are placed in this classification and how they are classified according to different types of functioning.



Scheme 1

Sources: main economic indices of agricultural enterprises activity: order of the State statistic committee of Ukraine, 06.11.2007 No. 403 / site of the Parliament of Ukraine, http://www.zakon.rada.gov.ua; Economic codex of Ukraine, 16.01.2003 No. 436-IV // Digest of the Parliament of Ukraine (BBP), – 2003, p. 18 -22.

Obviously households can be referred to the category of small producers, as this classification does not give a special definition for this kind of producers.

Makarenko (2013) defines main types of households: commodity-based, which represent a form of economic activity and natural ones, which are a form of self-employment. So, today we can see three kinds of households:

- Natural households: not oriented at the market as for input so for output (but they do not exist in their pure form);
- Commodity-based: small businesses and small individual farms;
- Consumption and commodity-based: having intermediate place between the two previous groups.

Commodity-based rural households are mainly situated around small towns or agglomerations of villages. Low productive households, but having favourable conditions for further development are situated in depressive territories. Households producing mainly for their own needs are situated around big towns. But they all have a common characteristic: they carry out production, processing and selling of agricultural products (Zbarsky, 2008).

In Ukraine, there is 4.9 million households on rural area. According to their economic activity, they can be of the following types: persons-entrepreneurs (agricultural producer exploiting a plot of 2 ha and more and acting as natural body), individual farming (agricultural producer exploiting less than 2 ha, producing for his family needs and selling surplus, offering services including rural tourism without being registered officially), farm (activity can be presented as production, processing and commercialization, acting as legal body) (State statistical service of Ukraine, 2017).

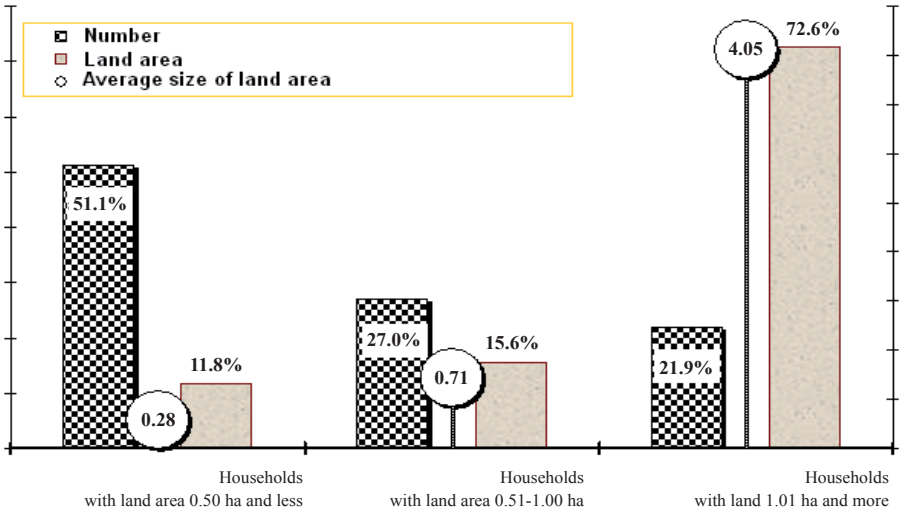


Figure 1. Rural households, their average land area in 2016, by main groups

Source: aggregate characteristics of rural households, State Statistical Service of Ukraine http://www.ukrstat.gov.ua/.

Ukrainian households: state of the art

In Ukraine 32% of the population lives in the rural areas. If we look at some statistical figures characterizing rural area, they are as follows: number of houses in rural area – 5 898 400, general surface of plots for agricultural activity – 2 690 500 ha, flats having heating – 2 325 434, water supply – 1 571 217, hot water supply – 727 479, sewerage system – 1 333 378; number of villages which need: nursery schools – 2 900, schools – 724, hospitals – 914, shops – 1 660, canteens, cafes – 1 535, post offices – 1 194.

The fact of living in a rural area defines the mode of life: peasants can be employed at big agricultural and processing enterprises operating in their area, at rural infrastructure (schools, hospitals, commerce, etc.), at towns' establishments (for villages situated near towns) or earn their living by individual farming. In any case, every rural family has its garden and some or many livestock units for self-sufficiency by foodstuff and production of commodity agricultural output.

Households have a consumer character and different motivation mechanisms than farms. Their functioning is based on manual work and minimal address to the market. One more peculiarity of households is an informal character of relations between its members and between them and other actors of the agrarian market.

Around 69.1% of households keep some kind of livestock and poultry, only 17.4% of households have machinery and equipment and 15.7% use hired workers.

In spite of the fact that households are not highly productive economic structures they play an important role in the national agricultural production. Their share in total agricultural production is 44.9%. In some sector, it is really crucial: 80% in milk production and 90% in fruit and vegetable production. In other sectors, it is less important: cereals – 22.7%, sugar beets – 7.5%, sunflower – 14.6%.

In the economic sense households can be considered as sustainable productive units. The main factors of their sustainability are the following: the necessity to satisfy their own needs in foodstuffs, minimum dependence on the market because of diversified natural production; domination of simplified technologies minimizing inflation impact on material and technical resources; close location of parcels and animal buildings.

In the conditions of undeveloped commercial infrastructure in rural territories households are important suppliers of foodstuffs not only for producer's family living in a village but also for their relatives living in towns. Natural multi-branch economic activity is a mean to resist to inflation processes and low purchasing power of rural population.

Households contribute greatly to the solution of unemployment problems on rural areas (mainly by self-employment). According to the State Statistical Service of Ukraine the households and farms employ 80% of persons living in rural areas (State Statistical Service of Ukraine, 2017). In conditions of economic difficulties in the country, it is the main source of employment for the rural population; but in conditions of economic stability it can be supplementary economic activity / employment. A big advantage of households and family farms is the accumulation of experience and skills with their further transfer from more experienced to younger workers.

The French researcher Cochet discovered an interesting phenomenon during his study of Ukrainian agricultural structures. As he indicates, although households are very labour-intensive and produce a large diversity of products, often with a high added value, their contribution to the national economy cannot be neglected.

The comparison of land productivity levels (added value by surface unity) was done between households' parcels and surfaces belonging to neighbouring big structures where cereals are growing. These structures are equipped with modern machinery and largely apply synthetic fertilizers. So, it was stated that added value obtained from surface unit by big modern structures is far fewer than added value created by "peasant's micro-farm" on the same surface (Cochet, 2014).

Besides these characteristics, households play an important role in keeping local traditions, preventing disappearance of villages, protecting environment.

Nevertheless, every year the rural population is reducing by 147 000 persons. In the last 15 years, 460 villages disappeared from the map of Ukraine. Two following figures represent the dynamics of rural population reduction and villages disappearance in Ukraine during the last 25 years.

This can be explained by aging of the rural population, as young people are not willing to continue activities of their parents realizing weak sides of households such as economic units: difficulty to compete with big structures, impossibility to provide higher quality of some products (e.g. in milk sector), limited access to market and finances, low quality of life, high level of manual work.

During a long period, the state did not take care of households, limiting their access to finances, creating fiscal and administrative obstacles. Households were considered as not viable forms of economic activity. Indeed, their production is not oriented at economic efficiency but mainly at satisfaction of family's needs. But surplus of products is marketed off-farm and this activity is subject to market laws.

According to scientific estimations, in the future one part of households will be transformed into small farms with further transformation into larger productive units, the other part will be transformed into "hobby-farms".

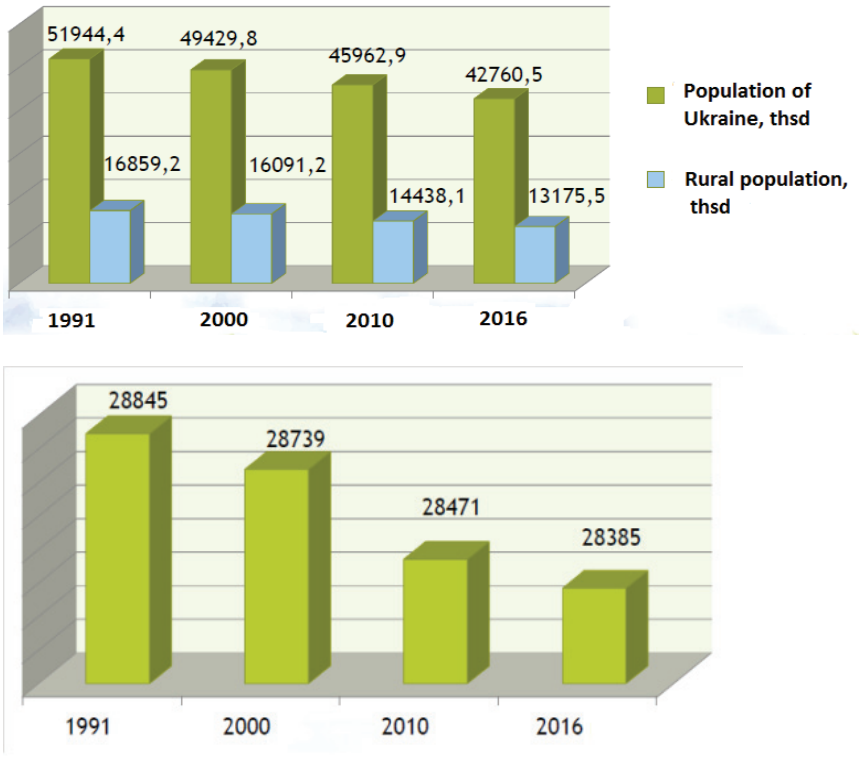


Figure 2. Number of villages in Ukraine

Source: Amazing villages of Ukraine 2017, Electronic edition "Agroportal" http://agroportal.ua/ua/publishing/konkurs/startuet-iii-vseukrainskii-konkurs-neveroyatnye-sela-ukrainy-2017/.

Nowadays a big challenge is to make this transition positive and to preserve villages.

In the same time Ukrainian village has an enormous potential for entrepreneurship activities development, as, for example:

- Creation of family farms;
- Creation of sawmills with further transformation;
- Production of seeds of vegetables and oil crops and their supply to enterprises;
- Construction of small animals' buildings, warehouses, greenhouses;
- Provision of different services to local inhabitants;
- Creation of farms specialized on animals, poultry or fish breeding;

- Production development on own plots (growing of nursery plants, flowers and their selling in markets);
- Growing and processing of vegetables, creation of own sell points or their provision to public catering places located in the region or neighbouring towns;
- Stockpiling of raw materials and production of alternative energy;
- Creation of cooperatives by households (e.g. milk production, fruit and vegetables growing, animals fattening, slaughtering and meat selling, provision of mushrooms or medicinal plants).

Actual state policy toward small producers and rural development

During the last period some positive tendencies in the state policy have taken place. Thus, the support to small producers was defined as one of the priorities of the State strategy of agricultural and rural development for 2015-2020. The first important Law on decentralization, adopted in 2015, gives the right to local communities to merge, obtaining autonomy in management of their budget, in arrangement of their areas, etc. This law was followed by the creation of special fund of regional development for financing projects of fused rural communities aimed at improvement of life quality in rural area, solution of environmental problems and development of small business.

Then in 2016, the Ukrainian Parliament adopted the Law on farms which attributes the official status of agricultural producers to households. Being officially registered as family farm legal or natural body, households will obtain the right to benefit from state aids. The new Law on self-regulatory organizations in agriculture is being developed as well. It will allow family farms and other agricultural producers to create non-governmental organizations for obtaining delegated rights from State authorities to regulate their own activities.

The Concept of rural territories development was adopted by the Cabinet of ministers of Ukraine in September 2015, but the plan of its implementation was adopted only in July 2017. This strategy is based on the idea that the agricultural transformations taking place in Ukraine during the last years allowed the country to increase gross agricultural production. But they did not contribute to the social and economic development of rural territories and to the improvement of life quality in rural area, so the complex approach is needed for the solution of this problem. This approach should be based on the sustainable development principles.

The plan foresees involvement of households into rural tourism, creation of employments in the field of tourism, growth of households' incomes and growth of incomes of local budgets. This actions should be regulated by the amendments to the Law on tourism (Plan of the implementation of the Concept of rural territories development, 2017).

But this plan does not contain any solutions for improving the economic efficiency of households. It proposes support for small farms. Such as improving performance of activities by creating cooperatives, providing consultancy services and trainings aimed at improvement of economic efficiency, quality of products and implementation of innovations. Should we understand that households will be involved into these actions having obtained legal status of agricultural producers? Are they really considered like viable economic actors?

Practical initiatives launched for rural development in Ukraine

Several initiatives were launched recently by NGOs, big businesses and European partners. Thus, the well-known milk processor "Danone" together with Heifer fund launched several projects in Dnipro region. One consists in the creation of milk collecting centres providing necessary equipment and training aimed to improvement of the milk quality. They united households having five and more cows helping people to obtain higher profit of milk production. The income of such family farms allows earning a living for a family. The strawberry cooperatives were their second socially aimed initiative. In the framework of the project 65 new jobs were created that allowed 500 families to sell their products guaranteeing them a stable income.

The national competition "Incredible villages of Ukraine" to promote development of small and medium-sized rural businesses and rural communities, popularize life in countryside, recall historical and cultural heritage of the Ukrainian village, was organized by the Ukrainian agro-business club. The villages were evaluated according to the following criteria: incredibility, contribution of small and medium-sized business, work of local authorities, social life, preservation of historical and cultural heritage, environmental protection. In 2017, the number of villages that participated in this competition amounted to 268.

The aim of the Ukrainian/Dutch Matra project 'Believe' (Self Governance in the field of Rural Development) was to ensure community participation and stimulate good governance in the implementation of the State Strategy to develop agriculture and rural areas and to stimulate self-governance through capacity building for development of local business rural development plans. As a result: six Public Platforms on Rayon-level in 5 different regions were created. These Public Platforms are comparable with the European Local LEADER groups; the platforms' leaders were united in the national network, their dialogue with the Ukrainian Parliament was established; the independent monitoring of the national legislation and state programmes implementation was organized; several projects of rural development with the participation of private and public sectors were launched by local communities.

Project "Awareness and identification of potential quality food products in Lviv region" was launched by the French Minister of Agriculture. Its objectives are: to support Ukraine in the implementation of the geographic indication system; to provide special accompanying methodology for development and valorisation of traditional food products adopted to the Ukrainian context with the further implementation in other regions of Ukraine; to create associations of producers of specific traditional products, to preserve them and to give them added value. The pilot project lasted from July 2016 until September 2017. The list of traditional products with a high potential was defined; three products were selected for a more in-depth study and development (Goldenrod honey, Yasko beans and Rakhiv brynza). As a result, now the work aims at creation of the Yasko bean producers' cooperative on the base of households. They are consulted by French experts who help them to elaborate the standard specification. The work with brynza and honey producers is going on as well.

Challenges and opportunities for small producers in the context of the Association Agreement between the EU and Ukraine

It is also important to notice the context of Ukrainian producers' activity. In 2014, the Association Agreement between the European Union and its Members States, on the one side, and Ukraine, on the other was signed. Moreover, the Agreement about the Deep and Comprehensive Free Trade Area with the EU entered in force since January 2016.

The Association Agreement foresees enhancing administrative capacities on central and local levels for the planning, assessment and implementation of the policy in the agriculture and rural development (Association Agreement between the European Union and its Members States, 2014).

It brings important opportunities for small producers, but an the same time, it can present threats in the condition of their passivity. Thus, high requirements to products' quality can lead to reduction of production by households (e.g. keeping of 1-2 cows will become unprofitable because of high expenses for modern technologies); the competition on the internal market will become higher because of customs duties lowering by Ukraine (some producers will not be able to adapt to these conditions); the lowering of export duties will lead to orientation of Ukrainian export at raw materials (small processing enterprises can feel deficiency of raw materials); the unavailability of financial resources for small producers will enhance technological retardation of Ukrainian agriculture.

On the other hand, these threats create challenges for Ukrainian producers which will encourage them to more dynamism and activity in order to survive in these conditions and to become more efficient. The following Table 1 represents possible challenges and ways of their overcoming.

Table 1. Possible challenges and ways of their overcoming.

Challenge	Solution
Low initiative of small producers	Encouraging creation of initiative groups, implementation of local initiatives and explanation of their influence force
Low development level of small entrepreneurship and rural area in general	Rural development by the promotion of agricultural production, offering of follow-up services, knowledge about perspectives and advantages of entrepreneurship activity
Market monopolization, closing of processing enterprises, lowering of prices on raw materials that leads to economic losses for small producers and to fiscal losses for local budgets	Local processing of agricultural products
Increasing competition on the internal market because of agroholdings and importers	Creation of cooperatives for providing competitive agricultural products, development of activities in other fields such as rural tourism, application of new marketing mechanisms
Production of animal origin products not corresponding to the EU standards	Improvement of production according to modern requirements, providing of information about innovation
Absence of proper support from public authorities, especially for small producers	Mainstreaming of local authorities activity aimed at support to entrepreneurship and perspective activities in villages

Source: Experts' edition "Association Agreement: advices for small producers" (Boyko et al., 2015).

The Association Agreement opens possibilities for Ukrainian businesses to look beyond native producers and to become a member of the European business community. It contains also provisions related to the cooperation in the tourism sector. Households will obtain larger possibilities in this field and develop tourist infrastructure. Ukraine has all necessary factors facilitating rural tourism development: unique historical and ethnographic heritage of villages, rich recreation resources, ecological cleanness of rural areas, available housing facilities to host tourists, traditional hospitality of people and moderate prices.

Conclusion and perspectives

In our article we tried to stress mainly the positive sides showing the positive transformations taking place in the rural sector. But one should understand that the problem is very complex, requires efforts, understanding and professionalism of public authorities, mobilization of society and finally changing of mentality by everybody.

Still small agricultural producers do not have a real understanding of their economic opportunities and social role. They do not hurry to be officially registered as they do not believe in state aid and are afraid of fiscal charges. Cooperatives look like the best solutions for small producers, but they do not want to join

their means. It is a negative impact of the communist system when cooperation was associated with expropriation of private property. The advisory services supposed to provide the access to innovations remain undeveloped.

To preserve Ukrainian villages and to enhance rural development the following measures should be undertaken:

- Further work aimed at creation of joint structures: cooperatives, clusters, united communities (based on the State support and participation of the society, dissemination of successful examples in order to create the trust);
- Development of niche products (organic, traditional products under geographic indications) and rural tourism;
- Enabling access to innovations by the development of advisory services;
- Active involvement of households in local initiatives (this role belongs to rural communities).

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Development of extension services – a challenge for the RDI flow in the agriculture of the Republic of Moldova

Abstract: *Considerable efforts to create a professional and effective rural extension service in the Republic of Moldova have been made in the last decade. Unfortunately, there are currently limited institutional connections between the components of knowledge in agriculture in Moldova and information system, for example, between institutions of agricultural research, extension and education/training. These three components work independently, while collaboration is limited to involvement of researchers and professors as consultants in short-term projects of the extension service. Therefore, the Republic of Moldova lacks a permanent platform for communication and cooperation, aimed at serving the common needs of the private sector. Agricultural science and innovative policy development should stimulate obtaining new knowledge, highly productive biological material, intensify innovation activities in agro-industrial sector, while creating conditions for absorbing local and foreign innovations through the range of measures, such as: research, development and innovation (RDI) activities focused on priority directions of the sector development; stimulating innovative scientific activities in order to create new varieties and hybrids of plants and highly productive breeds of animals, applying advanced farming and processing of raw materials; promotin the creation and implementation of a system of economic incentives for attracting and absorbing innovations in the sector; deepening economic research to ensure scientific support for the sustainable development of the agribusiness sector; modernizing the training and retraining of the staff from*

the agricultural education sector and adjustment of the quality of education to market requirements; supporting the development of technological transfer and extension network in agro-industrial sector (Government of the Republic of Moldova, 2008).

Keywords: *agriculture, extension services, agricultural research, Republic of Moldova*

Introduction

Development of extension services in the field of agriculture represents an important issue for the Republic of Moldova, as it involves the application of knowledge and technology transfer and scientific research for the establishment and development of the good agricultural practices in the country.

Extension services have to contribute directly and indirectly to the modernization of the agricultural sector, by informing farmers on the latest technologies, by implementing research from the laboratories in practice, by stimulating farmers to acquire new knowledge, etc.

The basic conclusion of the article is to maintain and expand the coverage of the extension network and the quality of the services provided. The service extension should further extend and diversify its services in order to cover the information needs of the whole value chain from production to the market, on the one hand, and to develop commercially based extension services, on the other.

Materials and methods

The aim of the paper is to analyse the linkage between science development, innovative ideas, their dissemination, establishment of extension services and their impact on the innovative development of the agricultural sector. As a result, solutions for expanding the coverage of the extension network, together with the diversification and improvement of its services are provided.

The primary data from key stakeholders were collected through a semi-structured interview. Secondary data were collected from official statistical yearbooks, publications of the National Bureau of Statistics of the Republic of Moldova, decisions of the Government of Moldova related to the development of the RDI activities and extension services, articles and studies developed by local and foreign experts. An important source of the secondary information was the Country report elaborated with the contribution of authors in the framework of the FP7 project “AGRICISTRADE”.

The analysis of data obtained was done using standard functions provided by the MS Excel.

Results and discussions

The status of the agricultural sector has changed dramatically during the post-privatization period, along with the disruption of production and distribution networks. The shift in production has also been accompanied by significant reductions in land productivity. This situation is directly related to lack of investments, capital and credit availability to the agricultural sector, factors that have resulted in farmers applying low yield technologies and drastically reducing their use of agricultural inputs (Moroz et al., 2015).

Nowadays the main weaknesses of the agri-food sector of the Republic of Moldova are the following:

- High anthropogenic pressure for the agriculture, that results from the excessive share of cultivated lands and a reduced share of forests that is critical for the sustainable development of this sector in the Republic of Moldova;
- Fragmented land ownership;
- Unfavorable demographic tendencies such as ageing, depopulation and mass migration that reduce the access to skilled labour force;
- High level of moral and physical depreciation of the agricultural machinery and equipment, post-harvest, food processing and market infrastructure;
- Dominance of the extensive agricultural systems and low land productivity;
- High dependence on import of agricultural inputs;
- Outdated agricultural education system, isolated extension services and weak agricultural research sector.

The lack of horizontal and vertical coordination of supply chains is another reason behind the low competitiveness of the agricultural sector. Such problems as underdeveloped wholesale markets, low bargaining power, changing quality of produces, lack of distribution channels, poor infrastructure and limited access to foreign markets are the major reasons for currently occurring low producer prices. The value chain deficiencies that lead to large gaps between farm-gate and consumer prices resulted in low incomes, low investments, and persistent low quality of agricultural raw material at the farm-gate level. In Moldova the downstream industry of buyers, including intermediaries, processors, exporters, food retailers and other players has not yet managed to establish long-term relationships with suppliers of raw material, by recognizing the farmer as a key business partner. Most of the downstream players still prefer to buy on the spot market and pay the lowest price possible to the farmers, while food retailers choose to largely import food products needed to satisfy domestic consumption. These market deficiencies have, therefore, so far prevented efficient transmission of market signals down to the farm level, and delayed farmers' integration into vertically coordinated supply chains. Moldova's underdeveloped producers' organizational structure hinders market access for farmers. The lack of institutional arrangements for farmers in form of voluntary membership associations aimed at improving their market access is another area of unsolved problems. Agricultural producers in Moldova –

and this is particularly the problem of small producers – generally lack group power needed to ease their market integration through increasing supplies, setting better prices with buyers, or jointly owning post-harvest facilities. The Moldovan government is currently undertaking measures to encourage establishment of producer groups by offering financial incentive for association and engagement with markets (Government of the Republic of Moldova, 2014a).

All these problems lead to the necessity of strengthening efforts to promoteg further reforms of agricultural research, education and the rural extension services in the agri-food sector.

The brief analysis of the economic situation of the Republic of Moldova reveals that the national economy is marked by limited production capacities, demand being largely satisfied by the import of goods and services. The current model of growth, based on remittances and consumption, proves to be unfavourable for the country's sustainable development. Moldova is lagging far behind other European countries in terms of innovation and sophistication factors and especially in such fields as: capacity for innovation (the 115th position out of 140 countries), quality of scientific research institutions (124th position), company spending on R&D (135th position), university-industry collaboration in research and development (123rd position), government procurement of advanced technological products (134th position) and the 132nd position for the availability of scientists and engineers (Schwab, 2015).

The new model of economic growth, assumed by the Government of the Republic of Moldova aims to change the country's development paradigm from a consumer-oriented economy to an economy based on investments, competitiveness, so that the national economy creates highly qualified and well-paid jobs and that the whole society and every individual citizen benefit from the effects of significant, organic and balanced economic growth. Achieving this goal involves increasing the share of science-intensive products obtained as a result of research and development activity (Government of the Republic of Moldova, 2014b).

In response to the vulnerabilities inherent in the remittance-driven model, the Government of Moldova has made a committed decision to develop a strategy of export-oriented economic growth. The national development strategy "Moldova 2020" is centered around the need to transition to a dynamic economic model based on investment and the development of goods- and services-exporting industries. Putting this model in place requires substantial increases in domestic investment and Foreign Direct Investment (FDI), and enhancing knowledge and innovation, in order to increase efficiency and competitiveness. Therefore, the "Moldova 2020" strategy is built around seven priorities amongst which the business environment, access to finance, education and infrastructure were defined as critical areas along with the judicial sector, energy consumption and the pension system (FAO, 2012).

Nowadays, there are several players in the field of extension services in the Republic of Moldova responsible for the transfer of knowledge and experience from the research and education sector to the field of agricultural production. Among the most important, one can mention the Agency for Consulting and Scholarship in Agriculture (ACSA), the National Federation of Agricultural Producers "FARM" (former "AGROinform"), the Republican Union of Associations of Agricultural Producers (UniAgroProtect) and the National Farmers Federation of Moldova (NFFM). All these organizations are involved to a different extent in providing extension services.

The Agency for Consulting and Scholarship in Agriculture (ACSA) was created in 2002 based on some regional extension offices that activated before, under the framework of various institutions such as the Institute of Management and Rural Development[1], AGROinform and some other farmers' associations. At the initial stage of its activity, the ACSA was financed by the World Bank, the Swedish International Development Cooperation Agency (SIDA), other foreign donors and, to a very small extent, by the state budget. The self-financing was almost absent in the ACSA activities. In 2013, the financial support of donors ended, and the Government took over full funding of the extension network.

Nowadays, the ACSA is a non-governmental organization with the mission to contribute to the sustainable development of rural communities through the establishment and development of a professional network of information, advice and training providers for agricultural producers and rural entrepreneurs. The ACSA ensures the access of the rural population to knowledge, experience and skills in a wide range of areas oriented towards the economic development of Moldovan villages. Currently, the ACSA manages a network of 35 service providers, employing about 425 consultants, among which are 75 regional consultants and 350 local consultants working in rural localities.

Rural extension services are provided annually to about 340 thousand agricultural producers, which cultivate about 670 thousand ha of agricultural land. Services are provided to all types of agricultural enterprises, including large corporate enterprises, medium-sized commercial farms and small subsistence farms, which form the largest group of customers. However, over 77% of them are subsistence farmers, while large scale corporate farms account only for 0.5% of the total number of farms covered by the national network of extension services (ACSA, 2017). This proves the orientation of the national extension services provided by the ACSA mainly toward small and medium-scale subsistence and semi-subsistence farms. Advisory services are provided to farmers free of charge, while the institution itself is very dependent on the state and other funding. At the same time, the large-scale commercially oriented farms often employ qualified advisors form the country or abroad. Most of the advice offered relates to production technologies (over 50% of services in 2011), while other consultancy areas include marketing (18% of services),

[1] Former faculty of the State Agricultural University of Moldova.

business (15%) and legal advice (13%). Based on the results of some recent surveys, the clients' satisfaction with the service quality is rather high. Thus, over 90% of farmers assess the impact of extension services on their businesses as beneficial. It has been estimated that one lei invested in extension services has led to gross value added creation of about 3.3 lei (IFAD, 2016).

The National Federation of Agricultural Producers from Moldova "FARM" (former "AGROinform") is a network of regional non-governmental organizations aimed at supporting the Moldovan agricultural producers, by granting them information assistance and professional consulting services. The Federation was created in 2000 with the idea of providing agricultural producers with the necessary information and consultancy in such fields as technological issues, land relations, farm management, access to credits, farmers' cooperation and marketing. FARM is a non-governmental organization that joins 15 regional NGOs with more than 4500 members. The Federation is a decentralized structure, where the regional organizations have an independent legal status and are very flexible in reaching the farmers' needs.

The main mission of the Federation is to support the sustainable economic development of rural communities by providing complex assistance in business development and marketing, advanced technologies implementation, as well as representing the interests of its members by promoting policies for sustainable rural environment development (AGROinform, 2017).

The Republican Union of Associations of Agricultural Producers (UniAgroProtect) includes 17 Agricultural Associations, bringing together 2238 medium-sized enterprises and about 24 thousand small-scale farmers. They cultivate about 800 thousand hectares that is about 50% of the total agricultural land in the Republic of Moldova. The objective of the UniAgroProtect is to provide information and consultation to its members; attract investment and implementation of new technologies; promote members' image in relation to potential investors, marketing development; and strengthen efforts to negotiate product prices.

The National Farmers Federation of Moldova (NFFM) is a non-governmental organization set up in 1998. The aim of the NFFM is to improve the welfare of the population in rural areas by realizing and protecting civil, economic, social and cultural rights of all landowners and of those who practice agricultural business and services. At present, the NFFM has 11 regional organizations, 9 information and consultancy centers, over 700 local organizations and encompasses over 27 thousand farmers.

Institutionally, the Ministry of Agriculture, Regional Development and Environment coordinates all structures providing rural extension services through the Service for science, education and rural extension. The main objectives of the current rural extension network are as follows:

a) Providing assistance and information services to agri-food producers in such fields as business planning, investment, legislation, organizational, marketing and financial management;
b) Promoting best production practices among farmers;
c) Facilitating farmers' access to advanced technologies and markets by providing information about service providers, buyers and sellers;
d) Facilitating access to information by organizing seminars, training courses, field days and various demonstration activities, collecting, systematizing and distributing the necessary data;
e) Identification of problems faced by agricultural producers, and their settlement at local, regional or national level;
f) Collaboration with all the structures involved in the rural extension system.

The Strategy for the development of rural extension services for the period of 2012-2022, approved through the Government Decision No. 486 from 5 July 2012, foresees a rapid transition to a modern model of organization of rural extension services, that should generate high added value, based on knowledge and innovation, oriented towards continuous improvement of the life quality in rural areas (Government of the Republic of Moldova, 2012).

The research and innovation in agriculture is currently represented by eight scientific institutes, including the State Agrarian University of Moldova. At the same time, there is a number of research institutes that develop topics closely related to agricultural production. Research institutes are subordinated to both the Ministry of Agriculture and to the Academy of Sciences and are funded, basically from the state budget.

Taking into account the outdated research equipment, insufficient financial resources and aged staff, the existing research institutes are in a state of survival. There is no clear and transparent procedure of selection for research topics that should be targeted to the real sector demands. Therefore, it is important to create closer connections between research and development sector and the agri-food business needs. At present, the research and innovation system in agriculture is not oriented towards the private sector and is relatively isolated, which makes it vulnerable. At the same time, the agricultural knowledge generation and transfer have quite small shares in the GDP (Fig. 1).

A brief outlook in the history of agricultural research in the Republic of Moldova shows that during the period of 1950-1990s, an impressive number of agro-industrial research institutes were established, thus ensuring the large-scale implementation of scientific results in the production process. From 1990 to 2001 there was a considerable decrease (by 42%) in the number of researchers employed at the scientific institutions in the agri-food sector as well as of the number of agricultural research institutions. At present, about 900 researchers are working in 12 research institutes that develop researches in fields related to agricultural production. The researchers are mostly approaching the retirement age, making it harder for institutions to maintain their ability to assess, expand and transfer technology to local and foreign innovations.

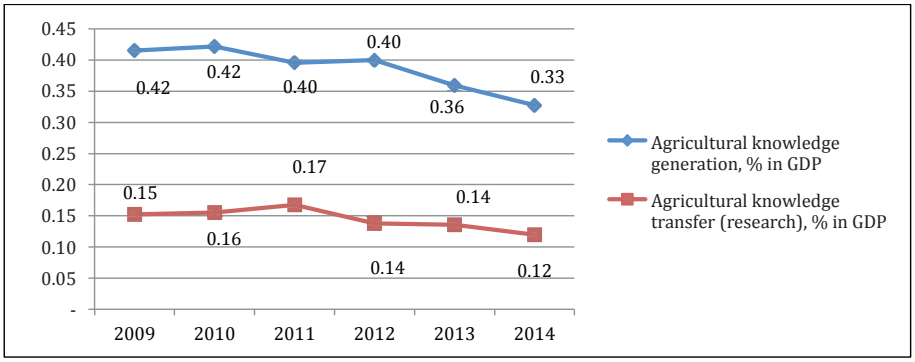

Figure 1. Agricultural knowledge generation and transfer, share in GDP, %
Source: author's calculations based on data from BOOST database (Ministry of Finances of the Republic of Moldova, 2016).

In the meantime, the agricultural education system has become less receptive and flexible to the requirements of the rural employment market. As a result of the insufficient partnership relations amongst education institutions, agricultural producers and processing industry businesses, education plans related to all specializations are not updated, as well as the learning curricula, education method and teaching techniques aimed at achieving a formation-developing, competences based education system.

The demographic decline leads to the continuous decrease of the population included in the educational process and generates problems of over-dimensioning the network of universities and other educational institutions, including those in the field of agricultural sciences. The number of students in agricultural sciences and veterinary medicine was constantly decreasing during the period of 2009-2016. Thus, the number of students in agricultural sciences decreased from 2039 to 1595 or by 28%, while those of students in veterinary medicine from 295 to 260 or by 13%, at the same period (Fig. 2).

Similar to the situation in the education sector, the agricultural research and innovation system has not yet managed to effectively break with the past and adequately reconnect with the private sector and still operates in relative isolation and is rather weak.

Struggling with dilapidated inventories and inadequate resources, insufficient funds, aging of the staff (due to low salaries), the existing research institutes are in a difficult position to compete with private research structures. There is no mechanism established on consulting the selected research topics with the end-users of the research, i.e. representatives of the farming and business community.

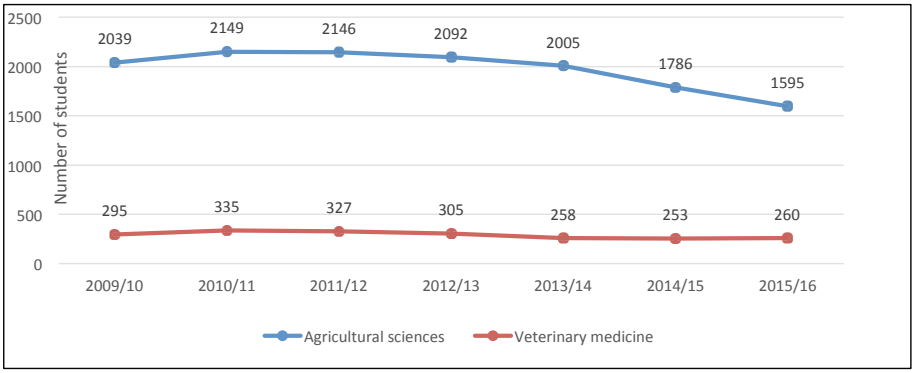

Figure 2. Number of students in agricultural sciences and veterinary medicine, 2009/2010 – 2015/2016, persons

Source: elaborated by authors based on data from the National Bureau of Statistics (2017).

The risk of irrelevance appears particularly critical as long as the research institutes continue to operate in isolation from the private sector and from the international research and development (R&D) system. Therefore, it is important to create and develop links between agricultural R&D and the needs of the agri-food business. Presently, some of the research institutes are involved in production and commercial activities that are not public domain and are better handled by private operators. Apart from research activities, some institutes are also involved in seed and seedling production, multiplication and commercialization. These activities bring additional extra-budgetary revenue to these institutes, but the drive for marketing of research products leads to the present unhealthy situation where commercial and research interests/activities are closely intertwined. In many European countries, private companies who are recognized to be better at the business of business relations carry out this type of activities. A clear separation between these two concepts needs to be made, and privatization of commercial activities considered. It has to be mentioned that some scientific institutions have already developed public-private partnerships, which are expected to lead to an improved and modern scientific-innovative domain. Recognizing the low capacity of the under-funded domestic research institutions to compete with international R&D, it is important to create an open regime for the easy and quick import of the latest technologies into the country so that Moldovan farmers can stay competitive. It is needed to speed up the inflow of the most competitive varieties of agricultural crops developed in other countries into the Republic of Moldova.

A major effort has been put, over the last decade, into building a professional and far-reaching extension service in Moldova. Thus the agricultural extension service network was created in 2002 with the support of the World Bank. Unfortunately, few institutional linkages exist today between the components of the Moldovan agricultural knowledge and information system, i.e. between its agricultural research, extension, education and training institutions. These

three components have pretty much their own agenda, and the collaboration is limited to involving researchers and/or university professors as short-term consultants in various projects of the extension service. A regular platform for communication and cooperation aimed at jointly serving the private sector needs does not seem to be fully functional in Moldova.

There are no mechanisms put in place by which the extension service can influence the agricultural research agenda. The Strategy for the rural extension services highlights the need to keep and extend the coverage of the extension network, along with further diversification and improvement of its services. This strategy aims at increasing, in a decade, the coverage by 25%, the number of beneficiaries by 20%, as well as the incomes of beneficiaries by 15% annually. To achieve this, the extension service should seek to increase its competencies by broadening and diversifying its services to cover the whole value chain information needs (from production to the market), on the one hand, and develop the commercial side of its service provision, on the other. To strengthen the rural pillar of the network, new services will be added focusing on entrepreneurship and diversification of rural economic activities, as well as family-targeted social services. It is important for the extension network to benefit from public funding in order to achieve its medium and long-term goals.

The Strategy states that development of rural extension services in Moldova will contribute to the development of rural economy and increasing agricultural productivity, enhancing the competitiveness of the agri-food sector. Although the success of this strategy will depend on adequate public funding, the fact that it works with measurable objectives is certainly an advantage compared to the other strategies elaborated before.

The rural extension service in the country tends to be in line with the principles of a modern system of consulting services such as value chain approach, which brings knowledge and information at all levels, from producers to the market, and, on the other hand, the market demand and the commercial orientation of the services rendered. The rural extension network must provide the knowledge and information requested by clients at all levels of agri-food production starting with agricultural production and ending with the final consumers (Government of the Republic of Moldova, 2012).

The consumer demand driven agricultural production leads farmers constantly to new requirements alongside the value chain and subsequently to new challenges. The main function of the extension services is to assist agricultural producers in facing these increasing requirements by providing more qualitative services. Moreover, extension services have to improve constantly the processes of technology transfer from scientific research institutions to end users of these technologies.

Conclusions

1. A large part of the problems faced by agricultural sector of the Republic of Moldova originates from poor links between the agricultural research, education, rural extension services and agricultural production.

2. The existing agricultural extension networks provide their services largely for small-scale subsistence farmers that have a very insignificant share in commercial production of agricultural and food production. At the same time, many large-scale commercial agricultural producers meet an increasing demand in specialized high-quality extension services that cannot be offered by local providers.

3. Advisory services are provided to farmers free of charge, while institutions involved in providing these services are very dependent on the state funding.

4. The major problems in the field of R&D and extension services can be formulated as follows:

- Lack of the inflow of qualified specialists in the field of agricultural research
- Existing research infrastructure in agriculture is outdated and does not meet requirements of this specific area.
- Research projects are formulated based on the existing capacities and less on the needs of real sector that denotes a poor connection between research institutions and the main actors in agricultural production and processing. Partners from the civil society as well as those from the central public authorities and local public authorities have a low involvement in the process of setting priorities and objectives, but also in evaluation of results of the RDI and extension systems.
- Research projects are focused on local objectives that a priory creates conditions for a limited utilization of the results achieved. Moreover, financing of the agricultural researches through international programmes is rather limited.
- Financing of the research projects is based on covering the operating expenditures and not on the performance indicators.

5. The existing network of extension services and research institutes from Moldova have to be considerably changed in order to satisfy increas• ing demands of the agricultural producers in specialized and highly qualified knowledge transfer system.

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Changes in networking of rural centres through direct public transport connections: case study of Prešov region, Slovakia

Abstract: *The peripheral non-centrally located Prešov region (NUTS 3) from North-Eastern Slovakia (Fig. 1) is, according to the OECD methodology on urban-rural typology, a "significantly rural (intermediate) region". Its territory consists of 13 smaller spatial units – predominantly and/or significantly rural LAU1 territories – districts of which centres (district towns) were selected for the comparative analysis of the changes in their networks of usually relatively long-term stable direct public transport connections. The changes between 2003 and 2017 were studied based on the existence and frequency of direct transport connections (transport accessibility) between them and other district towns in Slovakia. The presented outcomes show the influence of a top-down governmental decision (zero-fare railway public transport for selected categories of passengers) and other transport related issues (changes in modal split, transport infrastructure and organisation of transport) on the new, restructured and mainly weakened pattern of rural centres public transport networking shape and quality.*

Keywords: *small towns as centres of rural territories, direct transport connections, Prešov region, Slovakia*

Introduction

Public passenger transport had a dominant role in a modal split of former Czechoslovakia and also other socialist countries of the Central-Eastern Europe. Public transport after 1989 has been influenced by a very fast increase in the motorisation level (in Slovakia from 165 cars per 1,000 inhabitants in 1990 to 236 in 2000, 307 in 2010 and 375 in 2015 – Štatistický úrad Slovenskej republiky, 2017). The role of private cars increased at the expense of public road and railway transport. Investments in transport in Slovakia after 1989 were mainly oriented at development of road transport infrastructure (construction of motorways and expressways). Major changes occurred in organisation of transport where the state monopolies were gradually transformed into the market-oriented companies. Main organisational changes included privatisation of bus companies and deregulation and liberalisation of railway transport.

The specific governmental decision about free (zero-fare) railway public transport for selected categories of passengers (children, students, pensioners from all Member States of the EU) since 17 November 2014, have contributed to the improvement of the position of railway public transport and increase in its performance. The governmental decision that had clearly supported the rail-based public transport gave rise to a major public discussion. Questions without a clear answer resonated in the society, in the circles of politicians, laymen but also specialists: why is something free of charge and who pays for all of that? Why are there only these (selected) trains and why not also buses? Why does it concern only selected groups of inhabitants and even foreigners? Where is the (spatial) justice – after all, it is not possible to travel from every place by train? How will travelling change after such a decision? and the like.

All of the above-mentioned changes in transport system resulted in changes in the system of public transport connections and networking of geographical localities. The connections of points in the settlement network of spatial units of different hierarchic levels (continent, state, administrative or functional region) by public transport connections (train, bus) can be basically complementary or competitive. They express the transport connection and/or transport accessibility of mutually networked settlements (Bruinsma and Rietveld, 1998).

In Slovakia, the organisation of public bus transport lies within the authority of regional self-governments (NUTS 3 regional level), whose role is to form a functional (complementary) and economically rational service, which is defined in the official documents of the EU as one of the services of general interest. However, the organisation of public railway transport lies within the state's authority, based on the Contract on Transport Services in the Public Interest concluded between the Ministry of Transport and Construction of the Slovak Republic and ZSSK (*Železničná spoločnosť Slovensko* – state carrier). The state also creates the conditions for the optimal functioning of public transport at a national level, and its regulating measures should contribute to a higher quality of life of its inhabitants.

In Slovakia, there are some rural regions whose centres are either not connected to the network of railways or the passenger transport on the routes connecting them to other urban or rural localities has been interrupted for several years or terminated. The connections by public transport between the localities are then implemented exclusively by buses. But the need for public bus transport and the existence of parallel railway and road connections of localities in the region or localities from across the borders of each region may be threatened by the rising competitive struggle for customers and the unilateral state support for railways. There is the assumption that the railways become the winner of the competitive struggle for customers, in a situation when the price is the main criterion of transport selection. Subsequently, it can be assumed, under the market conditions, that bus transport will partially waken which will have a negative impact on the existence and intensity of interlocal connections, and in turn it will influence a reduction in the possibility of the use of public transport. According to the information from the Bus Transport Association (SITA, 2016), suburban regional buses, operating on-demand and with the support from the self-governing regions, transported in 2015 by 2.3% less passengers than in 2014. Long-distance bus services, which are not subsidised (by regional governments), in 2015 transported on average 12.7% less passengers than in 2014. These secondary statistical data support our hypothetical thinking.

The aim of the study is to test the drafted scenario of tensions and competitive struggle between railway and bus transport, on the example of direct public transport connections of centres of rural areas/regions (LAU1) in the Prešov region for two time points (working days on Wednesday) in 2003 and 2017. The difference between collection of statistical data about existence and frequency of transport connections for spatio-temporal comparisons is not optimal (in the context of the above-mentioned governmental decision) and, therefore, it is difficult to identify direct impact of the zero-fare travel on the changes in the public transport. It is necessary to look at the development of the public transport pattern through the perspective of simultaneous influence of the changes in society and transport-related issues.

The Prešov region, rural areas, and district towns as the centres of rural LAU1 territories

The peripheral non-centrally located Prešov region (NUTS 3) from North-Eastern Slovakia (Fig. 1) is, according to the OECD methodology on urban-rural typology, a "significantly rural (intermediate) region". Its territory consists of 13 smaller spatial units, districts (LAU1). Four of them (Bardejov, Medzilaborce, Stará Ľubovňa, Vranov nad Topľou) are included in the category of "predominantly rural regions". Nine of them (Humenné, Kežmarok, Levoča, Poprad, Prešov, Sabinov, Snina, Stropkov and Svidník) belong to the category of "significantly rural (intermediate) region". Relative geographical position, official statistical data about the performance of the regional econo-

my (low GDP *per capita* and high rate of unemployment) and the subjective, not very positive, perception of business vitality of the Prešov region, from the perspective of potential investors, have contributed to its generally presented image as one of the most problematic (underdeveloped) territories in Slovakia.

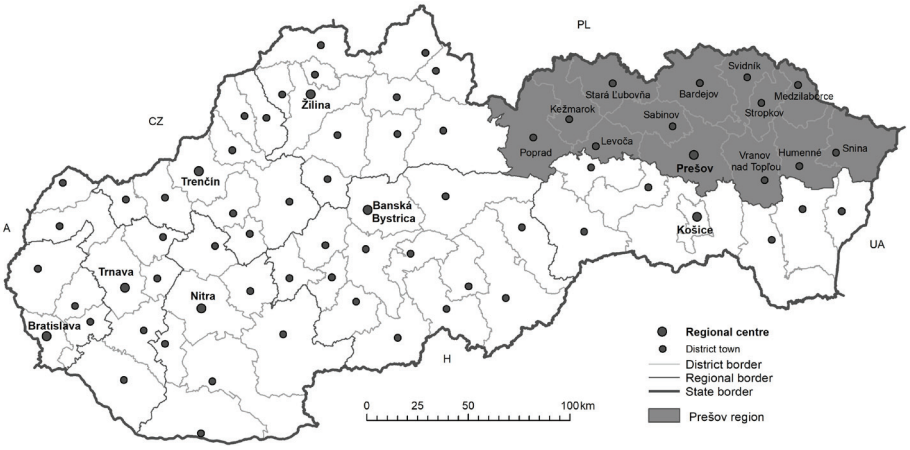

Figure 1. Geographical position of the studied Prešov region and its rural territories with district towns (centres of LAU1 territories) and spatial distribution of all district towns in Slovakia

Source: own elaboration.

Life in the region and beyond its borders is unimaginable without the movement of persons, for which reasons of travelling are very different (living, labour, school, shopping and leisure time activities) and they stem from unequal deployment of possibilities for the implementation of personal, highly differentiated requirements for individual quality of life. Some conditions must be created for moving the persons, which with the existence of transport infrastructure, includes either the ownership of personal transport means or the existence of public transport mutually connecting the places of particular activities of the people. Although the share of individual transport, which moves people permanently, grows, There still exist groups of inhabitants that prefer public transport due to various reasons. It is evident that owing to hierarchic structure of the settlement not all places in the rural regions can be mutually connected by direct public transport. Therefore, the centres of rural regions serve as departure places not only for transportation over longer distances.

The aim of the study is to identify and compare the existence and frequency of direct public transport connections, i.e. the assessment of transport accessibility of nodes in public transport networks in the rural Prešov region. Nodes are defined as settlements with the status of district centres (hereafter DCs), which represent the rural centres of LAU1 territories. Except for Poprad and Prešov, which have the status of regional centres, all rural centres are small towns

with a size from 6 thousand to 35 thousand inhabitants. Their demographic development from 2002 to 2016 was, in the majority of cases, stable and alternatively connected to a minor decrease in inhabitant numbers. The only exception is the DC Kežmarok which increased the number of its inhabitants by almost 30% (Table 1), this to a certain extent was also caused by a change in its administrative boundaries. It is certainly interesting that the rate of growth in the number of inhabitants of the rural districts was higher than of their rural centres (with the exception of Kežmark and Medzilaborce), which probably illustrates only the temporary decrease of interest in living in district towns with the accompanying growth of attractiveness of living in a rural environment (mainly in the surroundings of bigger towns like Prešov and Poprad).

Table 1. The status of the population permanently living in the districts and their centres at the end of the year

District (LAU1)	Number of inhabitants		Urban-rural category of district (LAU1)	Number of inhabitants in the district centre	
	2002	2016		2002	2016
Bardejov (BJ)	76,166	77,742	predominantly rural	33,415	32,699
Humenné (HN)	64,714	62,845	significantly rural	35,039	33,660
Kežmarok (KK)	64,007	73,756	significantly rural	12,903	16,562
Levoča (LE)	32,008	33,553	significantly rural	14,424	14,800
Medzilaborce (ML)	12,577	12,119	predominantly rural	6,717	6,654
Poprad (PP)	104,526	104,596	significantly rural	55,982	51,750
Pre□ov (PO)	162,658	173,457	significantly rural	92,486	89,618
Sabinov (SB)	54,676	59,694	significantly rural	12,341	12,709
Snina (SV)	39,470	36,945	significantly rural	21,401	20,031
Stará Ľubovňa (SL)	51,101	53,617	predominantly rural	16,351	16,333
Stropkov (SP)	20,943	20,644	significantly rural	10,836	10,669
Svidník (SK)	33,497	32,845	significantly rural	12,441	11,206
Vranov nad Topľou (VT)	76,839	80,497	predominantly rural	22,958	22,682

Data source: Štatistický úrad Slovenskej republiky (2017), http://statdat.statistics.sk/.

Vaishar, Šťastná and Stonawská (2015, p. 1396) considers small towns, which "in the central European conditions play a specific role in peripheral regions", as a part of rural areas providing the town proper equipment, however, not reaching the level of a regional centre, but mainly providing job offers and services. Of course, we are aware of that fact that the definition of a small town is, as a rule, very variable and this term belongs into the category of "fuzzy" terms. Knox and Mayer (2013) define small towns as up to 50 thousand inhabitants – in spite of this definition, more authors adopted the limits of their small town size pragmatically, respectively they do not dedicate themselves to their defining from the point of view of their size. For example, for Novotný et al. (2016) a small town from Eastern Slovakia is a municipality of

up to 5 thousand inhabitants which has acquired a town status; for Vaishar and Zapletalová (2009) small towns are municipalities with the town status, whose population is below 20 or 15 thousand inhabitants. Moreover, in the above-mentioned study of Vaishar et al. (2015) from the South-Moravian region, the upper limit of a small town is connected with 12 thousand inhabitants.

Despite the existing problems of the ambiguous perception of a small town from the point of view of its size, a relatively extensive attention in scientific literature is dedicated to the problematic nature of small towns, their relations with neighbouring rural areas (e.g. economic, social and cultural service centres for the inhabitants of surrounding rural areas) and the identification of their indisputable meaning for the social and economic development of rural regions (e.g. Satterthwaite and Tacoli, 2003; Courtney et al., 2007; Vaishar and Zapletalová, 2009; Vaishar et al., 2015; Czapiewski et al., 2016; Novotný et al., 2016; Steinführer et al., 2016).

Methodology

The idea of comparison of direct public transport connection (connections without transfers) of centres of rural districts in the Prešov region in the past and in the present has been evoked, not only by the above-mentioned decision on free travelling of selected groups of the passengers on trains, but also by other changes in the transport sector, such as development of individual automobile transport, development of transport infrastructure and liberalisation of transport market in passenger rail and bus transport. The studies on the existence and intensity of direct train and bus connections of district towns in Slovakia and the Prešov region which had come from the data of 2003 (Székely, 2006, 2008), enabled us, above all, to conduct a comparative analysis of registered changes for almost 14 years' period. It was necessary to create a new database registering the contemporary state of transport connectivity and accessibility of 13 centres of rural districts of the Prešov region for the identification of changes that had taken place on the territory of Prešov region and concern the quality of life of its inhabitants. The requirement for the correct comparison of their status in the transport network of Slovakia required application of an identical methodological procedure with the creation of a database of data about the mutual connections of settlements of equal hierarchic level by public transport.

Bruinsma and Rietveld (1998) offer, in their work, a relatively extensive overview of definitions and measures of transport accessibility of nodes in transport networks. The accessibility defined as a total quantity of direct connections of a specific node with the remaining nodes, which we apply in this study, represents one of alternative definitions and measures of accessibility. At the same time, we work with a further alternative definition that speaks to the node accessibility in the network as about a spatial interaction (about a frequency of connections) between the node and all the remaining nodes. The

rate of accessibility is relative – the used index expresses a ratio between the maximum value of interactions (and then also the maximally accessible node in a delimited transport network) that is expressed by a frequency of direct transport connections (the relative value of 100 is assigned to the node with the maximum value of interactions) and a value of interactions of individual compared nodes.

To identify the real existence and frequency of direct train and bus connections of 13 centres of rural areas of the Prešov region mutually among themselves and also with other (58) DCs of Slovakia, we used on-line databases of train and bus timetables: www.vlak-bus.cz (for 2003) and www.cp.atlas.sk (for 2017). The choice of a specific day and time intervals (a representative time point), during which the mutual connections were counted, was the base for the counting of mutual connections of nodes in a transport network and of their intensity expressed by the frequency of train and bus connections. To exclude the influence of the different organisation of weekend transport (it also concerns Fridays), the equal working days in the middle of the week: Wednesday 10/9/2003 and Wednesday 28/06/2017 were selected for days of deduction of connections. All train and bus transport connections were taken into consideration that had come out from each centre of rural district of the Prešov region (13 centres) into all DCs in Slovakia in the time from 0:01 am to 12:00 pm, over the course of 24 hours. The time of departure of a train or bus from the departure centre was decisive; the time of arrival of an already registered connection into the target station was irrelevant for us from the point of view of the study aim. We approached two simplifications with the identification of connections: 1) the trains and buses were not more closely specified, i.e. passenger trains, express trains and domestic and international connections are equivalents; 2) because the transport capacity of identified connections was not the subject of analysis, a train with several passenger cars was equivalent to a bus.

Because the electronic databases offered in some cases at some connections their multiple representations, a check was necessary for the correctness of the counting of their real numbers, after which a necessary reduction of searched connections by computer followed. At both selected time points (2003 and 2017), it was necessary to search the transport connections for 910 possible connections of two DCs: on the one hand, there were 13 district towns – rural centres in Prešov region, on the other, there were 70 district towns – centres of rural regions and also two urban regions (Bratislava and Košice) in Slovakia (in the context of the OECD urban-rural typology). The transport connections were counted for both directions, and a connection only in one direction (from point A to point B or from point B to point A) was sufficient for the registration of the existence of mutual connection of the two DCs. Hypothetically we assumed that all connections of the two DCs would not show an existence of direct transport connection. The acquired values on the existence and frequency of direct train and bus connections were written into matrixes that became basic databases for comparative statistical and cartographic analyses.

Results

A. Direct public transport connections of the DCs of the Prešov region – the existence of connections

The *conditio sine qua non* for direct transport connection of any two localities is their formal status as nodes in transport network. Nodes in transport network are settlements which are characterised by the existence of selected elements of transport infrastructure – railway tracks and railway station in which the trains of passenger transport stop, and roads with stops for public bus transport. The railway network in Slovakia has existed for 160 years, and the route of lines has been greatly influenced by the natural conditions of the country, and, of course, by the spatial distribution of population. The more dynamic road network is nowadays under the permanent building with the aim to reach the higher quality of personal and material movement.

The changes in transport infrastructure may, but they do not have to, initiate changes in the transport connections of two points. But then, the change in transport connections should reflect a change in meaning, through which the individual nodes of transport network passed (e.g. a growth or decrease in the number of inhabitants and / or in job opportunities), respectively a change that results from a declared effort for an improving the qualitative level of public transport.

A1. Direct train connections – existence of connections

Only 66 connections were identified from 910 maximally possible direct train connections of rural district centres (LAU1) of the Prešov region (mutually among themselves and with other DCs of Slovakia). It had represented only 7.3% share of the potential maximum (Székely, 2006) in 2003 and it did not reach even a half from the 16.1% Slovak average in that year (Székely, 2008). Up to 2017, the railway connections of 13 DCs of Prešov region were slightly improved: for 2017 we identified 74 connections and an increase to 8.1% from the potential maximum. Owing to a reduction in the railway connections of DCs from other regions of Slovakia, the studied DCs of the Prešov region exceed the half-value of the average for Slovakia which was reduced to 14.1%. The largest town and the administrative centre of the region, Prešov, has a decisive influence on the improved status of the centres of its rural districts – in comparison with 2003 it connected in the middle of the working week by trains up to 15 new DCs (Table 2, Fig. 2). At the same time, not even one of the direct railway connections has ceased to exist. From the point of view of the regional differentiation of Slovakia, in which a spatial dichotomy between the economically developed western part of the state and economically underdeveloped East, it is symptomatic that all newly connected centres are situated to the west of Prešov. The existing transport connections enable the job applicants from rural areas forming the surrounding of administrative centre of the region to react more flexibly to the potential job offers from other parts of Slovakia and the Czech Republic.

Table 2. Existence of public transport connections between the DCs of the Prešov region and other centres in the Prešov region and Slovakia, 2003 and 2017

District towns of the Prešov region	Number of rural centres (district towns) with direct connections											
	by train to district towns in				by bus to district towns in				by train and/or bus to district towns in			
	Slovakia		Prešov region		Slovakia		Prešov region		Slovakia		Prešov region	
	2003	2017	2003	2017	2003	2017	2003	2017	2003	2017	2003	2017
Bardejov	1	1	1	1	44	24	9	9	44	24	9	9
Humenné	20	21	5	5	23	30	12	9	33	38	12	9
Kežmarok	2	2	2	2	39	25	10	6	39	25	10	6
Levoča	0	0	0	0	41	33	9	8	41	33	8	8
Medzilaborce	10	1	2	1	3	5	3	4	12	5	3	4
Poprad	21	22	4	4	53	39	9	11	54	46	10	11
Prešov	5	20	4	5	49	40	12	11	49	44	12	11
Sabinov	2	2	1	1	13	9	6	5	13	9	6	5
Snina	1	1	1	1	7	24	5	8	7	24	5	8
Stará Ľubovňa	2	2	2	2	38	19	9	5	38	19	9	5
Stropkov	0	0	0	0	27	21	11	9	27	21	11	9
Svidník	0	0	0	0	26	21	10	9	26	21	10	9
Vranov nad Topľou	2	2	2	2	31	27	11	8	31	27	11	8

Source: own database based on data from www.vlak-bus.cz (2003) and www.cp.atlas.sk (2017).

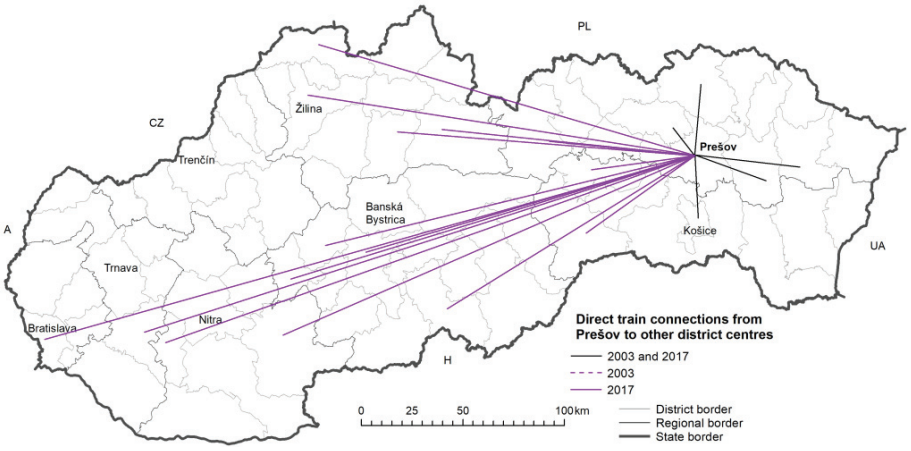

Figure 2. Direct train connections between Prešov and other DCs in Slovakia

Source: own elaboration based on data from www.vlak-bus.cz (2003) and www.cp.atlas.sk (2017).

If we concentrate our attention only on the territory of the Prešov region itself (where the individual rural LAU1 territories are neighbours and the distances among their 13 centres are not extremely large), we find out that the 24 identified direct train connections at both the examined years of 2003 and 2017, represent only 15.4% share of the potential maximum (Fig. 3). Only two changes were recorded: Medzilaborce lost the direct train connection with Poprad, and Prešov acquired a direct train connection with Poprad. In the context of identified low numbers of direct train connections of DCs, it is necessary to become aware of the peripheral position of the majority of them that lie in the proximity to the state border with Poland or Ukraine. The peripherality of the majority of the territory of the Prešov region also results in an inferior level of territorial amenities of railway infrastructure (Michniak, 2006). Three DCs in the Prešov region did not have in both, 2003 and 2007 research years a direct train connection with the remaining centres of Slovakia. Stropkov and Svidník were without a built-up railway infrastructure (railway track and railway station) and have not been incorporated into the railway network of Slovakia up to now, and Levoča, which was one of the nodes of the railway network in the past, had to solve the problems with the declared economic unprofitability of passenger transport on the Levoča – Spišská Nová Ves line (beyond the boundary of the Prešov region) which had led to the suspension of its operation and "erasing" Levoča from regular railway passenger transport routes.

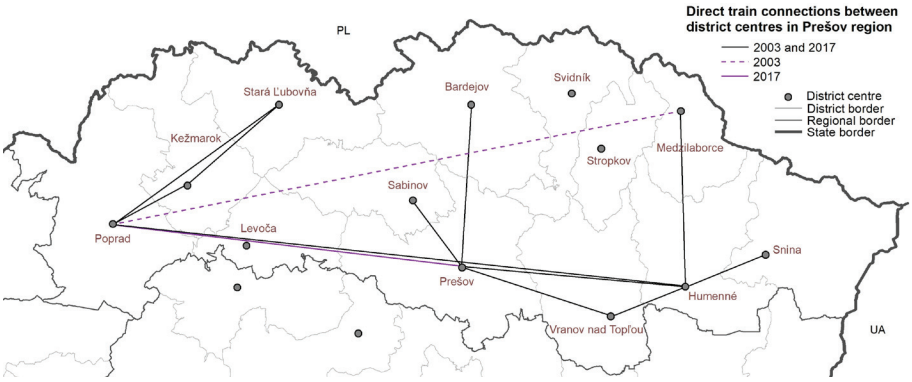

Figure 3. Changes of the direct train connection between the DCs in the Prešov region

Source: own elaboration based on data from www.vlak-bus.cz (2003) and www.cp.atlas.sk (2017).

At present, the ranking of the best connected DCs from the Prešov region by direct train is as follows: Poprad, Humenné and Prešov. However, the absolute numbers of the connected centres in Slovakia are not very high (22, 21, 20) and they do not reach even one third of the potential maximum. Poprad and Humenné benefit from their position in the railway network of Slovakia. They

are lying on the tracks, which connect the west and the east parts of Slovakia by the so-called North Slovakian transport corridor to the numerous DCs lying on the railway tracks between Bratislava and Humenné. The importance of Prešov in 2003, in the context of its position in the regional structure of Slovakia, had been distinctively undervalued. Therefore, the identified changes that happened to its direct train connections could help to improve the image of this regional administrative centre as a place satisfying the needs of the inhabitants of its broader rural surrounding.

In contrast, in 2003 Medzilaborce distinctively lost. Before that time directly it was possible to travel from Medzilaborce (with the unique Andy Warhol museum) to Prague, passing through the whole of Slovakia with stops in the DCs mutually networked by an existing railway track. Nowadays, the direct train connection between Prague and Medzilaborce does not exist.

A2. Direct bus connections – existence of connections

In 2003, the insufficient number of train connections has been substituted, above all, by a relatively extensive bus network. All in all, 394 connections have been identified from 910 maximally possible direct bus connections of 13 DCs of the Prešov region between each other and with other centres of LAU1 territories of Slovakia. In 2003, that represented 43.3% share from the potential maximum (Székely, 2006) and it was closely under 45.5% of the Slovak average (Székely, 2008).

Changes in the transport system resulted in changes of the networking of the examined DCs of the Prešov region by public bus transport. In 2017, we registered already only 317 connections that represented 34.8% share from the potential maximum. The bus carriers were under great pressure from the railway competition and the numbers of direct bus connections of all the DCs in Slovakia decreased from 2,262 to 1,448, i.e. up to 36%. A distinctive decrease in connections was reflected in the Slovak share from the potential maximum that decreased to 29.1%. It means that in 2017, the DCs from the Prešov region were better connected by bus transport between each other and with other centres of Slovakia and the decrease in connections was not as dramatic as in other regions of the state. To the large extent, the connection of peripheral Snina contributed to this because Snina obtained up to 17 new direct bus connections (Table 3), which connected this centre and its rural areas to other parts of Slovakia and so they enabled their inhabitants' integration into the economic life of the state (Fig. 4).

We have identified the growth of a number of direct bus connections alongside Snina only at Humenné and Medzilaborce (Table 3), and the improvement of the situation was not a distinctively dramatic one. The decrease in the number of direct bus connections up to 10 DCs is a more substantial change. The most dramatic changes concern DCs attractive for tourism:

Bardejov (-20) and Stará Ľubovňa (-18), where the inhabitants and potential visitors lost at least half of the direct bus connections that existed in 2003. At present, the largest DCs Prešov and Poprad are the best connected ones by direct bus lines within Slovakia and they exceed the absolute number of connected centres (40, respectively 49) with half from a potential maximum (57% and 56%). The changes that took place in the organisation of bus transport emphasize, at the present, their level of functionality and their exceptional status in spatial structure of Slovakia and the Prešov region – the differences in the number of direct bus connections among them and the remaining DCs of the Prešov region (bus connectivity and bus accessibility) were distinctively deepened.

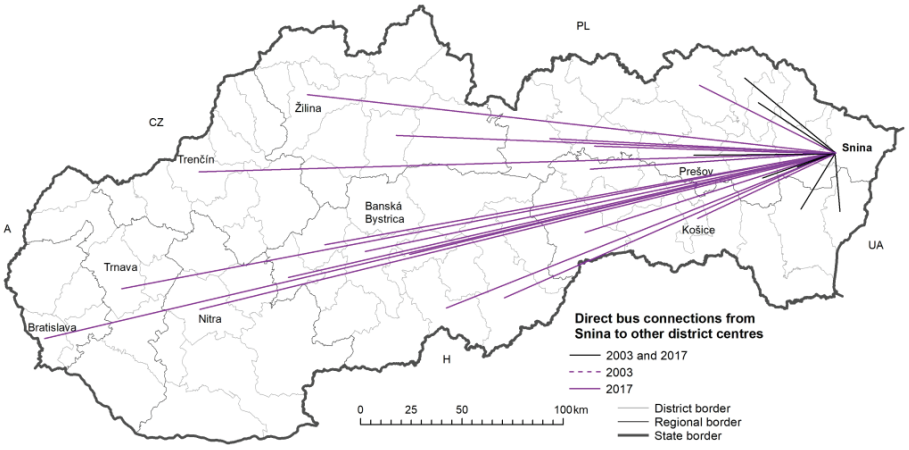

Figure 4. Direct bus connections between Snina and other DCs in Slovakia

Source: own elaboration based on data from www.vlak-bus.cz (2003) and www.cp.atlas.sk (2017).

Intraregional direct bus connections that lie within the regional self-government's authority (Buček, 2011) were also in 2003 more intensive than in 2017. While in 2003, 116 connections have been identified (74.4% share from the potential maximum), in 2017 only 102 connections have been identified (65.4% share from the potential maximum). Kežmarok and Stará Ľubovňa lost the most from the particular DCs (direct bus connection with four centres), Snina obtained the most with three new bus connections (Fig. 5).

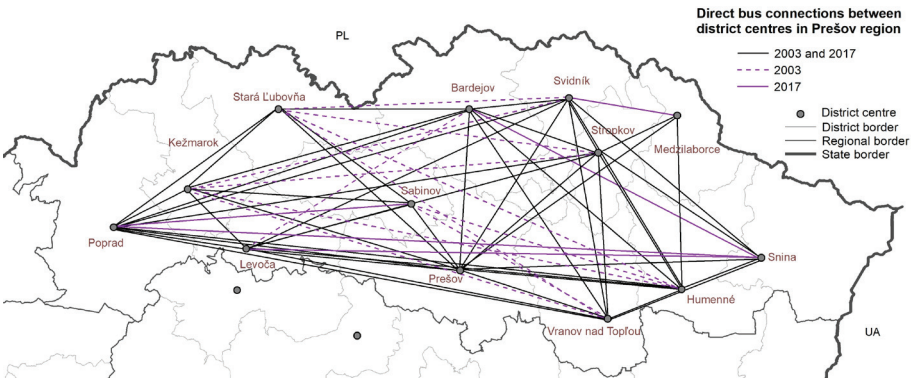

Figure 5. Changes of the direct bus connections between the DCs in the Prešov region

Source: Own elaboration based on data from www.vlak-bus.cz (2003) and www.cp.atlas.sk (2017).

B. Direct public transport connections of DCs of the Prešov region – frequency of connections

The identified existence of direct transport connections between 13 centres of rural LAU1 territories of the Prešov region, mutually and other between centres in Slovakia, which expresses a differentiated level of their transport connectivity, is *conditio sine qua non* for the subsequent analysis of intensity or frequency of connections (interactions) among mutually connected centres. The methodical procedure of obtaining of numeric data of transport accessibility was described above. We assumed that the identification of a number of direct train and bus connections of individual centres will provide us with (very specific) information about the mutual saturation of transportation needs among the inhabitants of interconnected centres and their rural surroundings using mass public transport.

B1. Direct train connections – frequency of connections

Table 3 presents summary results from the monitoring of the intensity of direct train (bus, train and bus) connections of the studied DCs, mutually and with other centres of LAU1 territories of Slovakia. Numeric values provide several interesting findings. Also in spite of the fact that after almost 14 years the majority of the existing nodes in the railway network of the Prešov region have been more fully loaded by incoming and outgoing trains of the public passenger transport, their status has not been more distinctively improved. For example Bardejov, Snina and Vranov nad Topľou remain constantly connected only with DCs from the Prešov region. Stará Ľubovňa is similar, however, the difference is that the number of its direct connections decreased by one fifth, or Kežmarok where the decrease is minimal. When we add to this the fact that three DCs from Prešov region are without a railway connection, it appears to us

that the more relevant changes concern only several centres. In the largest railway centre of the region (Poprad) it comes to an increase of almost one quarter of trains. Because the frequency of intraregional connections is stabilised, the registered increase in the number of direct trains among all DCs has enlarged exclusively the possibilities of interregional movements of inhabitants from and to Poprad. The geographic position of Poprad (close to the centre of Slovakia) contributes to the exceptional status of Poprad from which results its openness to the remaining territory of Slovakia, together with its position on the main railway line of Slovakia connecting numerous DCs (Fig. 1).

Table 3. Number of intraregional and total public transport connections between the DCs of the Prešov region and other DCs in Slovakia, 2003 and 2017

District towns of the Prešov region and Bratislava	Absolute number of the direct connections											
	by train to district towns in				by bus to district towns in				by train and/or bus to district towns in			
	Slovakia		Prešov region		Slovakia		Prešov region		Slovakia		Prešov region	
	2003	2017	2003	2017	2003	2017	2003	2017	2003	2017	2003	2017
Bratislava	801	1004			2096	1369			2897	2373		
Bardejov	15	17	15	17	491	211	236	137	506	228	251	154
Humenné	193	198	81	94	239	316	149	193	432	514	230	287
Kežmarok	46	44	46	44	498	293	299	223	544	337	345	267
Levoča	0	0	0	0	630	309	203	106	630	309	203	106
Medzilaborce	35	22	21	22	18	35	18	34	53	57	39	56
Poprad	415	512	54	53	1073	491	443	290	1488	1012	497	343
Prešov	109	168	72	93	968	766	452	400	1077	934	524	493
Sabinov	36	58	22	30	186	162	147	133	222	220	169	163
Snina	23	29	23	29	65	156	60	107	88	185	83	136
Stará Ľubovňa	45	36	45	36	415	192	221	132	460	228	266	168
Stropkov	0	0	0	0	190	180	152	152	190	180	152	152
Svidník	0	0	0	0	212	178	168	148	212	178	168	148
Vranov nad Topľou	35	42	35	42	430	398	186	187	465	440	221	229

Source: own database based on data from www.vlak-bus.cz (2003) and www.cp.atlas.sk (2017).

Prešov as the administrative centre of the region, which has also improved its position in transport accessibility above all in consequence of an increase in direct train connections with other DCs, falls behind Poprad considerably. However, thanks to its geographical position in the centre of the region and to its administrative function, its position in the intraregional railway transport is substantially better (it is almost identical to the best intraregionally connected Humenné). The results of the frequency of direct connections unambiguously document the meaning of the relative geographical position of the analysed DCs from which also their positions in the railway network of Slovakia are derived.

Two measures of transport accessibility were used to quantify the status of examined district towns as the centres of LAU1 territories and changes in their accessibility. The first one comes from the normative value of the administrative centre of the Prešov region, the second one, the centre with the highest frequency of direct train (bus, train and/or bus) connections – Bratislava – has been selected for a normative value. The calculated values are presented in Table 4.

Table 4. Indices of accessibility for DCs of the Prešov region, 2003 and 2017

District towns of the Prešov region and Bratislava	Index of accessibility = % share from direct connections of regional centre (Prešov=100) by						Index of accessibility = % share from maximum direct connections (Bratislava=100) by					
	train		bus		train and/or bus		train		bus		train and/or bus	
	2003	2017	2003	2017	2003	2017	2003	2017	2003	2017	2003	2017
Bratislava	734.9	597.6	216.5	178.7	269.0	254.1	100.0	100.0	100.0	100.0	100.0	100.0
Bardejov	13.8	10.1	50.7	27.5	47.0	24.4	1.9	1.7	23.4	15.4	17.5	9.6
Humenné	177.1	117.9	24.7	41.3	40.1	55.0	24.1	19.7	11.4	23.1	14.9	21.7
Kežmarok	42.2	26.2	51.4	38.3	50.5	36.1	5.7	4.4	23.8	21.4	18.8	14.2
Levoča	0.0	0.0	65.1	40.3	58.5	33.1	0.0	0.0	30.1	22.6	21.7	13.0
Medzilaborce	32.1	13.1	1.9	4.6	4.9	6.1	4.4	2.2	0.9	2.6	1.8	2.4
Poprad	380.7	304.8	110.8	64.1	138.2	108.4	51.8	51.0	51.2	35.9	51.4	42.6
Prešov	100.0	100.0	100.0	100.0	100.0	100.0	13.6	16.7	46.2	56.0	37.2	39.4
Sabinov	33.0	34.5	19.2	21.1	20.6	23.6	4.5	5.8	8.9	11.8	7.7	9.3
Snina	21.1	17.3	6.7	20.4	8.2	19.8	2.9	2.9	3.1	11.4	3.0	7.8
Stará Ľubovňa	41.3	21.4	42.9	25.1	42.7	24.4	5.6	3.6	19.8	14.0	15.9	9.6
Stropkov	0.0	0.0	19.6	23.5	17.6	19.3	0.0	0.0	9.1	13.1	6.6	7.6
Svidník	0.0	0.0	21.9	23.2	19.7	19.1	0.0	0.0	10.1	13.0	7.3	7.5
Vranov nad Topľou	32.1	25.0	44.4	52.0	43.2	47.1	4.4	4.2	20.5	29.1	16.1	18.5

Source: own database based on data from www.vlak-bus.cz (2003) and www.cp.atlas.sk (2017).

At the intraregional level, positive change in the frequency of direct train transport connections was identified only in the case of Sabinov. Strengthening the position of Prešov, reduced extreme disparities (Humenné and Poprad) among the DCs. But some centres, which in 2003-2017 lost direct train connections, contributed to the deepening of disparities in the rate of intraregional accessibility (especially Stará Ľubovňa, Medzilaborce, Kežmarok).

At the all-Slovak level the extraordinarily low values of transport accessibility of the DCs from the Prešov region attract attention in comparison with the normative value of Bratislava. It is caused by the non-central (peripheral) positions of Bratislava and the Prešov region with its centres of rural LAU1 territories.

In a similar way as with the evaluation of the frequency of direct train connections of the analysed rural centres of the Prešov region, we also proceed with the description of direct bus connections. Above all, we are interested in whether the bus transport acts in a competitive way or complementarily. This can be seen in Tables 3 and 4.

The extreme slump of direct bus connections with the exception of 3 centres (Snina, Humenné, Medzilaborce) can reflect the reaction of the transport contractors to the altered conditions on the market with public transport of persons. The transfer of people from buses into the trains and the application of economic profitability of transport activity, significantly reduced the interest of operators of bus transport in providing services over greater distances. The inhabitants of Bardejov, Levoča, Popradu, Stará Ľubovňa, respectively, persons interested in visiting the regions (where there is a slump in the possibility of directly reaching the DCs in Slovakia by above one half) are influenced by extensive restriction in providing services. We can register a worsening of the situation also by consideration of the rate of transport accessibility owing to Bratislava (Table 4). The discussion about the application of complementary access is relevant especially in the case of Poprad.

However, Snina, Humenné and Medzilaborce, as the centres of rural areas, in which the labour demand, on a long-term basis, exceeds the existing offer, still gain. Thus, the strengthening of bus transport is an economically rational reaction to the newly-emerged gap in providing services of public transport. And in comparison with the trend of the reduction of public bus transport in Slovakia also the remaining centres of rural areas in the Prešov region (Vranov nad Topľou, Stropkov, Svidník and others) gain. However, for inhabitants of the Prešov region probably the relative improvement of transport accessibility of their regional centre is the greatest benefit.

We find by a transition on the level of the Prešov region that the intraregional changes concerning the frequency of direct mutual bus connections of 13 DCs in considerable measure and with minimal modifications copy their image and status which we obtained a view of their all-Slovak connections: “the same winners, the same losers”.

It is obvious that the examination of the impact of identified changes on the perception of satisfaction of real and potential clients about functioning of public transport (with proposals of improvement), in direct confrontation with opinions and attitudes of relevant economic subjects, could provide a precious source of knowledge for quality improvement of public transport and quality enhancement of the lives of inhabitants of concerned spatial units.

Discussion

The identified differences in how the direct public transport connection of DCs in the Prešov region, which represents centres of rural LAU1 territories and which have been induced by the whole set of altered conditions, can be viewed from more perspectives representing either the attitude of providers of services or of real and/or potential clients. The agreement of the opinions of the two more or less antagonistic groups with differentiated interests on the suitability and utility of implemented changes always used to be highly appreciated.

Passenger transport in every state has its specifics, which are a product of not only the changes of the ratio of individual and public transport, but also the uniqueness and competiveness of the organisation of public transport on its territory bearing the signs and rules of the historically conditioned spatial organisation of society (Morrill, 1974; Klapka et al., 2010). Alongside the indisputable growth of individual transport from the end of 20th century (Horňák, 2004), which immensely increased the mobility of the majority of the inhabitants of Slovakia, increased attention is dedicated to the minimal verbal promotion of the concept of sustainable development, running demographic changes (ageing of population), and the accessibility and quality of public transport (e.g. Delbosc and Currie, 2011; Shrestha et al., 2017).

The individual points (places of concentration of inhabitants) in the transport network may but do not have to be interconnected to direct train or bus lines. According to Horňák et al. (2013, p. 68) "only the direct links can be competitive to individual transport in interregional communication". While movement from origin to destination, it is necessary in many cases to utilise more transport means at a higher or loer risk of changing. The above-mentioned citation from the study of Horňák et al. (2013, p. 68) goes: "as one or more changes during a single trip from one region to another may act as a time barrier and bring discomfort for passengers". In consequence of perception of hazardousness of transfers when arriving at the target point, travel with transfers is perceived by the public as less advantageous.

Let us mention only some of the interconnected problems which linked to the movement from point A to point B without the existence of direct public transport connections, and cause difficulties, above all, to the selected, mostly threatened and vulnerable groups of inhabitants: persons with lower income (e.g. Glaeser et al., 2008), people with small children (e.g. Fritze, 2007), disabled persons (e.g. Park et al., 1998; Taylor and Józefowicz, 2012; Zajadacz, 2015), and the elderly people with reduced adaptability to an unexpectedly altered situation (e.g. Banister and Bowling, 2004; Musselwhite and Haddad, 2010; Hounsell et al., 2016; Mifsud et al., 2017; Shrestha et al., 2017):

1. The change of a transport mean (from bus to train and vice versa) increases travel expenses as a rule;
2. The impossibility of purchase of a bus ticket with changes (while travelling by train it is possible in the case of the same carrier);

3. Enhanced individual effort and effort with luggage while getting-on and getting-off the means of transport;
4. Potential delay of connections induces the interruption of transport continuity, from which result not only time losses but also a whole series of direct or indirect negative consequences (e.g. a delayed participation in personal meetings, sport or cultural events which is connected, as a rule, with bad mood; increased cost (e.g. taxi costs, accommodation costs), induced by the need to solve an unexpected situation; fear and uncertainty together with an enforced change of the time schedule of a programme).

Not only the above mentioned most threatened groups of inhabitants but all moving people must get to the target place "safely, reliably, cheaply and comfortably" (Musselwhite and Haddad, 2010). However, it shows that the necessity of a change of transport means brings a question of an entire complex of risks that are the opposite to the primary mobility needs. Therefore, the analysis of the existence of direct transport connections of localities and regions by public transport, which is considered one of basic indicators of their transport accessibility (e.g. Bruinsma and Rietveld, 1998), is a natural subject of scientific interest in Slovakia (e.g. Székely, 2008; Michniak, 2008; Horňák et al., 2013; Horňák et al., 2013).

The justifiability of studying direct transport connections of localities and regions specially will be excellent in the context of demographic changes. The population of Slovakia as well as the one of the examined Prešov region is ageing (Table 5). Šprocha (2015) found that the number of persons at the age of 65 and more are growing in Slovakia more or less continuously from the beginning of the 1950s. While in 1950s in Slovakia only 233 thousand inhabitants of this age category lived, so up to 2014 this number increased to almost 757 thousand persons and from the original share of 7% in population of Slovakia it climbed up to a value of approximately14%.

Table 5. Comparison of dynamics of changes of some characteristics of age structure of inhabitants of Slovakia and the Prešov region, 1991-2011

	Prešov region			Slovakia		
	1991	2001	2011	1991	2001	2011
Number of inhabitants aged 65+	66,725	79,953	89,306	543,123	610,923	682,873
Share of inhabitants aged 65+	9.0	10.2	11.0	10.3	11.5	12.7
Index of ageing (in %)	32	44	60	41	60	83
Average age	31.1	33.2	36.1	33,1	35.6	38.4
Median age	28.6	30.9	34.6	31.5	34.3	37.5

Source: Šprocha (2015).

In comparison with the whole Slovakia, the age situation in the Prešov region is more favourable in terms of the higher representation of the Roma population with a progressive age structure (Šprocha, 2014) But also here the absolute

number of the older population for 1991-2011 is continuously growing, as its share in the total number of inhabitants, index of ageing, average age and age median. The demographic forecasts clearly indicate that the population ageing trend, which influences the functioning of the society and brings with itself a need for solving numerous practical consequences, will continue furthermore in Slovakia (Šprocha, 2015). Thus, the governmental decision concerning the free railway transport will probably influence the mobility behaviour of a constantly greater number of persons (according to the ZSSK (2018) the number of railway passengers in Slovakia increased from 42 million in 2014 to 72 million in 2017, when the share of zero-fare passengers reached 37%) and the growth in the case of the radical regrouping of political forces that may ask with a high probability the question about its sustainability. Therefore, the analysis of implemented, relatively major changes in the interconnection of nodes of transport network gives us the reason to assume that in altered starting conditions, also in the future, we can await (enforced) reactions (feedback) in the organisation of public transport in Slovakia, not only from the side of public transport providers, but also from those for whom the indicated services, as ones from the group of "services of general interest", are being created. However, the question always remains whether (enforced) changes in existence and the frequency of direct train and bus connections will lead to the general aim, i.e. whether they will increase the rate of consensus and subsequent satisfaction of all the interested and (economically) rationally reacting actors of public transport.

Conclusions

It is difficult to assess the direct influence of individual changes in transport system on changes of the system of public transport connections. Each of the most important changes has played a specific role. Increasing level of motorisation has led to the decrease of the public transport performance and smaller number of inhabitants was dependent on public transport. Decrease in connectivity of bus transport is a potential problem for those inhabitants who do not have a car (children, disabled persons and elderly).

Deregulation and liberalisation of railway transport has increased competitiveness between railway carriers and improvement of railway services on some tracks. Town of Prešov, as a regional centre, is an example of a town that has obtained new direct connections because of other organisation of trains by the private carrier Leo Express in comparison to the state carrier the ZSSK.

Introduction of the zero-fare railway transport can be regarded as a political decision on the state level, because the organisation of railway transport is in the hands of the Ministry of Transport of the SR. It can be positive for those inhabitants who live near railway stations. But not all regions can use railway transport. Increasing of the number of passengers on railways since 2014 can be regarded as a positive trend because railway is regarded as environmentally friendly and sustainable transport mode in comparison to the road transport. However, organisation of public bus transport lies within the authority of regional self-government, whose role is to ensure

transport services in the region. Regions finance losses incurred from transport operations on regional buses on the basis of contracts concerning services of general interest with selected bus companies. Long distance and international bus lines are provided on a commercial basis.

Railway and bus public transport in Slovakia are competing with each other. However, railway and bus transport should not compete; they should cooperate and create conditions for attracting new passengers. The operators of each type of transport should harmonise the arrival and departure of the connections and reduce concurrent connections with the aim of integration of regional transport as it functions in the South-Moravian region (see Šťastná et al., 2015). One of the solutions of this problem could be the transfer of selected competencies in the regional railway transport from the state to the regional level, what requires defining of the border between long-distance and regional railway passenger transport.

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An innovative method for the evaluation of LAGs and rural development: "A mirror for LAGs"

Abstract: *The Leader initiative delivers a variety of innovative activities. It is a tool for rural development that is used to bring people, communities, and regions together. Experience in the European countries, including the Czech Republic, has shown that the Leader initiative has delivered visible enhancements to rural areas. This paper is based on an internal project of the Institute of Agricultural Economics and Information (IAEI) elaborated in the period from 2014 to 2016. The internal project dealt with the creation of a methodology with a special focus on the self-evaluation of the Local Action Groups (LAG), titled "A Mirror for LAGs". The aim was to develop and validate a self-evaluation tool for LAGs. Cooperation with fourteen LAGs was used as the methodology of creation. The proposed procedure was tested on two LAGs. The method has two parts; an evaluation of the LAG's strategy is undertaken as Part A, and an evaluation of the Leader principles as Part B. The evaluation of strategy (Part A) is based on the analysis of LAG activities concerning strategy. In Part A, the following elements are analysed: the basic characteristics of the LAG, the financial budget, and the way the strategy's objectives were met. Part A is mostly based on a quantitative approach. The evaluation of the principles (Part B) is mainly based on a qualitative analysis. Part B assesses the most individual way that evaluators (LAG) conduct their work and requires a significant amount of subjective assessment. For example, very often questionnaire surveys, interviews and focus groups are needed to generate data. The evaluation of the Leader principles depends on the evaluator's skills too.*

Keywords: *Local Action Group (LAG) evaluation, strategies, Leader principles*

Introduction

The LEADER initiative stimulates a number of interesting and innovative projects in regions that are then further reflected in rural regions. The Local Action Groups (LAGs) that are the main drivers of these projects are largely a grouping of various types of people, different hierarchies, and approaches to development in the region. This fact, on the one hand, allows LAGs to be created exactly according to the local possibilities and needs. On the other hand, this diversity makes it difficult to set uniform guidelines to evaluate and develop LAGs. The methodology described in this article proposes an option for evaluation that takes into account the diversity of LAGs.

The presented methodology is designed so that the assessment can be performed by the LAGs' representatives themselves, or they may choose an external evaluator. The results of the evaluation are meant to serve the needs of the LAGs, in particular and to help with their further development.

The methodology consists of two parts:

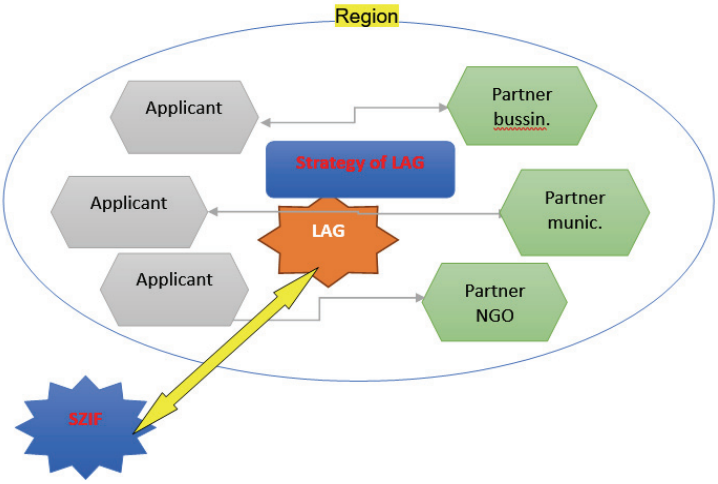
1) Strategy evaluation – Part A,
2) Principles evaluation – Part B.

The strategy evaluation (Part A) is based on the main facts of how the LAGs have managed, especially due to the implemented projects and their own activities, to meet the objectives set out in the plan set for the monitored period. This part is mainly quantitative and includes countable values, sometimes referred to as "hard data". The source of information for the quantitative component may be, for example, a database on the number of projects and allocated and realised funds in a tabular form that can be filled in by the LAGs each year. The evaluation (Part A) consists of the basic characteristics of LAGs, the fulfilment of the Leader Strategic Plan (hereinafter referred to as the "strategy" or "LSP") and monitoring indicators.

The evaluation of principles (Part B) is not easy and cannot be done in a uniform way or through instructions. In particular, the way the work of a particular rated LAG and its bodies is evaluated, requires a significant share of subjective evaluation. When surveying data, evaluator often has to rely on questionnaire surveys. It requires high-quality question processing and the knowledge of the principles of qualitative research in rural sociology[1]. When assessing Part B, we also see that some prerequisites for the proper practice of the Leader method are already conditioned in the programme (implementing) document (e.g. a sector's representation). Therefore, it is difficult to evaluate whether some data was the result of LAG's success or its simply fulfilling a mandatory condition of the programme.

1 For example – Sociologie venkova a zemědělství by Majerová (2000).

A graphic depiction of the strategy evaluation (Part A) is shown in Figure 1. The picture illustrates the entire LAG region and evaluation processes taking place on the basis of this approach. The figure shows the flow of money from the payment agency (SZIF) that is then re-distributed to a LAG's beneficiaries through a project competition.



SZIF is Payment agency. Used abbreviations: SZIF – The State Agricultural Intervention Fund, LAG – Local Action Group, Partner bussin. – a partner from the business sphere, Partner munic. – a representative of the municipality, Partner NGO – a representative of a non-governmental organisation.

Figure 1. The LAG environment and linkages evaluated within Part A

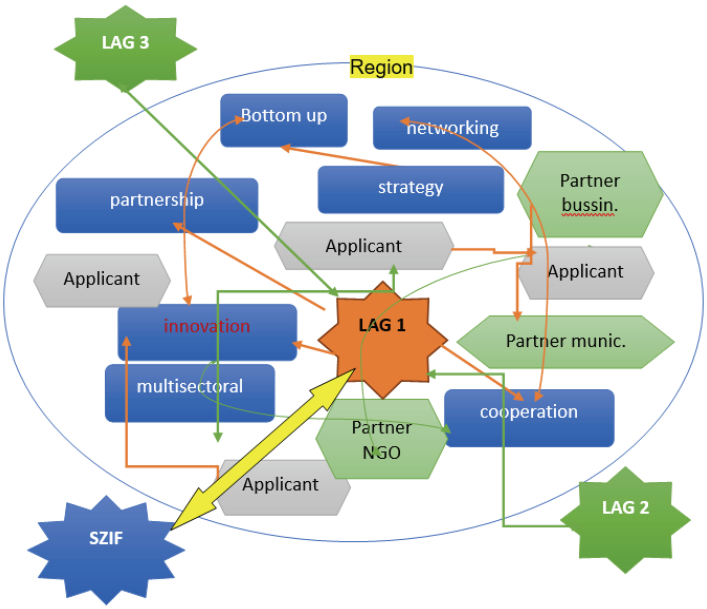
Source: own elaboration.

The objective of Part A is to evaluate the measures and to emphasise the results and impacts of these measures on the development of the area. This evaluation does not include the broader impacts of interventions elaborated in more detail in the second part (Part B).

A graphically depicted evaluation of the LAG environment for the analysis of the Leader principles (Part B) is illustrated in Figure 2. The scheme of this part is based on a broader need to evaluate the effects of the Leader principles that are more difficult to quantify, both for the operation of the LAGs and the development of the territory. The evaluation of the Leader principles is scarcely used, because the methods are painstaking, the skills of a LAG's leadership and members are various, and the principles in operation very often have synergic effects. This synergism could be present in the following cases:

1) Long-term (i.e. the occurrence after a long time after the intervention),
2) Linked (i.e. a particular intervention cannot be accurately determined),
3) Hardly quantifiable (i.e. a number of activities in the field of creating networks, co-operation, and partnership are hardly quantifiable by standard evaluation methods).

Due to these methodological issues, it is difficult to use a standard methodology for the evaluation of the impacts of Leader principles. From our point of view, the methodological combination of quantitative and qualitative indicators is the most suitable. This approach can be schematically depicted through the LAG region and the inclusion of the main actors in the region, also with regard to the Leader principles.



Used abbreviations: SZIF – The State Agricultural Intervention Fund, LAG – Local Action Group, Partner bussin. – a partner from the business sphere, Partner munic. – a representative of the municipality, Partner NGO – a representative of a non-governmental organisation.

Figure 2. Evaluation based on the approach, including the Leader principles (Part B)

Source: own elaboration.

The scheme in Figure 2 depicts all of the following seven LAG principles. These are:

- **Existence of the Leader strategy**, LAGs have worked out a Leader strategy,
- **The bottom-up principle** (the strategy is based on the needs and problems in the region – at the same time, the relationship between the SZIF payment agency and LAGs),
- **The partnership principle** – a number of various partners are represented in the LAG,
- **Multisectoral events** – activities carried out in the framework of cooperation between entrepreneurs, municipalities, and non-profit organisations,

- **Innovation approaches** – LAGs try to introduce innovations in rural areas (an idea, momentum, innovation or territorial approach),
- **Cooperation** – LAGs cooperate with other LAGs (among LAGs),
- **Networking** – based on cooperation, LAGs create social networks of co-operating LAGs

Part B can be considered as a new and innovative approach for evaluation and it is difficult to find similar approaches in the existing literature.

Tvrdoňová, who developed a more extensive methodology for the evaluation of LAGs in 2009 on the basis of an intervention logic evaluation, which itself forms the basis for Part A of the methodology, is considered a pioneer in the evaluation of the LAGs. The other author's input is aimed at elaborating the Leader principles, which is elaborated in the article by Bumbalová et. al. (2015). The above-mentioned methodology is based on the evaluation of seven key elements (the Leader principles) that are elaborated in more detail. The "criterion of success" (benchmarks) representing the ideal state of implementation of the particular principle is defined for each principle. After the evaluation the chosen principle through field research, the synthesis of the knowledge for implementing the LAG principles through SWOT analysis is provided along with recommendations for improvements.

The SWOT analysis offers recommendations for the LAGs in terms of their strong and weak points in applying the Leader principles and points out opportunities and threats that may arise. The evaluation is based on a series of questions. These questions were assigned to individual Leader principles according to Tvrdoňová (2014) and are shown in Table 1.

Table 1. Evaluation questions for the Leader principles

Leader principles	Evaluation questions according to Tvrdoňová (2014)
1) Existing local development strategies	Do the Leader measures reflect the needs, diversity, and interests within the territory?
2) Partnership between the public and private sector	How effective was the cooperation between the public and private sector within the implementation of the Leader?
3) The "bottom-up" approach	How has the Leader extended a subsidiarity-based participatory approach?
4) Integrated and multi-sectoral events	How has the Leader enabled the integration of different sectors?
5) Approach to innovation	Are the LAG actors and Leader beneficiaries aware of the innovations?
6) Cooperation	How has the Leader expanded the activities focused on cooperation, such as the transfer of information, best practices, and disseminating know-how to rural areas
7) Networking	How has the Leader expanded the links among individual actors?

Source: adapted according to Tvrdoňová (2014).

The LAGs have experiences with the evaluation process as they are obliged to evaluate their activities for their members as well as for superior institutions. According to the "theory of change" (Connell and Kubisch, 1998), the evaluation is part of the planning process. In practise, LAGs do not always accept this logic and, therefore, there are problems with the use and efficiency of the evaluation, e.g.:

a) The failure to use the strategic planning principles (e.g. the logical framework),
b) The lack of clarity in the long-term objectives of the LAG and unclear definitions for the LAG,
c) Difficult data collection (missing a system for regular data collection),
d) Low transparency of the results and impacts of the LAG.

Evaluation indicators include impact indicators having a direct relationship on the overall effects of the strategy, and their task is to measure the achievement of a strategic goal.

While monitoring looks after the process of change when the measures are being implemented or project is realised, the evaluation provides the basis for the evaluators to form judgments and opinions after the implementation or projects are finished. It always applies that a good evaluation will require good monitoring, so that the basic function of the evaluation can be fulfilled, i.e.:

1. Means for verifying the results achieved in comparison with the intended results (retrospection).
2. The basis for improving the quality of programming (a look to the future).
3. The self-evaluation, which is done by an evaluator for the LAG (e.g. someone from the LAG or an independent expert from the outside), especially serves the LAG and should help them to find reserves. The results of the self-evaluation show success or failure and are helpful for understanding them. Therefore, it is important that this self-evaluation is done as accurately and faithfully as possible.

Strategy evaluation – Part A

The assumption is that the objectives of the strategy are designed and fulfilled with the use of the Leader principles. This results in positive and long-term impacts on the region with follow-up positive activities. If the objectives are met without using the Leader principles, the positive effects may occur only at random or on a short-term basis and the projects have a rather consuming character, without developing co-operation, partnerships, innovations, etc. Strategy is actually the first principle which is assessed in the evaluation.

In the initial state of the strategy, when objectives are defined, it is necessary to well determine what the LAGs can and need to solve at a particular time. Inspiration for setting objectives should be sought after in the existing proce-

dures, such as the set of rules known as SMART. This method is applicable in all areas of management and decision-making and is very suitable for the needs of LAGs.

SMART is a designation of well-set objectives in the planning process and is an abbreviation of five English words briefly describing the properties of well-set objectives:

S – Specific
M – Measurable
A – Ambitious
R – Realistic
T – Time-bound

The main question of the strategy evaluation is "**To what extent have the LAGs managed, through implemented projects and activities, to meet the objectives set out in the plan set for the monitored period"?**

Answering the question requires a substantiation of the facts about the activity and results for the set period, usually the duration of the strategic plan. The quantitative part of the evaluation is represented by countable values, sometimes referred to as "hard data". The source of information for the quantitative component may be, for example, a database on the number of projects and allocated and realised finances in a tabular form that can be performed by LAGs every year.

The objective of the strategy evaluation is to assess the fulfilment of the strategy objectives, such as the outputs, results, and impacts that have been generated by implementing the strategy. Important descriptive commentaries or references should be added to the values entered by the LAGs to the tabular overview. The commentary on the tables can help to explain the course of fulfilment of the strategic plan and targeting according to the specific needs in the territory. It is also very appropriate to describe any unpredictable influences that have occurred.

Examples of descriptions:

- *The number of members is increasing more than we expected at the beginning of the period, therefore, also the needs of the objective 3 (more young people) have changed.*
- *We have managed to influence the balanced division of projects and activities according to the municipalities by the inclusion of an optional criterion when selecting projects.*
- *The planned projects for the landscape were solved by other means, therefore our projects have not been realised.*
- *We have organised trainings for projects with a new job, yet we have not achieved the planned number.*

The LAGs should be introduced as the first part of the evaluation, through **the basic characteristics of the LAGs**. These characteristics are understood as the below data stated by the LAGs to the last chosen date (e.g. January 1). Table 3 contains the basic characteristics of the LAGs.

Table 2. Characteristics of the LAGs and their development

Basic characteristics	
Size of the territory in km^2	
Number of municipalities	
Population	
Population density (population per km^2)	
Number of members	
Of which: the public sector	
Of which: the private sector	
Of which: the non-profit sector	
The date of the occurrence of LAGs	

Source: own elaboration.

The indicators provide an overview for the following recommended commentary on what these data mean and what the evolution over time was like. Why, for example, the number of members has decreased or increased (if known), or, as the case may be, what is the impact of the increase or decrease on the LAG and how it managed to fill in the members according to the sector where there is a deficit, as well as a number of others. The table can then be interpreted using graphs or cartograms.

Table 3. Development of monitored LAG indicators in 2007-2015.

Indicator	2010	2011	2012	2013	2014	2016	2017	2018
Size of the territory in km^2								
Number of municipalities in the LAG's territory								
Number of LAG members								
Of which the public sector								
Of which the private sector								
Of which the non-profit sector								

Source: own elaboration.

The funding for LAGs is multi-source and it is recommended to monitor funding from these sources separately, according to the individual objectives and priorities.

Table 4. Financial plan and ensuring the implementation of the strategy (CLLD*).

Allocation for the implementation of the strategy in CZK					
	RDP	IROP	OPE	OPEnvi	Total
Total funding allocation in the programme					
Number of planned projects					
The number of calls that have been opened					
Total number of projects received					
Total number of projects implemented					
Financial amount for the projects implemented					

CZK – Czech crown, RDP – Rural Development Plan, IROP – Integrated Regional Operational Programme, OPE – Operational Programme Employment, OPEnvi – Operational Programme Environment,

***CLLD – Community-led Local Development.**

Source: own elaboration.

The table and graphical summaries of the follow-up measures' objectives with the above-mentioned sources of funding can also indicate possibilities for the future or the impossibility to use the LAG's capacity, for example, due of the restricted settings of operational programmes, etc.

In addition, it is possible to monitor the activity of the LAG members, which is different within the LAG's territory, and the stated overview can trigger the required change. The activity description is summarised in Table 7, which is presented in a simplified form here and as an example of how it may be completed. The sectors (public, private, and non-profit and all municipalities within the LAG's territory may have a further breakdown, such as interest groups, gender, etc.) are listed in the columns. All the LAG members are listed in the rows. When filling the table in, it is important to put the member in the appropriate sector and municipality where it "belongs". The appropriate column of the sector and municipality is to be marked with number 1. In municipalities, it is easy to mark the municipality; the assignment of other members may be more difficult. The simplified procedure means that the member is marked with number 1 under the category or municipality where it belongs, which means where the member predominantly has its place of business, establishment, or domicile. If interested, the evaluator can also use the scale and replace the uniform number 1 by other values that grade the "member's activity". However, such an approach is very often subjective and can even devalue the sense of the table. Table 6 can be also interpreted by a chart or on a map (cartogram). Table 5 requires a brief commentary that is supposed to capture

problems with the calls, as well as evolution over time, preferably from the beginning of the programme. The members' category can be broken down according to interest groups, depending on which categories the LAGs they find important. An annual interval for data collection is recommended.

In the strategy, well-balanced support for all participating municipalities is considered to be correct. It will be useful to comment on the results found in this manner by a word-based description explaining, for example, how the LAG dealt with the problem with the even representation of municipalities during the period, what the obstacles were, etc.

Table 5. More detailed focus on the financial plan according to areas

Priority (area/effect)	CLLD objective	Programme	Measure No.	Description (name)	Allocated CZK
Business/ economic	Development of SME	RDP			
Tourism/ economic	Improving a complex offer for tourists	RDP			
Tourism/ economic	Increasing the number of visitors in the region	RDP			
Human capital/ economic	Developing technical potential and supporting innovation processes	RDP			
Cooperation/ economic	Supporting farmers' cooperation, processing, and sales	RDP			
Forestry/ economic	Modernising forestry companies	RDP			
Social services/ social	Social services	IROP			
Tradition/social	Cultural heritage	IROP			
Risk prevention/ social	Integrated rescue system	IROP			
Transport/ quality of life	Transport infrastructure	IROP			
Modernisation of schools	Background for education	IROP			

Source: own elaboration.

Table 6. Members of the LAG – division according to the sectors and operation within the territory (example).

	sector			*interest groups*				*representation*				
member	*public*	*private*	*non-profit*	fire brigade	church	farmers,	…	municipality 1	municipality 2	municipality 3	municipality 4	municipality n
1	*1*			1				1				
2	*1*					1			1			
3		*1*					1			1		
4			*1*	1		1					1	
5		*1*					1		1			
n												
sum	*25*	*14*	*12*	*12*	*2*	*7*	*30*	*7*	*4*	*10*	*5*	*25*
(v %)	***49***	***27***	***24***	***24***	***4***	***14***	***59***	***14***	***8***	***20***	***10***	***49***
project	*12*	*38*	*25*	*7*	*5*	*14*	*49*	*7*	*4*	*10*	*12*	*42*
1												
2												
n												

Source: own elaboration.

A sample of a simplified filling in of the table

The overview of the financial drawing is focused on the success of the fulfilment of individual objectives. A simple overview of how the end applicants were successful in project implementation, in terms of the number and the amount of money drawn, also deserves a written commentary – how the calls were dealt with, how difficult the preparation was, where problems were found, barriers in the applications, etc.

The LAG's objectives in the region are usually focused on the development and activation of the existing local resources, not on adding factors from the outside (e.g. a foreign investor). In terms of the development of local resources, especially support for human capital development, technical progress in the form of innovation and territorial marketing is important. The evaluator should assess the failure to fulfil some objectives since it is important to know whether the identified lack in the fulfilment of objectives was caused by internal factors of the LAG or due to external influences.

The planned indicators of the outputs, results, and impacts of the plan are then compared to the same indicators after implementing the strategy. These indicators include e.g.: the number of projects (output), the number of newly created jobs (result), and any increased number of co-operation projects with innovative elements (impact).

The fulfilment of the Project database enables generation of a number of partial tables for evaluation that can bring valuable information of interest to applicants about the topics in the calls, their successfulness, the level of allocated

funds to the applicants' demands, the share of the EU's contribution, and the use of their own means. However, it is not necessary to make a disproportionate number of tables and to collect an excessive amount of data. It is important to always be aware of the purpose that the table being prepared is going to serve and how to assess the results and impacts of the LAG as clearly as possible.

Table 7. An overview of submitted, approved, and implemented projects

Call	Aim/ measure	Submitted applications			Approved applications			Reimbursed projects		
		Number of projects	Total costs in CZK	Subsidies in CZK	Number of projecs	Total costs in CZK	Subsidies	Number of projects	Total costs in CZK	Subsidies in CZK
1										
2										
n										
Total										

Source: own elaboration.

In conclusion, the evaluator will summarise the findings in an answer responding to the question: To what extent have the LAGs managed, through the implemented projects and activities, to fulfil the objectives set out in the plan set for the monitored period?

Evaluation of principles – Part B

The evaluator needs to prepare questions for a focus group of the LAG at least at the end of the programme period. The questions could be used in the form of a questionnaire or interview. Suggestions for questions for the individual Leader principles were prepared in the methodology. This article presents for the innovation principle only (Principle 5).

Existing local development strategy (Principle 1)

Self-evaluation, consist of Part A, deals with this principle of analysis. In addition, questions could be included that capture the process of developing a strategy, its fulfilment, and evaluation. The qualitative part of developing and implementing the LAG strategy can be assessed using questionnaires or structured interviews. The basis for the evaluation process of this principle seeks an answer to the following questions: Assess whether the Leader's intervention reflects the needs, variety, and interest of the territory where it has been operating. How have the LAGs worked with the strategy during the period for which it was created? Did the strategy involve rural actors? Was the strategy discussed in the community? etc.

Partnership between the public and private sector (Principle 2)

There exists a balanced proportion within the partnership in terms of a balanced number of voices, strengths, sources, and cooperation. The partnership decides on the orientation and the content of a local development strategy. The local partnership of more sectors (LAG) takes over responsibility for the entrusted means. The integrated and multisectoral partnership includes a combination of different sectoral orientations (economic, social, cultural, ecologic), with the goal to achieve a complex view of the particular issue in the territory. The partnership can be surveyed by questions, most frequently within an interview with a LAG manager. How do you evaluate the level of partnership of the public and non-profit sectors and different interest groups? To what extent is the partnership protected against promoting the interests of one group? What is the share of the implemented projects and activities according to the initiator and the sector? Are the different age categories, men and women, and interest groups in the partnership represented in a balanced way? etc.

The "bottom-up" principle (Principle 3)

This approach is based on the endogenous concept of rural development responding to the assumption that the rural development should be planned with the people living in the region and exploit the resources within the region and build their development upon them. The bottom-up approach can stimulate the emergence of new project ideas that can be then supported by the LAGs. Applying the bottom-up approach can be surveyed by asking questions to the LAG managers, such as: How do you evaluate the interest of people participating in the LAG events or participating in the LAG drafting, making plans, evaluation, and other activity? What do you consider to be the impact of the use of the bottom-up principle? What influence did the use of the bottom-up principle have on essential changes that have occurred as a result of implementing the objectives of the strategy? In how many projects has the bottom-up principle been used?

Integrated and multisectoral events (Principle 4)

The events and projects contained in the local strategy should be interconnected and coordinated as a coherent whole. The integration can relate to events performed within one or more sectors. Most valuable is the involvement between different economic, cultural, and ecological actors from different sectors. Possible questions identifying an integrated approach are primarily focused on the manager. The following questions may be included: On which occasions have connections been made between the sectors? How many events took place as the sectors were interconnected? What was the added value of multisectoral events, and how would you express that? How has the use of the "multisectoral event principle" contributed to implementing the strategy in order to achieve a higher level of development objectives?

The innovation approach principle (Principle 5)

The innovations can include new services, new products, and new ways of conduct in a local context (Article 32, par. 2, letter d). Not everything in the strategy must be innovative, since the partnerships must often build confidence by showing that they are able to satisfy certain short-term basic needs. This is done by bringing together all individual participating parties in the particular area and by establishing a dialogue with external institutions, such as universities, research centres, higher levels of administration, etc. In the best case, the partnerships may become platforms for "social innovations" and subsequently obtain resources for their dissemination. Successful ideas can be then analysed, documented, and handed over by different actors' networks at the EU level, national level, and regional level.

The Leader method can play a significant role when stimulating new and innovative approaches to the rural areas development. When implementing local development strategies, the LAGs apply and support innovative solutions to problems through introducing new products, processes, or procedures (e.g. setting up a new organisation or a new market, non-traditional solutions, etc.). In rural areas, this support can also mean the transmission and acceptance of innovation developed somewhere else, modernisation of traditional forms of know-how, or finding new solutions to persistent rural problems that have not been solved in a satisfactory and sustainable manner. Table 8 shows an overview of the proposed questions, indicators, and frequency of data collection.

Table 8. Overview of questions, methods, data sources and data collection frequency for the innovation principle

	Question	Indicator	Method/ Data source	Frequency of data collection
1	What do you see as an innovation that can be done by the LAG?	-	Interview with the manager	At the end of the period
2	Has the use of the "innovation principle" approach contributed to basic changes in activities on the part of the beneficiaries?	-	Interview with the manager	At the end of the period
3	What impact did the "innovation approach" principle have on the major changes that have occurred as a result of implementing the strategy?	-	Interview with the manager	At the end of the period
4	How have the impacts of the implemented strategy been applied when meeting the developed needs of the target groups and how did the use of the "innovation principle" contribute to this?	-	Interview with the manager	At the end of the period

Cont. Table 4

5	What are the impacts of the use of the "innovation approach" principle?	-	Interview with the manager	At the end of the period
7	What do you see are the biggest problems for creating innovations?	-	Interview with the manager	At the end of the period
8	How did the LAG manage to make innovations within the LAG's activities and the end applicants' projects?	-	Interview with the manager	At the end of the period
9	How many projects have applied the innovation approach?	Number of projects applying the innovation approach	Questionnaire for the LAG office	At the end of the period
10	How much innovation was among the supported products (in the products)?	Number of innovation in proportion to all products	Questionnaire for the LAG office	At the end of the period
11	How many innovators, partners such as universities, research institutions, and foreign experts, were involved (in the processes)?	Number of involved innovators, partners, from the research field, also from abroad	Questionnaire for the LAG office	At the end of the period
12	How many patents and other prizes were present (in the processes)?	Number of patents and other prizes	Questionnaire for the LAG office	At the end of the period
13	How many people have been approached by new, untraditional communication methods (within the communication)?	Number of new people addressed by new communication methods	Questionnaire for the LAG office	At the end of the period

Source: own elaboration.

The cooperation principle (Principle 6)

Cooperation helps to solve some problems or adds value to local resources and activities. For instance, it can be a way to achieve the viability of a particular project or to stimulate complementary events, e.g. common marketing of the Leader groups in different regions or areas, or creating common initiatives for tourism established on shared cultural heritage. The cooperation rules are based on the principle that the LAGs should not compete with each other, but they should endeavour to associate, provide mutual support, and pursuit close cooperation.

Networking is a basic element of building social capital in the development of the territory and it is an important step to building a partnership. Within the leadership, networking among similar LAGs and the exchange of information and experiences can additionally lead to a higher level, which is the leadership level. The Leader programme should create impulses for creating social networks in places and areas where social networks have not been created due to missing leadership and the inner motivation of the people. Networking is a means of transferring proven procedures, disseminating innovation, and building on the experiences from local rural development. Networks create connections between people, projects, and rural areas and can help to overcome the isolation that some rural areas must cope with. Using these networks can stimulate cooperation projects by establishing contacts between individual leadership groups. Table 14 lists the proposals for questions and indicators.

Conclusions on the use of the "A Mirror for LAGs" methodology:

- The LAGs' task is defined in the Partnership Agreement of the CR (3.1.1. CLLD). In the area of monitoring and evaluation, it especially includes:
  - Monitoring the implementation of the community-led local development strategy; (monitoring),
  - Monitoring the realisation and sustainability of the supported projects (monitoring),
  - Performing the evaluation activities relating to the CLLD strategy (evaluation).

This is also the reason why theLAGs are interested in self-evaluation (this interest has been confirmed based on interviews with the visited LAGs). Currently, there have been a number of changes in comparison with the previous year, and therefore we have adjusted the LAGs evaluation methodology so that it can also be used for this period. This is done in accordance with individual programme frameworks, where monitoring and evaluation will have to be based on the rules issued by governing bodies of individual programmes. The comprehensive evaluation of fulfilling the SCLLD[2] is rather an internal matter for each LAG, as the level of achieving the goals can also be influenced by differing financial resources and programme conditions. The LAG management bodies are responsible for the fulfilment of the SCLLD for the entire partnership operating on the LAG's territory, therefore, it is necessary to prepare supporting materials for the self-evaluation of the LAGs and also to help increase the evaluation capacities of individual LAGs.

It is not easy to find measurable indicators for evaluating the principles (Part B), and it will also depend on the LAGs themselves which questions and the options proposed will they accept or supplement with their own ones. The sources

[2] Strategy of Community-led Local Development.

and tools for data collection include project records, basic statistics, high-quality factual annual reports on the LAG's activity, and transparent websites, as these are the basic pre-requisites for easily drawing information for the quantitative part of the investigation. Where it is necessary to find qualitative indicators and evaluations, a range of tools can be used so that the identified facts are as accurate as possible with regard to the funds for the evaluation.

Measuring the qualitative data is very difficult, and it can be subjective, but then it usually provides valuable and otherwise undetectable explanations of phenomena.

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The significance of social innovation for blue growth in the North Sea

Abstract: *The usage of the North Sea is in transition, influenced by the European blue growth strategy and the national follow-ups. Based on the principles of smart, sustainable and inclusive growth at sea, policies are formulated to stimulate growth in the existing and new maritime sectors. Creating blue growth will not be confined to technological change, but it will also cover changes in the human system, including ways of interacting and exchanging ideas, roles of responsibilities, as well as institutional settings of formal and informal rules. This also affects the rural hinterlands. Social innovation is needed to secure sustainable growth. Understanding the significance of social innovation is a first step to formulate governance efforts to stimulate social innovation. This chapter assesses the significance of social innovation with regards to blue growth in the North Sea. Social innovation can be explained both as process and outcome and these are strongly interwoven. The significance of social innovation – is here assessed by means of three core characteristics: scale, scope and resonance. The results show that the significance of social innovation varies considerable across the sectors; offshore wind energy, offshore mussel cultivation and offshore seaweed farming. Social innovation promises the benefit to further development of maritime sectors – just like it can benefit rural areas.*

Keywords: *social innovation, blue growth, offshore wind, aquaculture, significance of social innovation*

Introduction

With concepts such as blue economy and blue growth, governments across the world highlight the potential of maritime activities to contribute to economic growth and social well-being, also to the benefit of territorial hinterlands. Further development of maritime sectors can contribute to the supply of food, energy, natural resources, genetic resources and create additional revenues and jobs. In Europe, the European Union launched the blue growth concept as a strategy for economic growth in the European seas in the context of climate change, increased scarcity of natural resources, the increased vulnerability of the planet, growth in urbanization and the concentration of humans in coastal regions (European Commission, 2012).

Blue growth is an extension of the land-based policy strategy referred to as green growth, which the EU has launched in 2010. In response to economic challenges, in the context of climate change and overexploitation of natural resources, the green growth as a policy strategy aims at: (1) smart growth – developing an economy based on knowledge and innovation, (2) sustainable growth – promoting a more resource efficient, greener and more competitive economy and (3) inclusive growth – fostering a high-employment economy delivering economic, social and territorial cohesion (European Commission, 2010).

Today, it is common to address blue growth through the lenses of technology, markets and products. Illustrative is the EU's evaluation of the blue growth strategy, praising among others its contribution "to remove barriers and market failures" and to align research efforts for shifting research from the laboratory to the marketplace" (European Commission, 2017). At the same time, the evaluation identifies remaining social challenges, e.g. the capacity to mobilise the financial sector, and acknowledges "that the partnership approach has achieved results but that these have been uneven" (European Commission, 2017).

Creating blue growth will involve technological change, but also changes in the human system, including ways of interacting and exchanging ideas, roles of responsibilities, as well as institutional settings of formal and informal rules. Underestimating the importance of the social dimension of this innovation process, is likely to result in a simple technology-oriented approach. Experiences in natural resource management show that such an approach will not sustain in the long run (McGinnis and Ostrom, 2014). What is needed is "changes of attitudes, behaviour or perceptions of a group of people joined in a network of aligned interests that, in relation to the group's horizon of experiences, lead to new and improved ways of collaborative action within the group and beyond", which is actually a way of defining social innovation (Neumeier, 2016). In the literature the theoretical term social innovation is heavily explored and explained in several ways, e.g. Bock (2015), Biggs et al. (2010), include ecological contexts (see Baker and Mehmood, 2015; Neumeier, 2016).

The argument underlying this chapter is that social innovation is needed to release the potential of blue growth. And to stimulate social innovation, one needs to understand the significance of current initiatives. Against this background, this chapter aims to assess the significance of social innovation appearance and potentials in the context of the blue growth in the Dutch North Sea and provide recommendations to stimulate social innovation.

The relevance of this assessment goes beyond the maritime sectors for two reasons. First, various land-sea interactions exist by which (growing) activities on sea also affect socio-economic developments on land. For example, the Dutch fisheries sector has traditionally landed much of their catch in the village of Urk, where a thriving processing sector has been developed. Changes in the way we use the seas will affect the value-chains on land. Secondly, on a methodological level, the approach developed in this chapter is also applicable to the study of social innovation on land.

In this chapter three cases located in the Dutch North Sea are assessed through a social innovation lens. The cases explored are: (1) offshore wind energy, (2) offshore mussel cultivation and (3) offshore seaweed farming. These represent various new developments of the Dutch EEZ (Exclusive Economic Zone) of the North Sea. The information provided is based on a review of a series of research projects with the industries and the governments on the respective projects. In these projects, the authors conducted interviews, organised workshops and performed literature reviews. After an introduction of the cases, the significance of social innovation is analysed, looking at the potential impacts in terms of scale, scope and resonance. The chapter is concluded with an analysis of the relation to (rural) hinterlands.

Conceptual framework

Social innovation refers to the interaction among actors; how they define problems, how they coordinate, express and defend their interests (Neumeier, 2016). A central idea of social innovation is that the exchange of ideas and values is shifting from compartmental-oriented values and internal values of the actors, towards a broader and more society-oriented value-base. This requires, and results from, more collaboration-oriented partnership and co-creation minded interaction, with vaguer roles; moving away from self-oriented role definitions, often even antagonistic, as when for instance governments strictly act as law enforcers and regulators, and not as partners or creators of conditions for investments.

It is argued here that social innovations could add value to the blue growth strategy (Soma et al., 2018). The old situation was that the sectors used to lock their ideas up inside sector walls, without much interaction across them. In the past decades, it is observed that non-profit, government and businesses have developed a better appreciation of the complexity of global problems

such as climate change (Phills et al., 2008). A host of factors have eroded the boundaries between the sectors, and as a result, sectors are joining forces (Phills et al., 2008). These dynamics are illustrative of social innovation and understanding that conditions for social innovations to take place (or not) and thrive (or not) are crucial.

Social innovation can be explained both as a process and outcome, which are strongly interwoven (Baker and Mehmood, 2015). As process it refers to the interaction among actors through phases of problematization, expression of interest, and delineation and co-ordination (Baker and Mehmood, 2015). Throughout the process, social innovation fully depends on acting at individual level, when core people are taking initiative, the so-called enablers (Camps and Marques, 2014). Although initiated by individual incentives, social innovation has impacts on a social, economic and political context, beyond the individual level. As outcome social innovation develops to new institutional structures, for instance network structures, that can deal with the particular needs for change.

The significance of social innovation – indicative for the resultant institutional impacts – can be assessed by means of three core characteristics (Baker and Mehmood, 2015):

- The scale of social innovation refers to the people who take part. The question here is which actors are involved in social innovation. It is of interest to know in what capacity they operate and take part, referring to the roles identified above. For social innovation, imagination needs to be shared by an exchange of ideas and values in order to impact a larger share of people.
- The scope of social innovation is concerned with the multiple interactions that involve and impact different actors and the surroundings; such as the different users and governance systems of informal and formal institutional settings.
- The resonance refers to what people find imaginable. Low resonance implies that people imagine what would be possible with a given structure in a well-established system, whereas high resonance reflects a situation where people imagine possibilities that are not immediately a reality, but could become one in the future.

Introducing the cases

Wind energy

The offshore wind sector is rapidly developing in the North Sea. For example, The Netherlands' government has formulated a roadmap to expand energy production capacity from 1,000 MW to 4,500 MW in 2023 (RVO, 2015). New wind farms are under construction, licenced or scheduled. The offshore wind development is stimulated by governmental support schemes, and a contract-for-different support scheme is in place to compensate energy companies for the

difference between cost-price and market-price of electricity. The Ministry of Instructure and Environment and the Ministry of Economic Affairs (2015) have designated new sites in the North Sea for development of offshore wind farms, areas which will be closed for many other activities (Stelzenmuller et al., 2016).

The development of this sector is not purely market-driven; governments create a semi-artificial market with competition between providers in the context with subsidies, conditions and restrictions. Development of offshore wind involves technological change, in terms of cables, turbines, transport etc., but further development will require coping with stakeholders and other policy objectives. When it comes to creating more social value from wind parks, the potential for co-use is often discussed. Offshore wind parks can offer new areas for e.g. aquaculture and nature conservation. This has led to research and discussion on the co-use of wind farms (Rockmann et al., 2015, van den Burg et al., 2016). Multi-use is currently discussed in various fora (e.g. at the 2017 Noordzeedagen) and legislation to allow co-use by small vessels is in the making (Ministry of Infrastructure and Environment, 2017).

Mussel cultivation

The North Sea mussel sector currently producers near shore, where wild-harvested mussel seed is grown out to consumption-sized mussels (Jansen et al., 2016; Fairbanks, 2016). Reduced availability of mussel seed led to reduced total production from over 90 million kg in the mid-1990s to and 26,8 million kg in 2013[1]. Further expansion of current production will be difficult with existing production process due to shortage of coastal space as a main constraint (Lindahl et al., 2005).

Offshore mussel cultivation is considered feasible from an economic (Buck et al., 2010; Griffin et al., 2015; Jansen et al., 2016; van den Burg et al., 2017) and ecological perspective (Kamermans et al., 2016; van Stralen et al., 2015). However, as of now there is no commercial offshore mussel cultivation in the North Sea. The Dutch ministry sees the potential for offshore cultivation. Such as extension would clearly imply new institutional structures, new production systems, new networks and new standards and values about how to act and deal with each other.

Seaweed farming

Seaweed farming is a new sector in Europe, which attracts much interest from European policy-makers, scientists and entrepreneurs. This sector is currently supported by public funding for research at country level, but also through the European blue growth research calls.[2] In these developments also an increas-

[1] http://statline.cbs.nl/StatWeb/publication/?VW=T&DM=SLNL&PA=7203VLOO&LA=NL [26-6-2017]

[2] MARIBE, MERMAID, other FP7 and H2020 projects.

ing number of small companies investigate possibilities for seaweed cultivation and use, next to the traditional larger producers (most notably the food and hydrocolloid industry).

The North Sea Farm Foundation[3] is an organisation that plays a pivotal role in these developments. It has taken the task to stimulate knowledge creation and exchange of information, as well as facilitating individual companies in experimenting with seaweed cultivation. In particular, it "aims to achieve sustainable seaweed industry in the Netherlands. This development towards a full-fledged chain seaweed cultivation takes place in a challenging tension between technology, science, market, policy and culture. Innovation is more than just technology. There is support and cooperation needed in the chain. For this we started Seaweed Platform in 2014"4. The foundation itself has little money, but triggers cooperation and applies for funds elsewhere, mostly financed by private actors paying membership fee ranging from EUR 250 per year for start-ups to EUR 5.000 per year for large companies, as well as by governmental support. The two main activities of the foundation are (1) organising networking events to facilitate dialogue and exchange of ideas and (2) running an experimental test-site for seaweed cultivation in the North Sea. This test-site is open to other (future) users.

Significance of social innovation

Scale

With "scale" we refer to actors involved, their role and how they interact. It is about the number of stakeholders, and the roles they play and their capacities to interact and exchange values and ideas.

With the growth of offshore wind energy various new stakeholders come to be involved. In terms of regulators, this includes the European Commission and national ministries responsible for energy and climate policy and financial support agencies such as the European Investment Bank. A key enabler is the national government – who also is responsible for marine spatial planning and licenses. New extractors and inputters include energy companies and companies in their supply chain, responsible for building the wind turbines. New influencers include renewable energy-oriented NGO's as well as investors (banks and the like). Main affectees of offshore wind development are the fishing community – losing fishing grounds – and coastal communities, if wind turbines are situated close to shore. Beneficiaries of offshore wind energy include various stakeholders, ranging from energy consumers and governments to energy companies and investors who seek to profit from long-term investment in renewable energy. In recent years, large industry actors such as DONG Energy (now named Ørsted), Shell, Siemens and Van Oord have entered the scene, attracted by subsidy schemes and the prospects for future growth of the sector.

[3] http://www.noordzeeboerderij.nl/en [26-6-2017]

The case of mussel cultivation shows a lack of enablers, who can connect and make things happen. The main regulator is the national government who immediately is confronted with the issue of property rights at sea [17], requiring future collaboration with Rijkswaterstaat (government agency responsible for the design, construction, management and maintenance of the main infrastructure facilities in the Netherlands) and the Coastguard. The aquaculture entrepreneurs are inputters and extractors as they will enter materials into the sea by their extended activities in the forms of vessel pollutants and aquaculture production systems. The influencers are the NGO's with interests in conservation of the coastal North Sea and Wadden Sea. They would benefit if aquaculture moves offshore, as they criticise trawlers who operate in coastal areas, including the Wadden Sea, due to the impact on the benthic ecosystems (Ens et al., 2004), as well as mussel production claiming coastal space which alternatively could be used for enhanced coastal recreation and environmental protection (this is particularly relevant in the Wadden Sea). The affectees are the ones who will be excluded from the wind farms, who originally used to have user rights in these areas. These include the fishermen and the shipping industry. The affectees can also include coastal communities, with fishing as core income source, as well as potential future users. Beneficiaries include people who consume mussel products.

In the case of the offshore seaweed farming, the North Sea Farm Foundation plays a key role as enabler. The key regulators are Rijkswaterstaat and the Netherlands Coastguard who decide upon the admission of the test facility to the North Sea. Besides, the national and regional governments provide financial support, as well as a location in the North Sea for the test-site. Regional and local governmental actors play a role as they subsidise the test-facility, but they can also support companies who are the (future) users of the test-site. The principle extractors are the companies that are going to use the test facility. In the first instance, this might be the North Sea Farm Foundation itself – for demonstration purposes – but other companies are expected to take over this function. Inputters are the North Sea Farm Foundation – who has initiated and established the test facility – and the companies who use it. The key influencers are regional and national governments who stimulate the work of the North Sea Farm Foundation, because they see seaweed as a promising future crop with potential to stimulate the local economy. New offshore activities such as seaweed farming can impact on traditional users of the sea, making e.g. the fishing community potential affectees. This sector, however, is also an active member of the platform. Among the beneficiaries are the companies who use the test facility, local government who benefit from expected economic development and the national government once seaweed cultivation contributes to achieving policy objectives.

Table 1. Stakeholders identified in the Dutch North Sea*

Type	Blue growth marine governance		
	Offshore wind	**Offshore aquaculture**	**North Sea Farm**
Enablers	Ministry of Economic Affairs	Ministry of Economic Affairs	North Sea Farm Foundation
Regulators	Ministry of Economic Affairs Ministry of Infrastructure and Environment European Union European Investment Bank	National government. Netherlands Coastguard Rijkswaterstaat	Netherlands Coastguard Rijkswaterstaat
Extractors	Energy companies Technology companies	Energy companies Aquaculture companies	North Sea Farm Foundation and seaweed companies
Inputters	Energy companies Technology companies	Energy companies Aquaculture companies	North Sea Farm Foundation and seaweed companies
Influencers	NGOs	NGOs	Ministry of Economic Affairs Regional government
Affectees	Fisheries Coastal communities	Fishermen Shipping industry Coastal communities	Fishermen Shipping industry Coastal communities
Beneficiaries	Consumers Investors Energy companies Policy makers	Mussel companies, consumers	Companies, in the end also seaweeds users and consumers

(*) note that names of various Ministries have changed after this research was done.

We see here that both in the case of wind energy and mussel aquaculture, the scale of social innovation is limited. Both cases are characterised by division of roles that is still rather traditional with the business actors performing the business cases built within the platforms and consortia, and the government taking responsibilities for achieving policy goals by managing, coordinating, subsidising, regulating, enforcing and controlling. In the case of seaweed the scale of social innovation is larger. The main reason is that a private foundation is taking an enabling role cooperating with various levels of government, companies and integrating the fisheries community in development of this sector.

Scope

The scope of social innovation is about the (multiple) interactions that involve and impact the actors and the surroundings; such as the different users and governance systems of informal and formal institutional settings. When discussing the significance of social innovation, we are interested in (changes in) roles and responsibilities and in particular we question the extent to which the dominant actors allow for the inclusion of new innovations.

In the case of offshore wind energy, an observable main shift in roles and responsibilities set in motion a couple of years ago is the government investing considerable amounts of money in the private sector to reach public policy objectives, i.e. renewable energy targets, and thus intervening in market conditions. Governmental efforts were deemed necessary for realising offshore wind farms. By securing a revenue-stream, the government seeks to stimulate private actors to prove financial support to offshore wind development (Kern et al., 2014). In addition, agencies like the European Investment Bank co-invest in offshore wind. In effect, this has led to a joint public and private responsibility to secure safe renewable energy production at the lowest costs which reduced scope for social innovation. Now that large multinational companies enter the scene, the opportunities for other actors to be involved further decrease. Producers keep a strong focus on efficient energy production and will only grant admission to other activities, if they are forced to do so (Rockmann et al., 2015).

Among mussel cultivators, the willingness to shift roles and responsibilities is low. Change is inhibited by the fact that the present situation is comfortable, while offshore production implies long distance, harsh weather conditions, storms, long waiting times, high fuel costs, high investment costs, high risks insurance conditions, with a transition period filled with uncertainties, problematic relationships with public managers, and possibly, removal of existing coastal user rights. Moreover, uncertainty about the risks of offshore production in the future impedes innovation. The scope for innovation is further restricted by the fact that that some influencers – i.e. environmental organizations – want the companies banned from the natural Wadden Sea and Oosterschelde. There is, thus, a risk that development of offshore mussel farming could imply a ban to mussel cultivation near shore. At the same time, the situation is characterized by low levels of trust between business and government. The confidence of the sector in the government has yet to recover after difficult interplays during the last years when mussel seed installations started to be used in estuaries and the Wadden Sea. After years of investments in testing the participating companies have not received a right of usage. One of the companies is still embroiled in a lawsuit against the government. Previous experiences with governmental interventions, for instance, in terms of a supported pilot project, affect their willingness to cooperate. The increased attention given to offshore mussel cultivation is linked to private wind entrepreneurs increasingly gaining exclusive rights at sea. When such rights first have been provided, it is difficult to change afterwards, and potentials for future mussel cultivation get lost.

In the seaweed case, a shift in responsibilities can be observed in the role taken by the new foundation established, particularly by their work in developing seaweed production offshore. The foundation fulfils a role that governments no longer consider theirs. Both national and regional governmental bodies acknowledge the potential of seaweed businesses and therefore support the foundation, who can take the steps needed. The foundation's test-site is similar to

what once were called government experimental farms. Together with leading research institutions, the foundation will contribute with scientific evidence and knowledge retention. In October 2016, the foundation launched a test site for offshore seaweed cultivation, off the coast of Scheveningen, the Netherlands. The test-site enables other potential seaweed cultivators to make use of existing infrastructure. It is co-funded by the local authorities and Rabobank.

Resonance

The third aspect of significance is resonance. It refers to what people find imaginable, and to what extent they are willing to incorporate new ideas. Resonance requires an open exchange of values and ideas.

The governmental long-term vision on offshore wind energy is laid down in the public roadmap and although stakeholders were involved in developing the roadmap, the final decision-making and communication is one-directional – from the government to other actors. Despite efforts to involve sectors such as tourism and fisheries, it is questionable if their input has resonated with the dominant players in the offshore wind sector. Despite political and scientific interests in the possibilities for co-use of offshore wind farms and offshore mussel cultivation, there is no full exchange of ideas and values.

In the mussel case, there is little interest in innovation and ideas of producing in new, unknown areas are not welcomed, except for one cultivator who is playing with a thought that large-scale mussels production can contribute as protein source for a hungry future population worldwide, because of the low input intensity and environmental friendly production system. This person is aware of the fact that to realize this, a suitable enabler is needed who could realize such wishes by connecting technology entrepreneurs, researchers, international demands, NGOs, and producers worldwide.

The North Sea Farm Foundation cooperates with other parties who share their ambition to establish a sustainable seaweed chain with opportunities for new, sustainable revenue models. As such this ambition goes beyond the current economic practice. Furthermore, the foundation is established with a vision that sharing information and knowledge will stimulate the development of the seaweed sector in the Netherlands. The foundation could become instrumental in bringing together different parts of the supply chain and forging new partnerships. In this case of social innovation, exchange of ideas and values is central. Being a platform for cooperation in the sector, exchange of ideas is organised and facilitated. Regular meetings take place where different actors can present their ideas and vision on (future) uses of seaweeds. In addition, the meetings have a strong focus on networking to strengthen the ties between the different actors in the value chain. With the offshore cultivation test facility, the foundation aims to provide the infrastructure for testing, reducing barriers to experiment for both small and larger companies.

Table 2. Summarizing scale, scope and resonance across three case-studies

Case	Scale	Scope	Resonance
Offshore wind	Large industry actors enter the scene, multiple governments	Shifting scope, with greater focus on large industrial players. Limited room for involvement of other actors. Scope is narrow; focus on wind	Further development of current technology, upscaling, improving efficiency
Mussel	Limited number of producers, role of government NGOs	Restricted scope, mainstream actors dominate and no 'room' for other actors. Scope limited due to lack of trust / fear for the unknown	Stand-still
Seaweed	Many start-ups	Expanding scope as new actors enter the scene	Out-of-the-box, not based on current systems in other markets. Sky is the limit

Relations to the (rural) hinterland

Maritime activities – and changes therein – affect terrestrial areas through various land-sea interactions, and by that they have an onshore component. Ports are needed for shipping, fisheries (and seaweed farmers) need to land their catch and electricity generated through offshore wind farms needs to be fed to the grid. Land-sea interactions are studied from a biological perspective, to understand the interaction between food systems on land, on sea (Treasure et al., 2015; Cottrell et al., 2017) or even at species levels (Toft et al., 2013). In conservation planning, land-sea interactions are considered a missing link, not explicitly addressed in effort to conserve biodiversity (Alvarez-Romero et al., 2011). Another land-sea interaction studied concerns water budgets, particularly in situations where human interference with natural water flows affects hydrological balance in moors and wetlands along the coast (Niehoff et al., 2002). Our analysis of social innovation in the maritime domain points to the following observations on land-sea interactions.

The mussel aquaculture sector and the offshore wind energy sector are both part of established land-based supply chains. The Dutch mussel sector lands and auctions most of it produce in the village Yerseke – home to many of the mussel companies. In this rural area, the economic benefits of mussel aquaculture are reaped. The offshore wind sector has a geographically more dispersed land-based supply chain, with suppliers and clients spread out over Europe. This includes international suppliers and multinational companies (i.e. Siemens, Shell). Analysis of social innovation illustrates that these divergent communities of actors are not easily brought together, for geographical reasons, because of different economic concerns but also because of different

sense-of-ownership of the marine resources. For the mussel sector, the region is a given part and parcel of their livelihood, knowing the area in detail, this is where they do business. For offshore wind sector, maritime spaces are defined by their characteristics (bathymetry, current) and the prevalent wind regime.

The emerging seaweed sector, where social innovation is most significant – has interesting linkages to the hinterland. The initiative to set up the North Sea Farm foundation came from two urban-based organisations and many members of the platform come from the larger cities. These are often part of new food movements – experimenting with new products and markets. Traditional rural actors – farming, processing, aquaculture sector – are hardly involved in the network.

Concluding remarks

In this chapter we have explored a total of three case studies in the Dutch North Sea operating in the scope of blue growth, with the aim to identify social innovations in current developments. The cases are: (1) offshore wind energy, (2) offshore mussel cultivation and (3) offshore seaweed farms. The above-analysis points to large differences in the significance of social innovation – ranging from very little social innovation in the mussel sector to a good example in the case of seaweed farming.

Social innovation promises the benefit to further development of maritime sectors – just like it can benefit rural areas. Understanding the significance of social innovation is a first step to stimulate further social innovation through governance efforts. The key to enhance future social innovation is the extent to which networks with high levels of cooperation among stakeholders across nations, policies, sectors, actors and institutions can be realized (Soma et al., 2015; van Tatenhove et al., 2015). This depends on actors' incentives, willingness to cooperate and levels of trust (Holm and Soma, 2016), which in turn fully rest on the appearance of enablers who can connect and motivate people, and eventually realize change.

To further advance social innovation, we need to understand why the differences in significance occur. The adaptive cycle offers a promising approach to this. The adaptive cycle is a conceptualization meant to capture the dynamics and explain ways in which systems persist and innovate (e.g. Holling, 2001; Holling and Gunderson, 2002; Walker et al., 2006). The adaptive cycle illustrates what kind of social innovation we are dealing with; by referring to a "front loop" and a "back loop". In the front-loop social innovation takes place as processes within fixed institutional settings, whereas in the 'back-loop' social innovation contributes to developing new institutional settings; as outcomes. Further research should address the applicability of the adaptive cycle to understand dynamics in the significance of social innovation.

The analysis also points to the relation to (rural) hinterland. Social innovation benefits from an area where interaction between various sectors and exchange of ideas and values is easier. Although the empirical basis is too small to draw strong conclusions, the case-study suggest that this is easier realized in urban areas. Further investigations are needed to grasp the "geography of social innovation" and formulate differentiated strategies to stimulate social innovation in rural and urban areas.

Acknowledgments

MARIBE was a Horizon 2020 project exploring cooperation opportunities for companies that combine different blue growth and blue economy sectors. More info at: https://maribe.eu/

MERMAID (FP7) sought to develop Novel innovative design concepts should address different physical conditions in order to make the best use of the ocean space. More info at: http://cordis.europa.eu/project/rcn/101743_en.html

TripleP@sea sought to provide sound scientific and societal applicable knowledge that stimulates widespread offshore production of marine protein, taking into account ecosystems values, value chains and the involvement of stakeholder communities. More info at: https://www.wur.nl/en/Research-Results/kennisonline/TriplePSea-Multi-use-platforms-Noordzee-MUPS-1.htm

The Dutch project "Haalbaarheid mosselteelt in windparken" investigated feasibility of cultivating mussels in offshore wind farms. More info at: https://www.wur.nl/nl/project/-Mosselhangcultures-in-windparken-1.htm

In SOMOS, the focus is on renewable energy production in combination with seaweed and the goal is to develop a meaningful safety assessment and safety control to stimulate the production of energy and food at sea. More info at: https://www.wur.nl/en/project/SOMOS.htm

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Providing sustainability of agro-food chains in Ukraine

Abstract. *This article gives the first summary of peculiarities of agro-food chains formation in Ukraine and their typology according to different classification characteristics. The study systemizes distinctive features of agro-food chains functioning from agro-holding to small producers and across some products. The questionnaire of agro-food chains actors, namely in agriculture and processing industry, allowed us to define the binding factors of their development and to justify measures for their overcoming. It is proved that a low level of management systems at agricultural and processing enterprises is one of the binding factors for agro-food chains sustainability in Ukraine. But it requires the activation of measures aimed at implementation of the European standards at all administrative levels. The driving forces for agro-food chains sustainability are explored as well, they are fair distribution of added value, implementation of innovations, reduction in negative impact on the environment, etc. On the base of this analysis, a set of recommendations to support the sustainability of agro-food chains was developed. They can help the government to develop strategic programmes for agrarian sector development and also they can help the chains actors.*

Keywords: *agricultural and food processing enterprises, agro-food chains, sustainable development, value added chains*

Introduction

The chain approach in the agrarian sector of Ukraine was, in its essence, formed on the technological unity and interdependence of natural-biological (growing of food raw materials) and processing (production of food products) processes. In particular, even in conditions of planned economy, food industry enterprises were firmly tied to the raw material base, and direct links to specific agricultural enterprises (ACEs) were sanctified and secured by the state. The rhythm of work of agricultural producers was mostly subordinated to the production process of processing capacity: in order to maximize their load, first of all, and adhere to the schedules of food raw materials supply. Simultaneously, the issue of payment for raw materials was solved deliberately, the control over its quality was more formal, and the sale of the final food products was provided on the basis of its wholesale purchases by the state and cooperative trading systems. The privatization of food industry enterprises in the 1990s for their subsequent resale in 2000-2010 prompted new owners to create and develop supply, production and distribution chains similar to the network marketing. They received the name "intuitive informal clustering" and had no completed form. In particular, systems of food chains for milk and meat processing factories and cheese producers were created through the organization of their own network of rural procurement points and branded stores; sales of products to regular wholesale buyers for subsequent transport of goods to outlets; sales of products to individual consumers; supply of some means of production to producers of agricultural raw materials through their dealers (Krysanov et al., 2009). It should be noted that later in the agrarian sector of the economy they were called agro-food chains, or AFC.

What should be noted are the transformations taking place in the agrarian sector since the 2000s. In particular, in 2000-2015, the number of large and medium-sized enterprises in food industry decreased from 2.5 thousand to 1.0 thousand units, and small ones – from 6.4 thousand to 4.5 thousand units. Significant changes also occurred in agriculture: the number of enterprises, including peasant farms, decreased from 59.0 thousand to 52.5 thousand units, private peasant farms (PPF) – from 5.3 million to 4.1 million units (Krysanov, 2016). Only 19% of the entire number of PPFs are market-oriented, semi-proprietary small farms account for 41%, while the rest produce products for their own consumption (Borodina, 2014). Along with this the influence of transnational corporations on the agrarian sector of Ukraine increased, provoking additional challenges and encouraging active or passive transformations and contradictory changes.

Thus, since the late 1990s, i.e. since the completion of privatization processes, and up to now there are diverse and contradictory processes in the agrarian sector which are mainly related to the concentration of agricultural and food processing production, intuitive search for new organizational and legal forms of enterprises, adequate to a changing economic situation, and creation and development of agro-food chains. They serve as an integral part of the agro-

food system, promote the involvement of individual small and medium-sized producers to co-production in order to increase efficiency and competitiveness of the final food product to more fully meet the needs of consumers. Over the last twenty years, considerable practical experience has been gained in creation and development of agro-food chains, which requires its theoretical comprehension and generalization.

The main objective of the article is the generalization and elaboration of conceptual bases for the chain approach in the study of agro-food chains formation and functioning; the justification of measures for the orientation of their development to the sustainability principles. So, the objective of the article is to clarify the following problems:

a. Systematization of scientific and methodological approaches and principles to the definition, creation and construction of agro-food chains;
b. Typology of agro-food chains according to the main classification features;
c. Generalization of foreign experience in the assessment of functioning efficiency and enhancing of the sustainability of agro-food chains in actual conditions;
d. Justification of the proposals aimed at removing obstacles in the development of agro-food chains and to their sustainability.

Methodology

The theory of a chain approach is a rather young branch of scientific knowledge. The fundamental concepts of the chain approach are developed by well-known western scientists Porter (2006), Gereffi (1994), Kaplinsky and Morris (2003). The methodology of this study was based on works of the above mentioned scientists, as well as evaluative-analytical works and generalization of opinions of experts and practitioners in the agro-food sector of the economy, and included in the analysis of current trends and institutional environment in the field of agriculture, processing industry and trade. The research used scientific publications of leading world and national scientists, the results of studies of state-owned research institutions (on the institutional environment in agriculture and rural development) and those of statistics on production, processing, sale and consumption of agricultural products and foodstuffs.

Additional information on initiatives in creation of value added chains at the location of individual actors not registered by the State Statistics Committee of Ukraine was obtained from representatives of regional agriculture management bodies, technical assistance project staff, associations and international donor organizations operating in the territory of Ukraine. For the study of agro-food chains formation and functioning we applied the written questionnaire of their actors in agricultural and processing production. Namely, the agricultural producers having up to 50 ha, 100-500 ha, 501-2000 ha, 2001--5000 ha of agricultural areas participated in the questionnaire. Every group

was represented by 200 farms except the last one (agroholdings). The last ones were presented by 12 units working in the fields of egg and meat poultry breeding, dairy cattle breeding, cereals production and pig breeding.

Results

Organizational and economic transformations in the agrarian sector of Ukraine under the present conditions are aimed at transforming production into a virtually new system, which will be primarily targeted at the consumer – an indicatively regulated system. Such a production system, firstly, should be orientated at and take into account, as far as possible, the results of population's customization, namely to be targeted at needs, tastes and preferences according to the demands of different groups of consumers and their consumption budgets. Secondly, in the process of functioning, it should demonstrate and strengthen sustainability of its development, which does not only exclude, but also involves insignificant changes in its organizational and legal forms and territorial structure in order to achieve an optimal state and ensure sustainable development.

As known, the sustainable development includes three components: economic development, social progress and environmental stability, that is, preservation and improvement of the natural environment as a defining condition for current and future stability of the biosphere (Vergun et al., 2014). This is a maximum task and, therefore, the advancement to such a model of production system was accompanied by appearance of a number of transitional forms of territorial and production associations, the majority of which are based on network production structures.

Foreign scientists define agro-food supply chains as "a set of interconnected companies that work closely together in order to target the flow of goods and services across the entire value added chain of agricultural and food products, which will bring this flow to consumers at the lowest possible cost" (Beske et al., 2014), or as "activity that covers the stages from production to distribution, which ensures bringing products to final consumers" (Aramyan et al., 2006).

We believe that the most complete definition of agro-food chains is proposed by FAO (United Nations Food and Agriculture Organization) that defines it as a set of agricultural producers and organizations (or actors) that consistently coordinate creation of added value for the production of certain types of cultural products and their processing for the purpose of obtaining food products sold to the final consumer and after consumption are sent to waste, ensuring profitability at every stage, creating wider benefits for the society without permanent depletion of natural resources (FAO, 2014).

At the same time, Borodina defines agro-food chains as not only interrelated links of one process (including six stages: from producers of raw materials to consumers of final food products), but also (and above all) mutually beneficial

relations between groups of producers, sellers, processors and service companies that unite together to increase productivity and create added value based on understanding common benefits and fair distribution of the achieved result. Implementation of the concept of formation of agro-food chain can positively influence the earnings and employment in the agro-food sector, ensuring market access to small farmers and networking of small and medium processors (Borodina, 2014).

Consequently, the agro-food chain is an economic system consisting of different chain operators represented by suppliers of raw materials, providers of services, agricultural producers, processing organizations, distribution logistics organizations, marketing firms that promote delivery of products to the final consumer on the basis of provision of additional services.

The above-mentioned definitions of agro-food chains allow us to distinguish theirkey components: raw materials production, products supply, transportation logistics, economic feasibility, value added formation, sustainability of operation. Foreign researchers' attention is focused on the efficiency of supply and sustainability of agricultural food chains, which, in our opinion, is mainly due to their transnational character. However, national researchers focus on attracting small producers to agribusiness chains and to added value formation. This is perceived as an adequate response to domestic realities: it takes into account current peculiarities of agricultural production in Ukraine, as well as agro-food structures functioning, mainly at a regional and interregional level.

But in implementation of basic fundamentals of the Association Agreement (AA) between Ukraine and the European Union (of 16.09.2014), the focus of problems in agro-food chains is shifted to its lower link – relationships between producers of food raw materials and their processors. One of the key dominants of the AA is the provision / set of regulations on creation of appropriate conditions for gradual integration of the national economy into the EU internal market. For the agrarian sector, it is food production, which will meet the EU requirements for similar products and, therefore, it will have the right to export without hindrance to the European markets. In this regard, the problems of safety and quality of food raw materials and food products move to the level of their producers. Therefore, it is advisable to thoroughly analyse the situation in the primary segment of agro-food chains.

Creation of agro-food chains is an objective condition for combining the natural biological process of cultivation and mechanical harvesting of agricultural products with the process of their processing at the capacities of food industry and production of final food products, that is, it is necessary to launch an objective process of technological integration of primary production with processing and food facilities. How the relations between the actors of an elementary chain will develop can influence economic, social and environmental results of any integrated territorial production association's activity. These are

complex structures that arose on the basis of consolidation and strengthening of a large array of simple, spontaneously formed agro-food chains. It is important to determine the dimension and extent, as well as the minimum and maximum parameters of agro-food chains, in particular:

(a) The simplest (or primary segment) chain involves two participants: production of food raw materials and their processing, output and direct sale of food products.

(b) A full chain – at least five to six participants: production – transportation – processing – storage – transportation – sales. With regard to this chain, we can carry out various optimization options, namely: consolidation, isolation, division (Dankevich, 2011). This is about operations on agro-food chains within agroholdings, but they are completely related to the primary segment – its actors. However, current practice allows for optimization not only through physical separation or association, but also by other methods: (a) outsourcing – transfer of some functions, tasks, business processes to contractors or individual workers who can perform them better (for example, procurement of dairy products raw materials from the population, their accumulation in refrigerated tanks for transfer to processing capacity, provision of services for storage and transportation of raw materials and finished products, their realization); (b) outstaffing – directing employees most often from processing and food enterprises, to firms engaged in the sale of food products for a certain period, etc.

It is important to decide on the number of actors in agro-food chains with whom further research will be conducted. The smallest agro-food chain combines two actors: representatives of primary production and processing and food industry, i.e. enterprise- integrator (in other words, the first participant, or the initial link and the second participant, or the central or key link). Without them, creation and operation of agro-food chains, as well as the replenishment of new actors is impossible. It is due to the density of their connections and agreed coherence of actions that an increase in the chain up to the final participant or the final link – the sale of food products – takes place.

Another question is how many primary agro-food chains can an integrated formation – an agroholding, an alliance, a corporation, etc. – include? The key factor is the capacity of production: in order to ensure its full load, the contingent of primary participants is estimated at dozens (with ACE participation), and when it comes to food raw materials, whose production is concentrated on farms and PPF, their number can reach hundreds and thousands of participants. They are engaged in production of raw milk, cattle breeds, growing potatoes and vegetable crops. Their key feature is closeness to the enterprise-integrator. It forms the system of relations with primary actors of agro-food chains: on the one hand, depending on what the enterprise is like, what its purpose is and what the tools for its realization are; and on the other hand – what the array of primary actors involved in growing, collecting and transferring food raw materials for processing represents.

The union of primary actors in a single mission, to achieve the common goal and under the control of the central link, serves as a kind of "umbrella", under which all production processes take place and economic relations develop. Apart from this, the enterprise-integrator acts as a catalyst in increasing the search for unused reserves and resources, disclosing the innovative potential of each actor and the agro-food chain and their inclusion in effective production activities within the integrated formation. Agro-food chains have a different territorial structure and organizational-legal forms, but to ensure sustainable and continuous functioning are based on a single system of principles (Table 1).

Table 1. Basic principles underlying creation, functioning and development of agro-food chains (AFC)

Principles	Key characteristics
1. System	Use of a systematic approach in case of a natural occurrence or organized creation of an AFC as an organic whole
2. Voluntarism	Establishment of the AFC is carried out on a voluntary basis for the purpose of joint activity on the basis of commercial calculation and self-financing
3. Complexity	Cooperation of business entities (actors of AFC) on the inter-branch basis "raw materials – processing – finished products – realization"
4. Purposefulness	Vision of the common mission and the sole purpose of meeting the needs, demands and preferences of consumers for safe and quality food products
5. Unity of interests	Achievement of higher efficiency, productivity and profitability of agro-food production
6. Fairness	Objective consideration of production costs and fair distribution of income and / or profits received by AFC actors
7. Constancy	a) Maintaining the internal organization of the AFC with respect to external influences; b) Promoting economic development and social progress and eliminating dangerous environmental impacts
8. Collectivity	Conscious of the activities of all groups and employees of entrepreneurial structures included in AFCs as a necessary condition for survival, conservation and sustainable development in a changing economic environment
9. Innovation	Orientation to the involvement of social, environmental, organizational, marketing, logistic, information and computing and technological innovations, production of innovative types of food products and provision of innovative services

Sources: FAO (2014), Borodina (2014), Krysanov (2016).

Significant interest is caused by agro-food chains typology, the key classification parameters of which are various features:

– Technological: horizontally integrated, in which the output of finished products is carried out in ACEs or agricultural service cooperatives (ASCs), which maintain food-processing capacity; vertically integrated, in which

participants take part in various stages of creating a final food product; diversified – may be related, non-related, conglomerate (i.e. production of a new, linked or unrelated to the principal product, primary or final product);

- Territorial: the production and network structure which may cover different administrative and territorial enterprises: local (within a territorial community), regional (within several districts), interregional (within several regions), transnational (within two or three countries; for example, production process of processing of domestic semi-finished products ends abroad, for instance, processing of raw oil from Ukraine and turning it into the final product – oil for consumer purposes);
- Branch: dairy products (raw milk – processed milk and dairy products of industrial production); oil products (seeds of oil crops (sunflower, flax, rape, mustard, soya, corn) – vegetable oil); meat products (pig farms and poultry farms with a closed cycle of production: reproduction of young animals – production of forages – fattening of industrial herds – industrial processing of pigs and poultry – meat and meat products); grain products (grain – flour – bread); forages (grain (waste from food processing production) – mineral and organic additives – feed and feed additives (premixes); fruit and vegetable products (fruit and vegetables – essential ingredients and consumables – canned fruit and vegetable products), etc.;
- Organizational: small format (created with the participation of farms and PPFs, small and medium ACEs and ASCs, where food processing facilities are operating); medium format (created with the participation of farms and PPFs, small and medium ACEs and food processing facilities); large-scale (created with the participation of farms and PPFs, small, medium and large ACEs and food processing facilities, research institutions, design and development organizations, enterprises for production of technological equipment for national agribusiness, bank and parabank structures, etc.);
- Organizational and legal: "mild" – actors of agro-food chains carry out joint activities while maintaining full legal and economic independence; "firm" – chain actors in the organization or in the process of operation lost completely or to a greater extent legal and economic independence;
- Spatial-temporal: permanent functioning (raw materials are supplied daily: raw milk, eggs, fattened poultry and pigs); seasonal functioning (raw material are supplied seasonally: fruit, vegetables, potatoes); episodic functioning (repair young animals, fodder), etc.

It should be noted that foreign researchers, depending on the specifics of primary and final actors, as well as the scale of the served food market, distinguish the following types of agro-food chains:

- Traditional, consisting, as a rule, of small farmers, who directly sell products produced at their own households to consumers, mainly in local markets;
- Modern, covering national and transnational agro-food enterprises that deliver and sell food (agricultural, i.e. unprocessed or fresh (green) products from producers to the networks of powerful supermarkets;

– Modern-traditional, which include national and transnational agro-food enterprises, which sell their own food products through a network of traditional sellers and retailers;
– Traditionally modern, covering the supply of food products from small farmers and agro-food enterprises to small traders and modern supermarkets (Gómez, 2013).

It should be emphasized that the above typology refers not to a single agro-food chain, but mainly to their aggregate. This allows, at a certain stage of generalization, to speak about integrated formations based on a united network of primary agro-food chains and "targeted at" the enterprise-integrator.

At the present stage, the views of scientists and practitioners are increasingly focused on peculiarities of organization, conditions of functioning, institutional norms and informal rules and forms of socio-economic relations, both between actors in the agro-food chains and between members of participating teams. Ensuring improvement of functioning of agro-food chains is possible on the basis of a deep and comprehensive disclosure of their internal innovation potential, intensifying the role of each actor in the chain of increasing value added, identifying and eliminating problems and obstacles that hinder these positive processes. Consequently, special attention should be paid to the issues of effective and targeted interaction between actors in agro-food chains, which requires a detailed analysis of their structure.

In particular, agricultural producers include the entire spectrum of business entities: farms and commercial PPFs, ACEs of various organizational and legal forms (joint-stock, cooperative, state), etc. But, given the technological need for the transfer of grown products to the next actor, their safety and quality are at the forefront. According to expert estimates (Buryak, 2013), in Ukraine, most agrarian enterprises do not have a systematic approach to quality management, and introduction of systematic safety methods is practically in their infancy – only 3% of agricultural producers have introduced them (Krysanov, 2016). Therefore, a logical question arises: how is compliance with the normative parameters of quality and safety of food raw materials guaranteed by agricultural producers, where there are no functional management systems (MS), that is safety and quality?

In our opinion, on the one hand, there exists the effect of traditionally used technology, as well as the deficit and high price of agrichemicals, chemical plant protection products, hormonal preparations for accelerated growth and veterinary preparations for treatment of animals, which leads to the maintenance of natural and environmentally safe technology of raw materials production. On the other hand, at ACEs, where the technology of industrial production is implemented, all these aspects are detailed in technological cards and their strict performance is a guarantee of compliance with quality and safety parameters of raw materials. However, on the way to European integration, this approach is unacceptable and particularly risky in animal products.

Key characteristics of enterprises – integrators of agro-food chains, which form relations with other actors, are:

- Food specialization of the enterprise and available (design) and actually operating (used) capacities for processing of food raw materials;
- Number of employees (from a few workers to several thousand);
- Territorial placement of food industry capacities in relation to the location of food producing enterprises;
- Transport accessibility between points of growing of food raw materials and production facilities for their processing;
- Markets for realization of finished food products, etc.

It is important to draw attention to the problems of relationships between actors in agro-food chains. It is necessary to fully reveal their internal potential and to provide additional diversified preferences: increase of cash receipts, mitigation or complete "removal" of contradictions between separate units and between members of their labour collectives, reduction of ecologically dangerous load on the environment, dematerialization of production, etc.

Integration of enterprises requires proper convergence of technological transitions, in particular products with processing facilities. But problems in organizational and technological units (places of transition from the primary link to the key one) are not limited by only optimization of volumes of food raw materials with processing and food facilities under current conditions. In our opinion, actual and potential inconsistencies, neglect, asymmetry and discrepancies are much larger and include:

- Deficiency, poor quality unconfirmed by certification (necessary laboratory-diagnostic procedures) compliance of food raw materials with the safety requirements fixed in national standards or technical regulations of the European Union;
- Low level of implementation of systematic safety methods by enterprises of primary production, as well as lagging with the introduction of MS of safety (HACCP and State Standards of Ukraine (DSTU) ISO 22000: 2007) on processing facilities in accordance with the Law of Ukraine on food safety (Law of Ukraine, dated July 22, 2014, No. 1602-UII);
- Lack of perfect methodological developments regarding objective evaluation of each actor's contribution to creation of the final food product, as well as the increase in value added by each of its links;
- Absence of perfect methodological developments regarding fair distribution of income and / or profits between chain actors;
- Lack of economic interest in the development and strengthening of direct relations between primary and key actors in chains outside the zone of influence of integrated formations, etc.

According to the provisions of the framework law of Ukraine on food safety, one of the obstacles hindering the integration of the agro-food sector into the EU internal market, is compliance with the requirement for the mandatory introduction of HACCP on food production facilities. Consequently, this is the key issue, whose successful and comprehensive solution will have an impact on sustainable and efficient functioning of agro-food chains.

One of the indicators for solving this problem is availability of functional MSs (safety and quality) at food industry enterprises, as well as introduction of other systemic safety methods by primary production entities. It should be noted that as of 01.01.2017 in accordance with the requirements of international standards in food industry there were functional MSs:

– ISO Series 9000: there were certified 403 units of Quality Management Systems, in the stage of development and implementation there were 46 units;
– ISO Series 14000: there were certified 43 units of Environmental Management Systems, under development and implementation there were 14 units;
– HACCP: there were certified 342 units of Food Safety Management Systems, under development and implementation there were 150 units;
– DSTU ISO 22000: there were certified 552 units of Food Safety Management Systems. Requirements to any organization of the food chain, at the stage of development and implementation there were 128 units.

In general, 1340 MSs were certified in food industry, and there are 338 functional systems under development and implementation at 979 enterprises out of 1118 (i.e. 87.5%) that are subject to the relevant ministry. The total number of enterprises is 5.5 thousand, including more than 4.4 thousand of small ones. Thus, more than one hundred medium-sized enterprises are waiting for the implementation of the HACCP. As for small enterprises (SEs) in food industry, there is no statistical information and, therefore, it would be advisable to conduct a survey and find an answer to the key question: what type of possible systemic safety methods is appropriate for them. Its main variants are as follows:

(a) Introduction of HACCP (or DSTU ISO 22000:2007 provided that SEs are a link of a functioning agro-food chain);
(b) Auditing for the conformity of production with minimum requirements of basic programmes (ISO / TS 22002-1: 2009 Programme of mandatory preliminary measures for the safety of food products – Part 1: Production of food products) in order to further eliminate identified nonconformities (i.e. being not ready to meet these requirements);
(c) Introduction of flexible or simplified procedures based on the principles and approaches of the HACCP, taking into account the level of product safety.

In primary production (agriculture, forestry and fishery), there are 77,400 business entities. In particular, among agricultural producers, according to expert estimates, there are approximately 1.1-1.5 thousand agricultural enterprises, where such procedures are permanent, namely:

(a) Implemented Safety Systems (HACCP or DSTU ISO 22000:2007) as an integral part of agro-food chains;

(b) Independently conducted an audit for production compliance with the minimum requirements of the basic programmes (ISO / TS 22002-3: 2011 Programme of mandatory preliminary measures for the safety of food products, Part 3. Production of agricultural products);

(c) Conducted a similar audit within the framework of agro-food chains to which they were included; such practice is realized both in integrated formations, and by independent entrepreneurial structures, connected by technological ties (raw materials – processing) (Krysanov, 2016).

In the structure of primary production, according to the framework law of Ukraine on food safety it is necessary to select a group of producers of meat, dairy products and fish raw materials that will be aimed at processing of raw materials into final food products, after the cultivation process is completed. Fixed terms (to 20.09.2017) for introducing systemic safety methods have been set. Statistics points out three subgroups:

(a) Animal husbandry – 2426 enterprises and 87.9 thousand employees (on average 36 employees per livestock farm);

(b) Mixed agriculture – 1028 enterprises and 4.7 thousand employees (on average 4 employees per one farm);

(c) Fish farming - 881 enterprises and 5.5 thousand employees (on average 6 employees per one fish farm).

The rest of agrarian enterprises mainly produce the products of plant origin, among them there are three main subgroups:

(d) Cultivation of annual and biennial crops – 38,856 enterprises and 409.6 thousand employees (on average 10 employees per one farm);

(e) Growing of perennial crops – 1121 enterprises and 15.4 thousand people employed (on average 14 workers per farm);

(g) Plant reproduction – 159 enterprises and 5.5 thousand employees (an average 11 employees per farm).

Introduction of systemic safety methods at agricultural enterprises for cultivation of products of plant origin will depend to a large extent not only on the level of compliance with the minimum requirements of the basic programmes, but also on the interest of food processing enterprises in obtaining safe and quality raw materials. Under current conditions, creation of agro-food chains takes place without a clear identification and appropriate fixing of specific commitments in Agreements, taking into account specifics of economic relations and technological requirements on both sides in order to bring products and food processing production to regulatory parameters.

The economic activity of Ukrainian agroholdings should be assessed as well. In 2012, there were 129 agroholdings functioning in the Ukrainian agriculture. They controlled about 8.7 million hectares, namely 21.0% of the country's agricultural land, completely absorbed or took under control more than 6000 conventional agricultural units (Lupenko and Kropyvko, 2013). In our opinion, the results of operation of chains are contradictory and asymmetric, in particular:

– The economic development has a positive trend, but at the same time we should highlight the welfare worsening of rural areas that became a territorial-production base for holdings;
– The social progress takes place in the groups of actors, but declines in the social sphere and rural territories degrade;
– The fertility becomes lower and agricultural land degrade, etc.

Agro-food chains also operate outside agricultural holdings, but the nature of their emergence, resistance to external influences, and the length of existence do not allow us to make a definite conclusion about their sustainability. This is due to the domination of economic interests of food processing enterprises over the subjects of entrepreneurship of primary production, which causes resistance of agricultural producers and often leads to curtailment or even to termination of their activities. A classic example: low prices for raw milk, which dairy enterprises collected from individual households. Practical results: a long-lasting stable trend in reducing dairy livestock in the individual households as a result of discriminatory economic relations. It should be noted, though, that this was preceded by other factors, in particular, aging of rural population and its reduction.

Consequently, in order to overcome the existing disparity, to develop and strengthen direct relations and to establish equal relations between actors in agro-food chains, it is necessary to consider the following as a defining condition: guaranteeing the balance of economic interests of producers of food raw materials with food processing enterprises. At the same time, since even the simplest agro-food chains, as a primary production system, function and are closely linked to the natural environment, not only economic but also environmental and social problems generated by entrepreneurial activity, require the search for adequate approaches to their successful solution.

The strategy of sustainable development of agro-food chains on the basis of a combination of agro-zoo-veterinary, and food processing technology and resource support, taking into account trends of climate change, ecology of the environment, deterioration of water quality and reproductive functions of soils, is worth paying attention to. Understanding the acute need for agro-food production on the basis of sustainable development, the background of which is sustainable development of primary agro-food chains, by all subjects of entrepreneurial activity, power structures and consumers of food products is of paramount importance. On the other hand, key problems of agro-food produc-

tion should be considered in a comprehensive manner, namely: taking into account the acute need to comply with ecological requirements for functioning of rural, forestry and fishery sectors – namely through the prism of maintaining, preserving and protecting natural resources, and the environment in general.

Of particular significance is the problem of harmonizing the interests of actors in agro-food chains with public interests related to ecology, social climate in teams and society, employment of population and possibilities of expanding the sphere of application of labour, etc. Since both primary and key actors in agro-food chains are represented by a diverse spectrum of subjects of entrepreneurial activity, it is necessary to systematize common problems of scientific-methodical and applied nature including:

(a) Identification of sources of pollution, assessment of direct consequences and delayed destructive effects of agro-food production on the environment (see case);
(b) Legislative fixing of permissible load parameters on the environment;
(c) Substantiation of directions, development of tools of localization and overcoming destructive consequences of pollution of the environment with the direct participation of actors of agro-food chains;
(d) Identification of causes, direct and indirect consequences of dissatisfaction with conditions of employment and payment, etc. among workers in labour collectives.

We believe that national scientists are only at the initial stage of identifying the above-mentioned problems and finding solutions to them. But abroad there has been gained a lot of experience in this area, which needs to be analysed, adapted and implemented where possible in accordance with our realities.

In particular, foreign researchers believe that main challenges for agro-food chains in modern conditions are seasonal nature of production, losses from damage, absence of necessary market infrastructure in certain regions, weak market relations at the level of farmers, and the strengthening of the requirements for the quality and safety of food raw materials and finished products (Canavari et al., 2002). At the same time, other researchers point out that the process of commodity flow management is central to the supply chains, where the market and regulatory decisions of the state interact through decisions of the government, private players and the rural community to achieve efficiency and responsibility (Chandrasekaranand and Raghuram, 2014). For us, it is important to exchange the latest knowledge at all stages of agro-food chains to ensure their sustainability. This will be critical for maintaining quality and safety of products, extending expiry dates while storing perishable food products.

One of the essential indicators of the efficiency of agro-food chains functioning is the level of satisfaction of final consumers with food products (Fischerand and Hartmann, 2010]. This requires establishment of systematic quality con-

trol and product safety at all stages of commodity movement, which will foster the confidence of consumers in these products. Changing consumer preferences and the environment plays a decisive role in ensuring sustainability and efficiency of agro-food chains, as the quality and volumes of agricultural products depend heavily on weather conditions. The best international practice has convincingly proved that increasing the efficiency of agro-food chains functioning is possible when following key principles such as: high transparency, hygienic safety, clear traceability and quality of food products.

In particular, hygienic safety is provided by the so-called "cold chain" at all stages of storage and transportation of products from the manufacturer, carrier, wholesale and retail trade and to the final consumer. It should be noted that the "cold chain", which guarantees preservation of freshness and quality of agricultural products, is planning and controlling flows of agricultural and food products in the supply chain in order to meet the needs of consumers, subject to strict observance of the specified temperature regime. At the same time, the ability to monitor changes in the state of products in the process of production, processing and commodity circulation, is also an important element in the food safety system.

Foreign scientists who conducted research under the auspices of FAO adhere to the view that the concept of sustainable functioning of agro-food chains is based on the following three important provisions:

(a) Agro-food chains are dynamic market systems, where the main element of the association is vertical management;
(b) Concepts of sustainable agro-food chains cover different scales (region, industry, country);
(c) Added value and sustainability are precise and multidimensional indicators of the efficiency of functioning of agro-food chains in the integrated (complex) value.

An important connecting element is the agro-food chain management system, which implies the nature of relationship between participants both at a certain level of the chain (horizontal links) and the chain as a whole (vertical links). This relates to elements such as information exchange, pricing, product compliance with standards, payment mechanisms, contracts between food chain actors as to distribution of food to the final consumer, which play an extremely important role in the value-added process.

Consequently, agro-food chains are the driving force behind economic growth, as they contribute to creation of added value on the basis of the following components: salaries and wages of employees; return on assets (profit) of entrepreneurs and owners of assets; tax revenues to the budget and non-budgetary funds; diversified food supply to final consumers; total impact on the environment (positive or negative). In its turn, added value creates conditions

and preconditions for the growth of such components that can be correlated with economic, social and environmental sustainability, namely:

(a) Investments – profit and savings are reinvested in the economy and for the needs of improving the consumption by the population;
(b) Social progress – the state spends money received to support proper development of the social sphere, preservation and protection of the natural environment;
(c) Welfare of the population – income of employees of groups – participants of agro-food chains is increasing and the opportunities to meet their needs and demands more fully are expanding.

In order to ensure stability of chains, it is necessary to use actively various effective institutional mechanisms that will promote:

(a) Fair distribution of increased value added;
(b) Reduction in the use of non-renewable natural resources;
(c) Limiting the negative impact on the environment, etc.

At the same time, the three constituents of sustainability are closely interrelated: social and environmental sustainability largely determine access to the market (compliance of products with the requirements of standards), and economic sustainability contributes to increasing competitiveness on the basis of market differentiation.

It should be noted that the agrarian sector of Ukraine is gradually adapting to the European requirements regarding safety and quality of food products, which is an important prerequisite for the development of regional and national agro-food chains to the level of transnational ones. Under such conditions operational access of food products to the European markets will be ensured and, on this basis, incremental value added will be generated. This opens up new opportunities for small producers to have an access to these markets, and, accordingly, will help them to receive additional revenues.

Ukraine entered into the new economic reality linked with the processes of globalization, European integration and climate conditions changes for the agriculture. It requires the development of new strategic priorities for the agrarian sector in general, as well as for the development of agro-food chains in new conditions taking into account macro-economic, technological, external-commercial and climatic risks. At the same time, the agrarian sector of Ukraine became more stable in its development as compared with functioning of all national economy. But, this stable tendency to growth can be observed only in plant production. Although, regarding the fact that during the last 5 years the humidity has been insufficient, we can say that this field has risky character and we can expect the lowering of yields in the nearest perspective. Other risk consists in the domination of raw materials (grains, colza) in the export structure. It does not allow using potential of the

added value creation in agro-food chains. Beside this, the functioning of the Ukrainian agricultural sector is followed by higher economic risks. This factor decreases stability of its growing namely due to rapid inflation, devaluation of the national currency, low accessibility to credits, absence of complex insurance programmes, etc.

The following measures should become strategic tasks for achieving sustainability of agro-food chains:

- Increasing added value in agro-food chains by their prolongation (deep processing of agricultural raw materials, creation of competitive logistic units, processing of agricultural and food wastes on biofuel etc.);
- Increasing competitive ability of Ukrainian agro-food products, that will contribute to the creation of added value in export oriented agro-food chains;
- Formation of efficient system of commodities movement for promotion of agro-food products at internal and external markets, this system should minimize cumulative expenses and risks of lowering quality;
- Aiming at interaction with the world scientific community for adaptation of the agriculture to climate changes, creation of the background for abilities to apply innovative agricultural technologies on the base on public-private partnership for increasing agricultural production productivity and for minimizing negative impact on the environment.

Discussion and conclusion

Agro-food chains are an integral part of the agro-food system, whose effectiveness and sustainability will largely depend on economic well-being of their actors. However, under current conditions, creation, development and functioning of agro-food chains are burdened with a number of problems such as: disparity of economic relations between the participants, a low level of implementation of systemic safety methods in the sectors of primary production, lagging behind with the introduction of safety management systems at processing and food facilities, unconfirmed compliance of food raw materials with normative parameters of safety and quality, unregulated relations regarding distribution of income / profits between the actors, etc. In order to attract small and medium-sized commodity producers to these chains so that they can obtain appropriate benefits, it is necessary to deal with: disparity of economic relations between its participants; low implementation of system safety methods in the sectors of primary production, lagging behind the introduction of safety management systems at processing and food facilities; unconfirmed compliance of food raw materials to normative parameters of safety and quality; unregulated relations in relation to the distribution of income / profits between the involved persons (actors) etc.

In order to attract small and medium-sized commodity producers in these chains in order to obtain the appropriate benefits, the following is necessary:

- Intensification of the practical activities of the administrative structures of the profile of the ministry and industry associations for the introduction of systemic safety in the sectors of primary production, especially in relation to the cultivation of animal products (milk, meat, eggs, fish, other seafood) and its subsequent processing or marketing on food markets.
- In further studies of agro-food chains functioning in Ukraine we should emphasize the development of measures for minimizing impact of every chain's actor on the environment. It should be necessary to justify and to codify by law the quantitative indices of the tolerable impact on the environment in agro-food chains of meat and eggs poultry breeding, meat and dairy cattle breeding, etc. Nowadays, the processing of agricultural and food wastes on biofuel have high importance. For example, law-grade fats generated from meat poultry breeding are not used, but their processing could contribute to the prolongation of agro-food chain, to the accumulation of added value, and of course, it could minimize negative impact on the environment.
- In present conditions it is necessary to study further social aspects of agro-food chains functioning, namely fair distribution of incomes among their actors. A very important in the Ukrainian conditions is the employment of rural population and providing a proper salary. As in actual conditions big agroholdings renting large surfaces do not take care of the development of rural territories. So, it could be helpful to elaborate scientific and methodological provisions for the evaluation of contribution by every agro-food chains' actor to the income and added value and their distribution among different actors. These provisions should be elaborated on the basis of inter-sectoral agreements (agreements of conciliation commissions).

The experience of developed countries in Europe shows that the main benefits for actors in the agro-food chain are formed through the production of safe and high-quality products, its operational delivery to the enterprises of the commercial network and its timely implementation.

In this sense, domestic producers should actively explore the world's leading experience and implement it through the understanding of the realities of an economically changeable market environment. Only in this way we will be able to master modern production technologies and find ways to promote our own food products to European markets and other countries, as well as to form positive changes towards increasing the culture of consumption of quality and safe agricultural products on the domestic market.

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Challenges for farmers' collaboration in the post-industrial economy

Abstract: *This article discusses the differences between incentives and forms of farmers' collaboration in agrarian, industrial and post-industrial economies and introduces collaboration examples based on the concept of a two-sided network as a new phenomenon appropriate for the post-industrial era. During the last decade the concept of a two-sided network (market) has been utilised predominantly by ICT businesses, however, the authors believe it has potential to become a general theoretical background for the revision of cooperative movement goals and means relevant to a post-industrial economy.*

Keywords: *two-sided network, short supply chain, cooperation, farmer, consumer, post-industrial economy*

Incentives and forms of farmers' collaboration in agrarian, industrial and post-industrial societies

The content, quality and intensity of collaboration all change as a result of common experiences and outcomes of the collaboration (Ploetner and Ehret, 2006). Research on business relationships suggests that the evolution of partnerships is a time-consuming process (Dwyer et al., 1987; Johnson and Selnes, 2004). However, the economic system has a significant influence on collaboration incentives and forms. Analysis of farmers' collaboration showed that the methods used by agrarian and industrial societies differed. The most important economic resources in an agrarian society are land and labour. Farmers help each other in various types of agricultural work with the common aim of finishing cultivation work on time. Working together in sowing and harvesting of crops or in other agricultural work increased their collective labour productivity. In an industrial society, capital is the most important resource for economic development.

New incentives for the establishment or enlargement of farmers' cooperatives have emerged since a certain degree of agricultural industrialization was reached. Small farmers were encouraged to cooperate with each other as a response to changes that occurred on the market. Oligopoly or monopsony, with a large number of small farmers, but only a few or one agricultural product collector and processor, more frequently appeared on the market of agricultural products as a result of expanded food processing companies. Oligopoly or monopsony also appeared more frequently on the labour market in some rural regions since the mechanization of agricultural production processes resulted in less employers being willing to employ agricultural workers. Oligopoly or monopsony also resulted in distortions of competition. Studies confirmed that these processes and other market distortions, along with increasing transactional costs, were a considerable incentive for farmers to cooperate and take collective action (Milford, 2004; Novkovic, 2006 and 2008). A lack of capital encouraged the establishment of cooperatives as it was the most convenient way of including a large number of farmers into the capital accumulation process. By consolidating their small physical and financial capital and establishing a formal united organization, members of the cooperative conceived a scale effect as market players and producers.

The rise of the post-industrial economy has created new possibilities and needs for joint economic activities. In the post-industrial economy the most essential economic resource is knowledge (this stage of the economic system evolution is often called "the knowledge economy"). Therefore, the collaboration should be implemented in ways that lead to the creation and accumulation of knowledge. Thus, alongside traditional cooperatives, new forms of collaboration, such as clusters, strategic alliances, networks of innovators, etc., were established. New forms of collaboration do not require the establishment of a formal organization; their management models are more flexible and more focused on the maximum use of knowledge. Unfortunately, cooperative studies still pay little attention to the influence of the post-industrial economy on the economic collaboration needs and forms.

A two-sided network as a key post-industrial collaboration model

The post-industrial society is often called a "network society". According to Castells (2011), in the 21st century humanity has entered the era of networking, where many functions and processes are implemented through networks. Networks become the main tool for management and public administration, which contributes to the achievement of new knowledge, exchange of information, and experience. Networking theories ensure the smooth progress of these processes and results. The development of the network theory, especially the concept of the two-sided network, presents new opportunities for organizational forms and management of cooperative organizations. The two-sided network (market) concept is rather novel: the first publications analysing two-sided network effects in business management appeared in the first decade of the 21st century. A network with homogenous members is called a one-sided network, as opposed to a two-sided network which has two distinct groups – the so-called parties – whose respective members have different and sometimes contrary goals. In fact, a one-sided network can be described as a part of a two-sided network because two-sided networking also generates same-side network effects, although it concentrates on cross-side network effects (cross-side network effects mean that the strengths or weaknesses of one side have an impact on the growth of the other).

A two-sided network must have a platform that creates a certain infrastructure and sets the rules for its cooperation to facilitate execution of transaction (Eisenmann et al., 2009). As in one-sided network, an important function of two-sided network is to reduce transactional costs. According to Hagiu (2006), this can be implemented in two ways using two-sided platform: firstly, by reducing the costs of information search prior to the transaction, and secondly by reducing total indirect costs of transaction participants in the process of transaction.

Cooperative societies of the 20th century were organized as one-sided networks. A cooperative was usually defined as a group of homogenous members acting together to meet the common needs and aspirations of its members. This means that during the industrial stage of the economic system, the cooperative organization traditionally joined homogenous members who were aiming for the same goals.

In response to globalisation at the end of the 20th century, agricultural cooperatives in the United States and Western European countries were restructured, merged or started to apply new organizational models. Particular attention was paid to operational changes, specifically to the extension of the processing and marketing process of agricultural products using cooperative efforts, thus obtaining greater value-added for the same amount of production (Cook, 1995; Ortmann and King, 2007). However, the changes were focused

on the accumulation of capital and as Chaddad and Cook (2004, p. 1) outline "alternative organizational models mainly differ in how ownership rights are defined and assigned to economic agents tied contractually to the firm – members, patrons, and investors".

In the 21st century, major shifts in dietary patterns are also occurring throughout the world. There are attempts by an increasing number of local food movements to fundamentally reform the global food system. As Marsden (1998, p. 110) states "Food markets are becoming more differentiated on the basis of a range of socially constructed food quality criteria", resulting in the emergence of new quality-food markets in addition to (and superimposed on) existing anonymous mass food markets (Renting and Marsden, 2003, p. 393). At the time new markets are created, most attention is focused upon reconstructing the food supply chain, with the aim of minimising a number of chain elements that increase the distance between farmers and food consumers. A key characteristic of the new supply chain is its capacity to resocialise or respatialise food, thereby allowing the consumer to make new value judgments about the relative desirability of foods on the basis of their own knowledge, experience, or perceived imagery" (Renting and Marsden, 2003, p. 398). According to Woodhouse (2010) "for reform of the existing, large-scale "global" food system, in which much of the value chain of food is controlled outside agriculture itself, it would seem that more attention needs to focus on governance of the system, to discipline its drive to profit and accumulation by the effective introduction and imposition of social goals. As yet, steps in this direction have hinged on "consumer activism" (e.g. in "fair trade" campaigns) which have demonstrated the capacity of highly concentrated food marketing systems to implement broad, if incremental, change" (Woodhouse, 2010, p. 451).

Evolution does not deny the achievements of the previous period, therefore, one-sided networks do not lose their importance in certain functions and remain an important part of the economic system. However, in the post-industrial stage of development, objectives and methods of a one-sided network must be supplemented by a new important economic resource of the post-industrial stage – knowledge. The size and effect of networking in the post-industrial society depend upon the existing knowledge of network members and initiatives, and the ability to apply this knowledge in practice. Moreover, importance is placed on particular knowledge of the needs of consumers, illustrated by Ploetner and Ehret (2006, p. 5) in outlining that "collaboration between buyers and sellers becomes more intensive and contains new elements and processes that are subject to cooperation". However, knowledge must be applied not only to the one-sided network model, but the two-sided network model as well. If the cooperation movement previously separated firstly farmers' cooperatives, seeking to accumulate capital in one organization, and secondly consumer cooperatives, whose purpose was to help members purchase necessary goods for a better price, then in the 21st century farmers and consumers have to create a joint organization, utilizing the two-sided network model. Creation of this new type of cooperative organization is especially

important for small farmers as they can, as in the industrial stage of development, become active advocates of this organizational innovation, encouraging collaborative efforts.

In the next chapter, two short case studies are presented, with the aim of explaining the incentives and forms of collaboration, which provide the basis for an innovative collaboration approach; and main components of the two-sided network organizational model used for cooperation between farmers and food consumers. The first case study describes the two-sided network functioning at a regional level, and the second case presents an organizational model of the two-sided network established at a national level. The first network was established by farmers and the second by food consumers.

The following two organizational models describe the main components of the two-sided network:

- Characteristics of both sides of one-sided and two-sided networks.
- Main instruments of the network platform which creates channels for new product circulation between producer and consumer.
- Evidence on effects of one-sided and two-sided networks.

Case study of the two-sided network "Vivasol"

The creation of the two-sided network "Vivasol" was initiated by an innovative farmer. The initiator of this two-sided network, Valdas Kavaliauskas, decided to escape the "rat race" lifestyle. He moved from the capital city to Darguziai village, situated 60 km far from Vilnius, and became a farmer. However, he did not want to be an ordinary small farmer and decided to raise goats and to produce goat milk cheeses based on French recipes.

Fresh and matured goat milk cheese was an innovative product for the Lithuanian market, with consumers being prepared to pay a higher price as compared to cheeses produced in the industrial way and imported from other countries. The biggest problem for Kavaliauskas was to find a market for these products. A small farm could not take advantage of traditional food supply channels, as in Lithuania about 90% of the food market is concentrated in large shopping centres which require large quantities of product. This form of trade requires high costs of advertising a product with the aim to make your product recognizable among many similar products. Kavaliauskas offered his innovative product to the market but traditional advertising methods were not sufficient to promote it. In order for consumers to purchase the new product, it was necessary to offer tastings to have the opportunity of talking about the method of production, the uniqueness of the product, and its nutritional characteristics.

Characteristics of both sides (members) in this network

Valdas Kavaliauskas did not want to rely solely on random sales in the farmers' market and started to bring together consumers of his products and established a group of "goat cheese lovers". Food gourmets who supported the concept of local food and slow food became members of this group. This group agreed to organize weekly meetings at a particular meeting place so it was possible to plan production quantities and assortment in advance.

Regular communication with consumers increases the understanding of their needs and helps the business thrive in offering a wider range of products. A wider assortment of products has been proposed not by expanding their own production capacity, but offering other farmers of Darguziai village and nearby areas the opportunity of producing different kinds of cheese and cooperating at the sales stage. The farmers cooperate in providing their production to the permanent consumer group with the principle that a new farmer can become a member of this network under the condition that he/she produces a different product than the existing members. Thus "Vivasol" can offer consumers not only several types of goat milk cheese, but also a wide range of cows' milk cheese produced on farms that have important features for customers: a fresh, natural and unique taste. In addition to dairy products, consumers can purchase honey, vegetable and fruit products. The network members – farmers put forward another important factor – the desire to be closer to nature and enjoy a feeling of freedom. Most of them are former city residents, and these needs are effectively met by the pattern of their life in the countryside where they practise small farming.

This project of innovative cooperation, developed in 2008, became a two-sided network in 2016. It consists of a network platform with basic tools and two types of members: 12 farmers of Darguziai village and farmers from neighbouring areas, and of Vilnius cheese lovers (about 400 persons) (see Figure 1). The members of the consumer group are open-minded and active in various innovative ways of cooperation, quality of food, and environment. A number of consumers actively participate in events organized by "Vivasol" as celebrations of public holidays, community volunteering, open door days and discussions. Consumers who are willing to learn about the farming and cheese-making process also have an opportunity to be invited as volunteers in the cooperative's activities.

Main tools of the network platform

There are two main platform tools used by two-sided network "Vivasol": (i) Cheese Farm Market – Discussion Club in one of Vilnius cafés; and (ii) the Cheese House in Darguziai village. They help establish a close link between rural and urban areas. The Cheese Farm Market every Saturday invites consumers to participate not only in purchasing cheese. The cooperative "Viva-

sol" has more general objectives. Each week in the Cheese Farm Market and during organised events, the members discuss possible ways of improving quality of living in rural areas. With this aim, the network assists the survival and establishment of small farms by inviting urban citizens to come to the village and join activities organised in rural areas, festivals, and farm work. Consumers have the opportunity to express their opinion on the cheese flavour, recipes or make suggestions for new products they would like to purchase. Therefore, the continuation of the cheese-making process has started to achieve producer and consumer co-production.

Many urban people are visiting the village as customers of the Cheese House or the participants of festivals, lectures, discussions, and farmers' meetings with urban consumers, where tasting of new products and knowledge of how to improve recipes is provided. Rural people are also encouraged to visit the city, to learn about city life, the activities of urban people, and to understand what people distanced from the natural environment think.

In addition, by developing activities of the network, a "cheese school" was established for farmers of other regions who want to start a business of cheese production. Here also various ferments for cheese production and equipment for small processors are sold. Both consumers and farmers are actively engaged in Slow Market project events, when educational events and various festivals organized by farmers provide an opportunity for consumers to learn not only what they eat, but also how it becomes a product on their table, and why they should care about it.

This platform also serves as a distribution channel, for example, selling cheeses at social events, in small ecological food shops in cities, etc., arranged by network members – consumers.

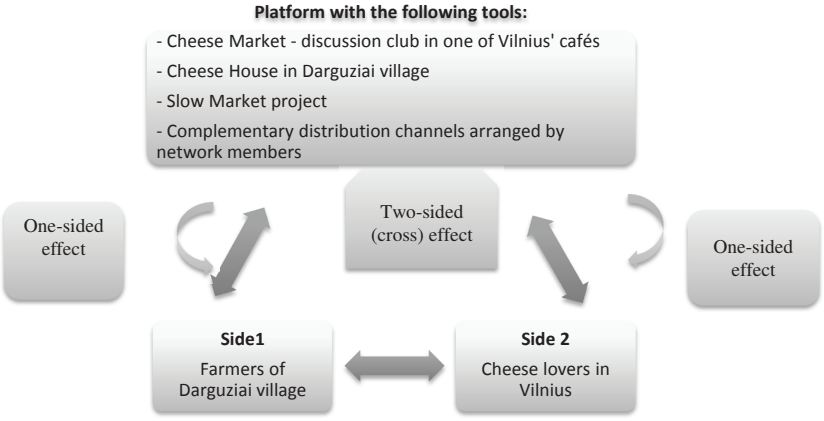

Figure 1. Structure of two-sided network "Vivasol".

Source: composed by authors.

Evidence of one-sided and two-sided effects between members of "Vivasol" network

The network was successful in creating one-sided and two-sided effects among the members of "Vivasol". At the outset, network members were successful in creating a strong one-sided effect among the farmers focusing on production of cheese. When the market for these new products was created and the large two-sided network was functioning very effectively, two-sided effects increased as well.

The farmers participating in the "Vivasol" activities receive a one-sided effect at the stage of formulating assortment of cheeses as they specialise by producing only particular types of products, which reduces production costs and achieves better use of their time and equipment. The one-sided effect is also received at the stage of production and logistics. As network members they achieve a scale effect because products produced on individual farms are transported and sold together.

The two-sided effect occurs as a result of the pre-order system that exists within the network. As a result, transactional costs are significantly reduced for both farmers and consumers. Farmers who have stable buyers can collect and continually update their knowledge about the needs of users. Farmers communicating with end users without intermediaries achieve a better price for their cheese, resulting in higher revenues. On the other hand, consumers can negotiate the price with the farmer and optimize their benefits. The pre-order system reduces storage costs and avoids losses of unrealized production due to spoilage. Pre-orders, and the opportunity to cooperate with other farmers to deliver cheese to one specific place and quickly distribute it to consumers, save farmers' time compared to the trade at the market only. In addition, farmers can attend product weighing and packing operations at a time convenient for them, or employ others; thus making efficient use of working hours. The network allows long-term relationships to be established with consumers and to derive stable income flows, ensuring farming stability and security.

Recently, leaders of the network have made efforts to increase the one-sided effect to the other side of the network – for consumers. The one-sided effect for consumers of cheese is a result of the opportunity to purchase exclusive products without preservatives, which are responsibly produced by farmers with similar values and worldview. Although consumers have been able to purchase cheese every week at the time of meetings, not all members are able to come at a particular time. Therefore, more places for selling cheese have been created, and a delivery system based on pre-orders has been developed. Cheese lovers also have a positive impact on these initiatives by exploiting their personal contacts to organize cheese tasting events, cheese sales in organic food shops, or at various leisure or work events.

The two-sided network of consumers and farmers "Village to your home"

Creation of the two-sided network of consumers and farmers in Lithuania was stimulated by the increased demand of local food produced by farmers. Large numbers of Lithuanian people are no longer satisfied with making yes or no decisions on what food processing enterprises offer. However, the majority of the urban population in Lithuania has to accept traditional food marketing channels because they do not have time to find direct contacts with farmers and to organize the supply of fresh, locally produced products to their household. Therefore, the two-sided network of consumers and farmers was established by consumers who aimed to create an innovative marketing instrument, for the convenience of organizing direct purchases; thus enabling both farmers and consumers to benefit from the short supply chain.

The initiative of encouraging cooperation between farmers and consumers, using an innovative interactive communication platform for the creation of a network, was initiated by researchers of the Lithuanian Institute of Agrarian Economics (hereafter – Institute). The idea originated from employees of the Institute who had been purchasing food baskets directly from farmers for many years and were actively promoting such food as being aligned with healthy diet principles. They already had a stable network of suppliers of fresh and high-quality fruit and vegetables and were convinced of the benefits both to consumers and farmers of the supply of food products in this way. However, the operating system had some limitations. Firstly, employees of the Institute wanted to increase the range of products produced on farms, but the network of farmers was growing slowly, mainly as a result of random contacts. In addition, the work involved in providing a full basket of products demanded a lot of time. Employees were using the simplest tools of information technology to communicate with existing suppliers in ordering baskets of products and co-ordinating delivery by e-mails or phone.

Main tools of the platform

At the time of searching for more efficient ways to organize purchases and to communicate with farmers, researchers had the idea of applying the theory of a two-sided network for the creation of an interactive communication platform between consumers and farmers. This allowed an exchange of information about the supply and demand of products and the selling process to be organized in a more convenient way. The main goal of the two-sided network platform was a fundamental change in the character of the relationships between producers and users of their products; i.e. the relationship between seller-buyer and the network members, interacting as service providers-customers.

The experience of the Institute researchers has shown that the success of cooperation with farmers depends on the ability to organize a food basket of suffi-

cient size for the farmer, therefore, by reducing product transportation costs per unit. This result was achieved by a number of consumers pre-ordering a food basket together. This principle was applied in the interactive communication platform. Initiators of the platform suggested that consumers organize themselves into communities, as this way of collaboration, based on the experience of the institute's researchers, helped to increase the possibilities of creating a food basket of sufficient size for the farmer, in that it would be worthwhile for them to travel to the city, even from remote rural areas. This would also reduce the risk of products not being collected or paid for. It was expected that members of the communities would communicate with each other not only virtually, but also help each other in the purchasing process. In the process of creating this platform, particular attention was given to community development activities, for example a communication board was designed so that any member of the community could initiate a purchase process, write a review for a product, suggest a new service provider, or propose other offers.

A simple and user-friendly tool was installed in the interactive communication platform for creation of an aggregate food basket for the farmer that integrated choices of all community members. Firstly, one of the community members initiates the purchase of products from a particular farmer. Secondly, each community member receives an email inviting them to join in the purchase. Based on their needs, members add information of what kind of products they want to purchase from the assortment offered by the farmer. Finally, all requests of community members go to the common 'shopping basket' of this community and the farmer receives an email outlining the list of purchasers and the products they wish to purchase. At the time of initiating a purchase, delivery time and place are adjusted accordingly. A product evaluation system was integrated in the platform with the aim of preventing low quality products and poor service, which allows each participant to assess the quality of products and the delivery service.

Another benefit of the two-sided network is that farmers have the possibility of introducing their farms and products to the communication platform since they are selling directly from their farm, without any intermediaries. The platform enables farmers to continuously update information about the assortment and prices of products, respond to the seasonality of production, provide production quality certificates, react immediately to consumer orders, create and sustain relationships with regular consumers, and create consumer communities for purchasing farm products.

Considering that the success of a network requires a certain number of members, referred to as 'critical mass', it is conceived that the communication platform needs to operate at a national level, as Lithuania is a small country. The platform 'Village to your home' as a two-sided network represents the public interest and aims to encourage advanced nutrition, based on the short food supply chain model.

The two-sided network "Village to your home" is a national network joining communities of local food consumers and farmers of different regions of Lithuania. More than 300 communities participate in the network. They are located throughout the territory of Lithuania, however, the biggest part of communities has been created in major cities, where there is a tendency for higher income, consumers are more educated, and are interested in a healthy lifestyle. Communities of local food consumers are created by co-workers, neighbours, friends or relatives. Community development can be initiated by any person registered on the platform and by sending an invitation to join. The community can also invite friends by taking advantage of a Facebook account. Communities can be either open – that is, for anyone who wants to join – or closed; accepting new members only on the recommendation of the existing community members.

The other side of this two-sided network are the food producers who deliver food baskets to communities. The number of producers introducing their products to the platform has reached 200 in the past year. In addition to the farmers who offer products produced on their farms, other network members are rural communities and farmers' cooperatives. Rural communities offer products processed from agricultural raw materials purchased from local farmers. Consumers have the opportunity to purchase more than 900 different food products in the platform: meat, dairy products, bakery products, fish, fruit and vegetables.

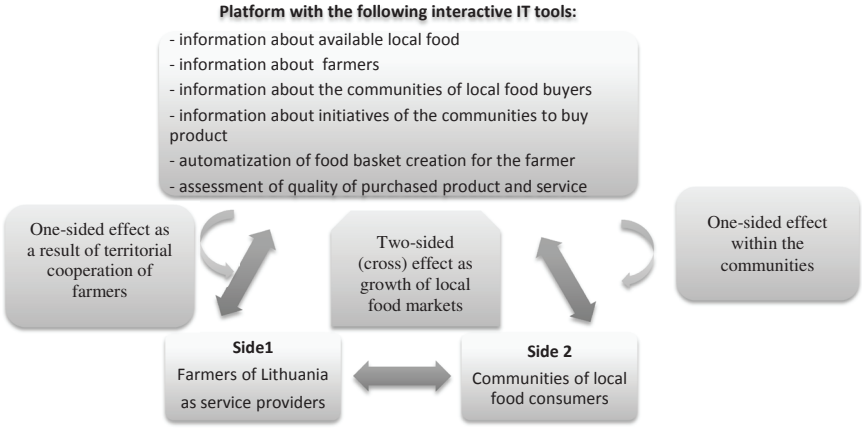

Figure 2. Structure of the two-sided network "Village to your home"

Source: composed by authors.

Evidence of one-sided and two-sided effects between network members

The rapidly growing number of communities of local food consumers indicates that the network has helped to create a strong one-sided effect among consumers. Consumers involved in the network gain the one-sided effect because of relatively lower product prices, compared to the prices of exceptional, fresh products in other marketing places. Products are delivered to the community in a convenient location at a time agreed in advance, so that consumers do not waste time going to a shop or a farm. Members of the community share information with each other about the taste of new products and provide recommendations of new products that the community can start purchasing. The product quality evaluation system installed in the communication platform helps reduce the risk of a farmer providing low quality products to the consumer.

While farmers as members of the communication platform introduce their products individually, some tendencies of cooperation among producers began to emerge. Increasingly, farmers are interested in tasting or purchasing products produced on neighbouring farms. It is hoped that in the near future, the efforts of farmers in one village or region to cooperate in delivering products to communities will increase, allowing the one-sided effect for farmers participating in the network to increase as well. The platform provides an opportunity for farmers to develop their own territorial networks, thereby expanding the assortment of products and reducing the cost of logistics.

The two-sided effect is firstly measured by the benefit for the Lithuanian national interest, in growth of the local food market. This type of effect can also be measured by the benefits provided to each network member. The benefit is initially provided by reduced transactional costs for both farmers and consumers, due to their participation in the network. However, there are other benefits as well. The network allows farmers to establish long-term relationships with consumers and to derive stable farm income, ensuring farming sustainability. Like other systems based on the pre-order principle, the platform helps farmers to plan production quantities and assortment of products, avoiding unrealized losses of production. Direct contact with consumers allows farmers to collect information about their needs, provide tastings of the products, and provides guidance on how to adjust the production process to increase demand for their product. In addition, farmers communicating directly with end users, i.e. without intermediaries, achieve a better price for their products, resulting in higher revenues. Consumers also derive benefits as they are able to purchase products according to their needs and can negotiate price with the farmer, thus reducing their spending on food.

Conclusions

The two-sided network theory is still under-developed. Cooperative organizations, willing to apply this innovative form of cooperation, create and organize their activities by using a method of trial and error. However, the analysis of organizational models shows that the initiators of the two-sided networks (farmers and consumers) had a clear understanding of the main differences between industrial and post-industrial stages. That is, the forces driving consumers and their suppliers to intensified levels of collaboration, which eventually leads to a two-sided networking model. They wanted to establish an organizational network where two sides with different goals interact with the aim of creating new business and consumption opportunities in a volatile environment under constant flux. Therefore, the main goals of the two-sided network initiators were the following:

1. To use the network for innovative product promotion in the local market.
2. To include as many elements as possible of the service economy into the farmers' activities; instead of a relationship as "seller-buyer", network members are seeking to interact as "service providers-consumers".
3. To propose a means of value co-creation that brings farmers and food consumers together, in order to produce an outcome of mutual value.

Another way to develop farmers' cooperative movement is to involve more groups of actors as homogenous sides of the network and to organize their networking on the basis of multi-sided network theory. An established two-sided network of cooperative organizations can be developed to the three or four sided network by involving suppliers of agri-resources, local governments, NGOs, etc. with the aim to gain more network effects and chances for innovation in knowledge-based post-industrial economy.

The theoretical development of the structure and design of the two(multi)--sided network, based on the analysis of individual successful projects, opens new possibilities for cooperative movement and promotes organizational and product innovations in all modern economic sectors. In the opinion of the authors, the creation of a new type of cooperative organizations is particularly important to small farmers who want to sell their products to local consumers and thus obtain a higher added value. The farmers, as well as in the industrial stage of development, could become active creators and implementers of organizational innovations in the cooperative movement, reforming the existing large-scale "global" food system on the basis of "consumer activism".

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Biodiversity monitoring by farmers to sustain ecosystem services of high nature value grasslands in Austria

Abstract: *In 2007, the pilot project "Biodiversity monitoring in high nature value grasslands by farmers in Austria – We look at our meadows" started with fifty farmers monitoring indicator plant and animal species in extensive grasslands. Meanwhile, the monitoring methods and processes have been refined, based on first experiences, and lessons learned within the pilot phase. The overall goal of the project is to raise the farmers' awareness and intensity of land management on biodiversity rich grasslands. Another objective of the project is to use this citizen-science scheme to gather in-depth knowledge about the effects of different extensive land management practices on biodiversity and ecosystem services.*

A countrywide network of more than 650 monitoring farmers was set up, supported and instructed by ecologists. Since 2009, also 14 agricultural college schools are participating in the project. Farmers observe and count plant and animal species that are sensitive to cultivation and fertilisation and report the monitoring data to a central online database. An evaluation in 2017 showed that farmers participating in this environmental consciousness raising initiative became significantly more sensitive to the value of biodiversity and ecosystem services and consequently to extensive farmland management methods.

The project creates positive effects on farmers' perspectives to high nature value grasslands, increases sensitivity to management practices and fosters the motivation to sustain these habitats. Farmers can retrieve data reports at farm level,

cumulated evaluations are work in progress. The vision of the project team is to enlarge this biodiversity monitoring network with farmers to a European level in the next years.

Keywords: *biodiversity, monitoring, high nature value grassland, awareness raising, citizen science, environmental consciousness raising, ecosystem services, cultural heritage*

Introduction

Extensively cultivated grasslands and meadows are characterized as species rich ecosystems (Heinz et al., 2014). They provide manifold ecosystem services which can only be maintained by sustainable extensive farming methods (Resch et al., 2012) and the motivation and willingness of farmers.

The loss of biodiversity as a result of inappropriate intensive farming practices, amongst other pressures, is a world-wide documented problem (Pötsch et al., 2012). Several international conventions and initiatives like the UN Convention on Biological Diversity (UN CBD) – in which Austria is participating since 1995 – and the UN Sustainable Development Goals (Goal 15: Sustainably managed forests, combat desertification, halt and reverse land degradation, halt biodiversity loss) as well as the Alpine Convention defined measures to halt the loss of biodiversity. Following article 13 "Public Education and Awareness" of the UN CBD awareness rising about the importance of biodiversity to society is a major contribution in order to sustain biodiversity (UN CBD, 1992). Education experts propose action-oriented knowledge transfer as a successful approach for rising awareness about biodiversity aspects (Ramadoss and Poyya, 2011; European Commission, Directorate-General for the Environment, 2011; url 1). The Eurobarometer 2015 concluded that less than one third of the EU citizens currently know what biodiversity actually means (Eurobarometer 2015). In 2006, the project "MOBI-E – Development of a concept for biodiversity monitoring in Austria" developed 50 indicators as a means of measuring biodiversity in Austria. Assuming that farmers are experts on their own farmland, one of the indicators identified was 'species monitoring by farmers" (Holzner et al., 2006). Based on the fact that farmers directly influence biodiversity according to their farmland management, they should be guided to observe and count plants and animals. (Holzner et al., 2006; Bogner et al., 2006).

Within the EU Biodiversity Strategy, participating Member States committed to develop national biodiversity strategies, which aim at halting the loss of biodiversity and ecosystem services in the EU and help stopping biodiversity loss by 2020 (European Commission, 2001). In the Austrian biodiversity strategy 2020+ under action field "sustainable use of biodiversity", target 3

"agriculture and forestry contributes to conservation and fostering of biodiversity" the measure "preservation of permanent grasslands, particularly extensive grasslands and grasslands with high nature value (HNV)" was defined (Stejskal-Tiefenbach et al., 2014). HNV farmland covers areas in Europe where agriculture is the dominant land use and where agriculture ensures or promotes a high diversity of species and habitats or protected species and habitats. HNV is one of three biodiversity indicators for integrating environmental concerns into the Common Agricultural Policy.

Aim of biodiversity monitoring

Apart from policy driven top-down approaches at international and European level, particularly bottom-up solutions to stop further loss of biodiversity and to create a broad awareness are needed. Against this background, awareness rising amongst farmers and the dissemination of knowledge about flora and fauna depending on grasslands and extensive farming practices is highly important to sustain the biodiversity of grasslands. The initiative "Biodiversity monitoring in high nature value grasslands by farmers in Austria – We look at our meadows" piloted a citizen science scheme where farmers are trained by ecologists and gain knowledge about rare plant and insect species on their own grasslands. Subsequently, farmers are able to observe and document species on their own. Further objectives of the project are to gather knowledge about the effects on biodiversity and ecosystem services resulting from different extensive land management practices.

Monitoring design

In 2007, a pilot-awareness raising project started with 50 farmers. In order to receive valuable data for statistics, the monitoring method was adapted and enhanced in 2014. Farmers who want to participate in the project are visited by ecologists. In this personal training farmers gain deeper knowledge about rare plant and insect species on their own grasslands. They can select up to three different homogenous monitoring spots. According to the characteristics of the meadow, typical indicator species are selected on each monitoring spot. Up to five different plants and insect species can be chosen for monitoring on each spot. The farmers subsequently observe and document the selected species on the same monitoring spot every year. In doing this, they are trained to be "citizen scientists" and deliver valuable data.

About 64 plant species (e.g. *Salvia pratensis*, *Silene flos-cuculi* and *Achillea millefolium*) and 53 animal species (e.g. *Argiope bruennichi*, *Mecostethus parapleurus* and *Lygaeus equestris*) can be observed by farmers.

Depending on whether plant species, insect species or butterflies are being observed, different methods for monitoring can be differentiated (see Fig. 1). For the monitoring of plant species, a circular area of 80 m^2 has to be defined.

The farmers count the number of plant species at this given site. For counting the number of insects and spiders, a circular transect (10 m diameter) is defined, counting then occurs within a width of one meter. For counting the butterfly activity on the site, farmers have to watch from a point outside the plot. They need to monitor three times, on two days for exactly one minute and note how many different butterflies they counted each time.

Personal observations (for monitoring non-defined indicator species and/or personal preferences concerning specific species) may also be documented. For example, 189 farmers observe swallows (*Hirundo rustica* and *Delichon urbicum*) in the barn and in the surrounding area of the farm. They document the date of the first and the last observation of swallows in the year, the number of swallows, broods and offspring.

The centre of the area is signed and documented via GPS coordinates. Via an online data input system monitoring data is reported back by farmers. Thereafter, the data is correlated with data on management options (number of cuts, cut dates, fertilization, etc.) and then harmonised for further evaluations.

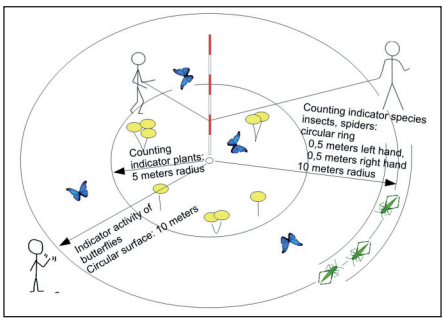


Figure 1. Monitoring design
Source: www.biodiversitaetsmonitoring.at.

Figure 2. Use in practice
Source: www.biodiversitaetsmonitoring.at.

Guidelines and educational materials were developed for the participating farmers, where attention was paid to ensuring easily readable, comprehensible documents and understandable graphs. Furthermore, storytelling methods were used, in order to better understand and memorize comprehensive knowledge.

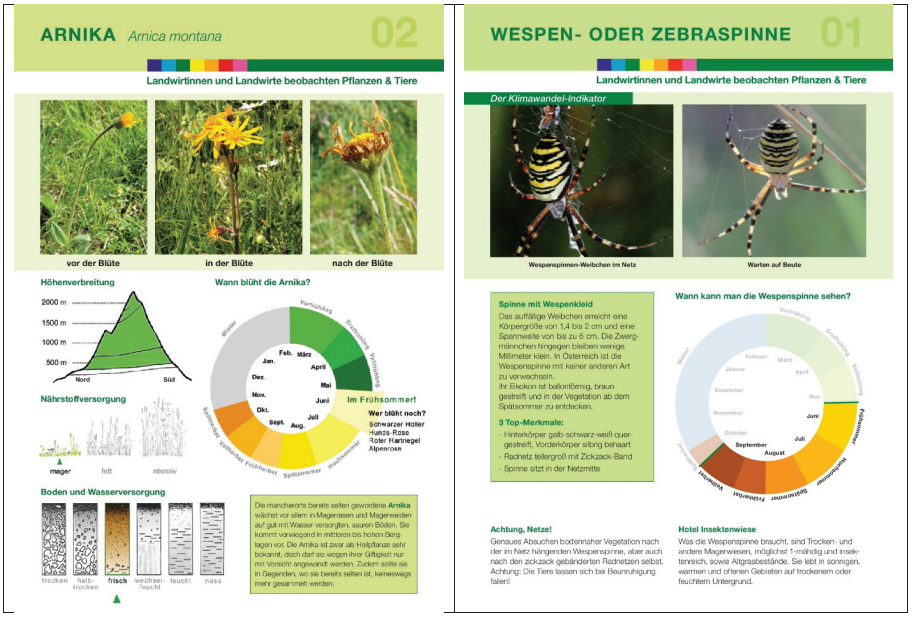


Figure 3. Educational material

Source: www.biodiversitaetsmonitoring.at.

Results

Today the network involves more than 650 participating farmers all over Austria who are monitoring indicator species at more than 850 monitoring spots. In addition, 14 agricultural schools are part of the monitoring team and about 15 active dedicated participants disseminate their knowledge on grassland biodiversity in rural regions all over Austria. More than eight ecologists were instructed to train the farmers on the fields.

Figure 4. Excursion for monitoring farmers with a dedicated participant and an ecologist at a farm in Styria

Source: www.biodiversitaetsmonitoring.at.

Figure 5. On-farm training by ecologists

Source: www.biodiversitaetsmonitoring.at.

Amongst the participating farms, organic farms and farms with nature conservation contracts can be differentiated. The difference is that organic farms are not bound to nature conservation targets within the Agri-Environmental Programme in Austria. Farms with nature conservation contracts have to fulfil defined requirements concerning land management, like for example exact date of mowing or number of cuts per year. In this respect, long-term monitoring could provide knowledge about the impacts of different land management practices.

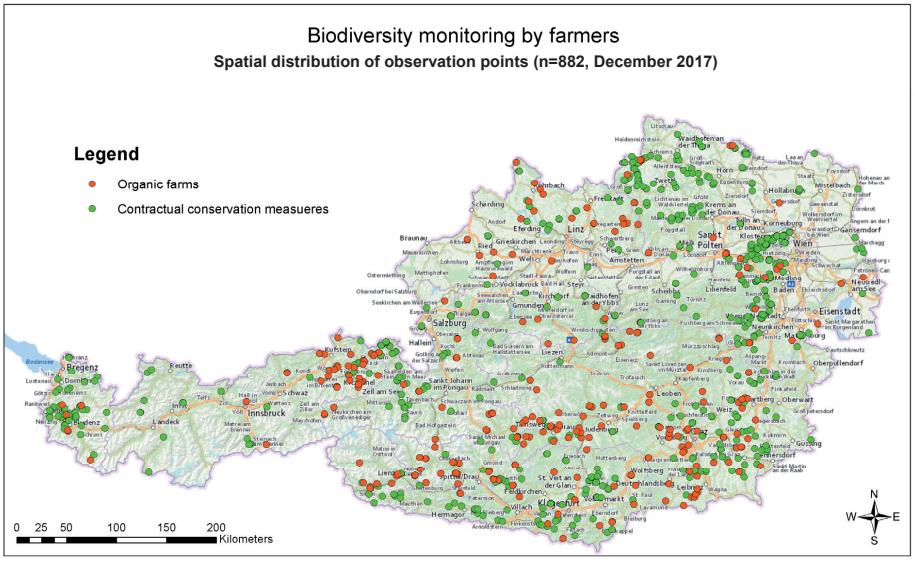


Figure 6. Spatial distribution of observation points

Source: www.biodiversitaetsmonitoring.at.

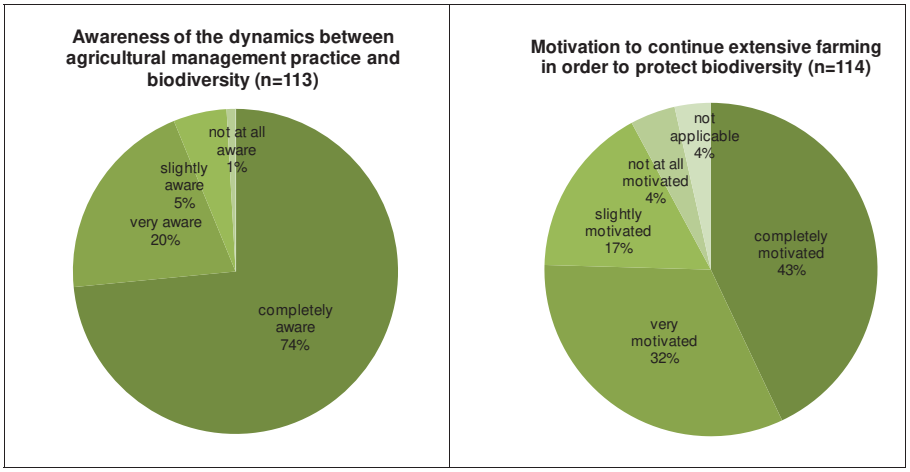
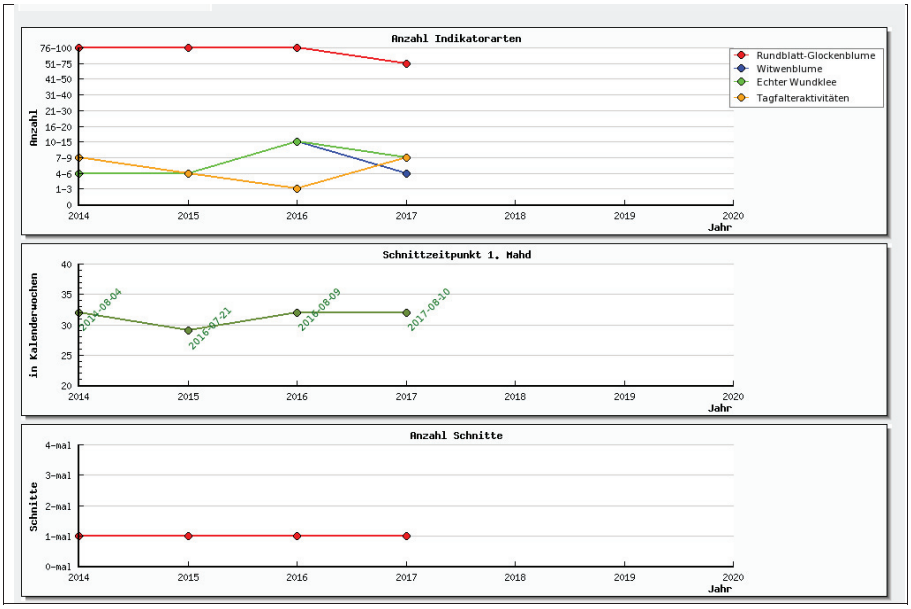


Figure 7. Evaluation of educational effects

Source: www.biodiversitaetsmonitoring.at.

The feedback from participating farmers is positive: most participating farmers reported that they gained deeper understanding and appreciation for flora and fauna on their farmland (more than 89%). All in all, 94% of all participants of the last online evaluation in 2017 quoted that they are more aware of the dynamics between agricultural management practice and biodiversity. More than 75% of all participants of the evaluation report stated that they are more motivated to continue extensive farming in order to protect biodiversity.

The analyses of the monitoring data are still at the beginning due to the fact that long-term series are needed. The re-setting for standardized monitoring started in 2014 with 80 farmers, and since the end of 2017 all participants submit data based on the same monitoring design, which can be used for valid evaluation.



Translation of German variables:

Anzahl Indikatorarten = number of indicator species
Anzahl = number
Schnittzeitpunkt 1. Mahd = time of first cut (grass mowing)
In Kalenderwochen = calendar weeks
Anzahl Schitte = number of cuts
Schnitte = cuts (one times, two times three times)
Rundblatt-Glockenblume = *Campanula rotundifolia*
Witwenblume = *Knautia ssp.*
Wundklee = *Anthyllis vulneraria*
Tagfalteraktivitäten = Butterfly activity

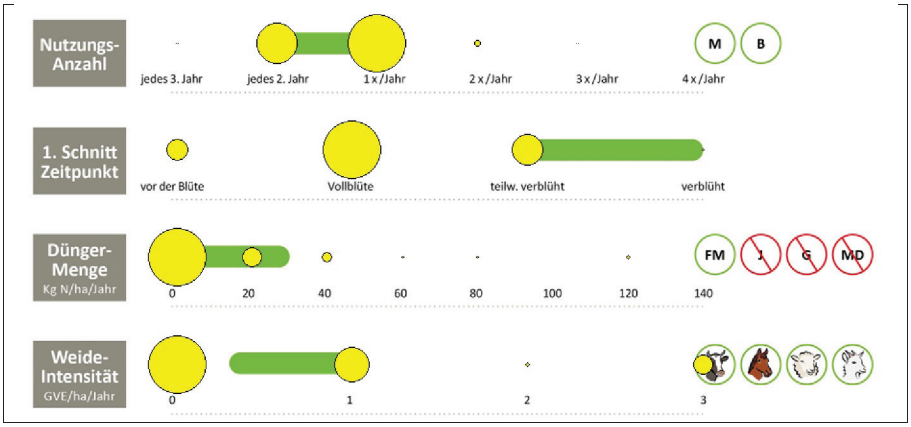
Figure 8. Reports at farm level

Source: www.biodiversitaetsmonitoring.at.

All monitoring data is documented like a diary for every farm. Reports at farm level are prepared and visualized with graphs. For example, the number of indicator species, the weather conditions, the type of land management for different time frames, even on a yearly basis can be retrieved by farmers. Participants have the possibility to look up changes in abundance of species within defined time frames, as well. Whenever monitoring data alters (e.g. changes in abundance of species) farmers can reflect the reason and the influential factors (weather, climate, land use management practices, changes in management, etc.). Participants have the opportunity to look at their farm-specific reports at any time.

Besides individual reports at farm level, aggregated on-site data analyses of all farms can provide in-depth knowledge about the ecology of plant and insect species and relations to (extensive) farm management.

In a first step, selected experts (vegetation ecologists, botanists and zoologists) assessed (based on their own experiences and expert knowledge), which types of land cultivation are recommended and optimal for different indicator plants and insect species (= ecological tolerance) and thus, result in stable numbers of indicator species.



Nutzungsanzahl = number of cuts
1. Schnittzeitpunkt = date of first cut
Düngermenge = quantity of fertiliser
Weideintensität = intensity of grazing
Vor der Blüte = before flowering
Vollblüte = full flowering
Teilweise verblüht = partially withered
Verblüht = withered

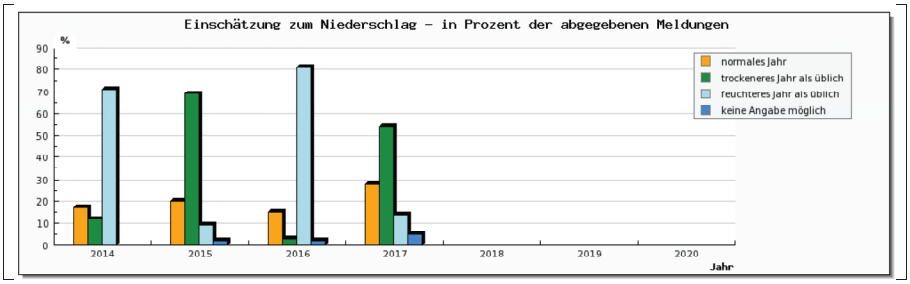
M = mowing
B = grazing
FM = solid manure
J = slurry
G = liquid manure (fermented)
MD = mineral fertilizer
jedes 3. Jahr = every third year
jedes 2. Jahr = every second year
4x/Jahr = 4 times a year

Figure 9. Analyses of land use on the example of the indicator species Arnica (*Arnica Montana*)

Source: www.biodiversitaetsmonitoring.

The green bars in Figure 9 present the expert knowledge about the plant species *Arnica montana*. The yellow bubbles visualize the actual land use from on-site data analyses. The size of the bubbles indicates the relative frequency of submitted data about land use by farmers. For example, regarding the number of cuts (*Nutzungs-Anzahl*) expert knowledge and actual land use are concurrent. Contrary, most farmers mow their monitoring site earlier (date of first cut = 1. *Schnittzeitpunkt*) than experts defined it as best practice.

Abiotic factors like weather conditions have an impact on biodiversity as well. Therefore, many farmers record precipitation and/or date of first blooming of plant species. In addition, famers can enter their observations about weather conditions in the database. An analysis demonstrates a high level of consistency of the farmer´s observations. As shown in Figure 10, the vegetation period in 2016 was monitored as a wet year above average while in 2017 the year tended to be dryer and above average.



Translation of German variables:

Normales Jahr = typical year
Trockeneres Jahr = dry year above average
Feuchteres Jahr als üblich = wet year above average
Keine Angaben möglich = no entries

Figure 10. Observed weather conditions: aggregated assessment of farmers about precipitation

Source: www.biodiversitaetsmonitoring.at.

Conclusions and Economic aspects

The overarching goal of the project is preservation of extensive grassland habitats. The economic value of the project lies in the collected biodiversity data, which shows potential for various analyses concerning biodiversity and ecosystem services on agricultural land. A further economic value is to preserve biodiversity and ecosystem services (carbon capture, soil fertility, biodiversity, climate change resilience, cultural heritage, tourism, recreation) for future generations by participating farmers. Moreover, extensive grasslands with a higher level of biodiversity than intensive grasslands have the potential to contribute to animal health, and thus to healthy food. It can be observed that the consumer demand for high quality products (organic products, fair trade,

standards of animal welfare, less CO_2 emissions, etc.) has been rising steadily in the last years. Well-directed marketing of such high quality products from species-rich grasslands can account for higher profit margins on farms.

Outlook

In the further run, it is intended to use the collected monitoring data for environmental consciousness raising initiatives for farmers all over Austria and for analysing trends of biodiversity on contracted nature conservation sites.

The vision of the project team is to apply the biodiversity monitoring with farmers at the European level in the next years. The biodiversity monitoring by farmers could also include endangered species and habitats within the European Natura 2000 network, since farmers are relevant actors with a high influence on biodiversity.

More information on similar biodiversity monitoring projects can be found on the project website: www.biodiversitaetsmonitoring.at and in the final reports of the biodiversity monitoring projects (Steurer et. al., 2016; Steurer et. al., 2017).

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