INSTITUTE OF AGRICULTURAL
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The Common Agricultural Policy of the European Union – the present and the future

EU Member States point of view

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The Common Agricultural Policy of the European Union – the present and the future

EU Member States point of view

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THE POLISH AND THE EU AGRICULTURES 2020+
CHALLENGES, CHANCES, THREATS, PROPOSALS

Warsaw 2018

This monograph was prepared under the Multi-Annual Programme 2015-2019
"The Polish and the EU agricultures 2020+. Challenges, chances, threats, proposals".
The publication is a collection of selected papers delivered at the 22th edition of the International Scientific Conference organized by the Institute of Agricultural and Food Economics - National Research Institute. The theme of the conference was "The Common Agricultural Policy of the European Union – the present and the future. The conference was placed on 5-7 December 2017 in Stary Jabłonki in Poland. Common Agricultural Policy was and still is one of the key pillars of European integration. Published in two volumes materials refer directly to the current and future of the CAP in EU and non EU member states, the strategic objectives and principles of agricultural policy for the agri-food sector and rural areas, address the issues of equilibrium between agriculture, forestry and land use, relate to the dilemmas for the EU budget and the CAP after 2020, CAP instruments and their adjustment, transformations of the rural economy and programming of the rural and agricultural policy, as well as productivity and production efficiency and tensions between sectoral action and between different models of territorial activities.

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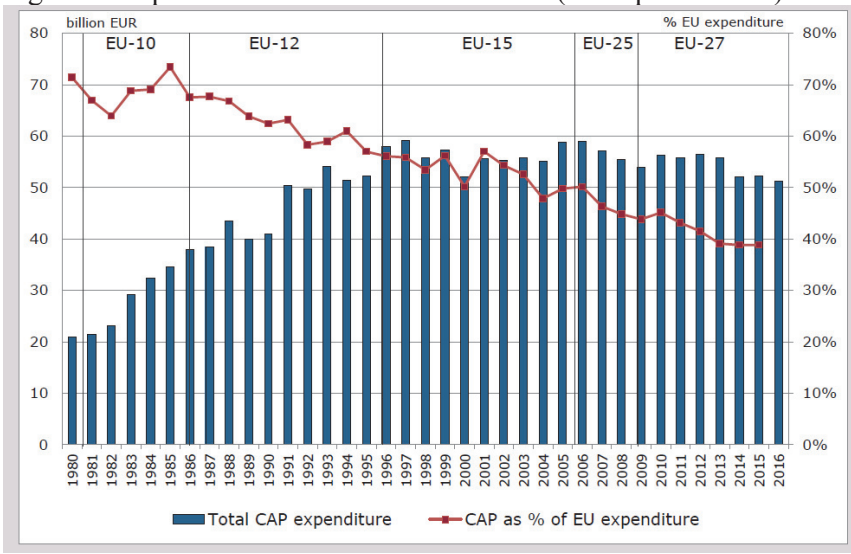
Introduction

The Common Agricultural Policy has a rich, over 60-year history, inseparably linked to the history of the European Union. The CAP was and still is one of the most important (alongside the regional policy and cohesion policy) ways of enhancing the European integration. Over this period, the CAP has been subject to many deep changes and reforms, which were the results of changing priorities of the internal and external economic policies of the entire group, as well as transformations in agriculture itself and in rural areas. During this period, the EU Member States built and developed modern agriculture and, on its basis – the modern food economy. This process was the consequence of the natural evolutionary changes in the economy as well as conscious intervention programmes undertaken by the authorities of the Community and the governments of individual Member States. The agricultural transformation was fostered by exceptionally rapid economic growth which provided new, alternative jobs for those who abandoned agricultural professions and stimulated demand for food. At the same time, the rapid economic growth created the opportunity to support the agriculture with public measures through the market, price, structural and regional policies. The evolution of the agricultural structures consisted in transformation of the 19th century European farming into modern post-industrial agriculture targeted at fulfilling, besides production, also other social functions such as e.g. the multipurpose, sustainable development of rural areas, environmental protection or protection of rural cultural heritage, improvement of food safety and well--being of animals. However, the process of programming and implementing the agricultural policy was not free form numerous errors, e.g. in the fields of public policy effectiveness, its sustainability and efficiency.

Depending on the point of view of those who assessed the agricultural policy, its predictability and common budget are its main advantages (more financial resources = more possibilities) or disadvantages (higher expenses = higher costs). In its entire history, the budget for the implementation of the CAP has been systematically growing, however, compared to the overall EU budget, it decreased (from over 70% in 1980 to around 38% in 2016) (Fig. 1). At the same time, in 2017, the expenditure on the agricultural policy represented only around 0.39% of the EU GDP (compared to 0.65% GDP in the decade between 1984 and 1993). The cause of these changes was the declining role of the agricultural sector in creating GDP, as well as simultaneous dynamic growth in the non-agricultural sectors of the national economy. However, despite the general trend of limiting the share of expenditure on agriculture policy, it continues to be the largest EU budget line.

Figure 1. Expenditure on the CAP 1980-2016 (fixed prices 2011)

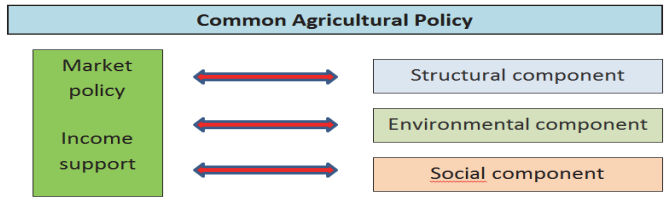


Source: https://ec.europa.eu/agriculture/sites/agriculture/files/cap-post-2013/graphs/graph1_en.pdf.

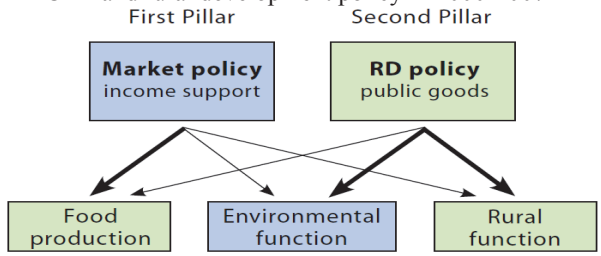
Regarding the second important characteristic of the CAP – its predictability and sustainability, it should be emphasized that, since its beginning, i.e. 1957, until today, the CAP treaty goals remain nearly unchanged, they were, however, complemented over the years. The agricultural policy reforms that have been systematically introduced according to the changing challenges concerned its instruments, which, in consequence, was to contribute to achieving the assumed objectives more effectively. In 1957-2000, the key impact area of the agricultural policy included the market and concern for the stability of production (Mansholt Plan) and farmers' incomes (MacSharry reform – direct payments), while the aim of the structural policy was to improve the effective functioning of agricultural holdings. In 2000, the CAP was divided into two complementary pillars – market-based and linked to the development of the rural areas (Fig. 2). The Fichler reform, based on the rules of decoupling, cross-compliance and provision of public goods by the agriculture, was the next stage of evolution. The rural development policy in 2007-2013 was based on three 3 pillars, i.e. (a) competitiveness of agriculture and forestry, (b) land management and environment and (c) quality of life and diversification of economic activity in rural areas. In the present programming period 2014-2020, the changes included: transformation of decoupled aid into a multifunctional system of agricultural support, consolidation of both CAP pillars and integration of the territorial approach in rural development. Sustainable and competitive agriculture, sustainable use of natural resources, climate change prevention and ensuring economic and social dynamism in rural areas became the priorities of the CAP.

Figure 2. Evolution of the agricultural policy and rural development

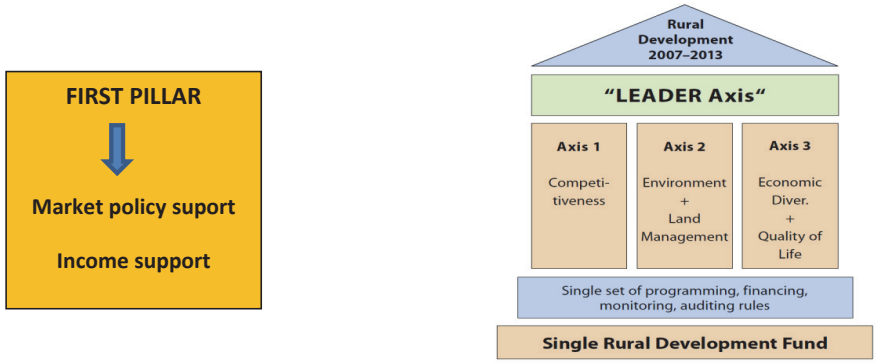
CAP 1957-2000



CAP and rural development policy in 2000-2007



CAP and rural development policy in 2007-2013



CAP and rural development policy in 2014-2020

Source: own compilation and http://enrd.ec.europa.eu/enrd-static/fms/pdf/BEC22A59-E570-413B-5A9B-682D3306E183.pdf, https://enrd.ec.europa.eu/policy-in-action/policy-framework_en.

The agricultural and rural development policy in 2014-2020 is characterized by the sustained direction of interventions developed in 2007-2013, which may be described as continuity and stability. It is also characterized by a broader spatial context. The maintained structure of the two pillars (1st pillar – market policy and 2nd pillar – rural development policy) maintains also the duality of the agricultural policy, and sometimes even causes the overlap of particular areas of competence (e.g. agri-environmental payments and direct payments related to the greening)[1]. Solutions adapted for the period of 2014-2020 also blur the previously clear division between the rural development support and the income support, and the Member States can transfer the funds from the 1st pillar to the 2nd Pillar.

The current CAP does not, however, solve the already identified problems of agriculture, broadly defined food economy and rural areas in a comprehensive manner. Among the challenges forcing further reforms in the CAP and rural development policy after 2020 there are e.g.: reduction of risks in agricultural activity and market instability, improvement of efficiency, counteracting the exodus from peripheral areas and maintaining the agricultural activity in areas difficult for farming in natural conditions, shortening the distribution chains and supporting small agricultural holdings, environmental protection (including soil, water resources and biodiversity) and protection of cultural landscape, adaptation to the climate change (including the limitation of greenhouse gas emissions, counteracting the effects of extreme events), development of renewable energy sources, food safety, food quality and well-being of animals.

As it is clear, the first 5 challenges are linked to the CAP objectives which have already been identified in the Treaty of Rome, whereas the others have emerged due to the evolution of the economic, social and natural environment. It may be even assumed that they are the results of the human economic activity, population growth and agricultural activity itself, since both the agriculture and the man contribute to the degradation of the 'natural capital' (degradation of the natural balance in the environment). This applies to the soil fertility, biodiversity, air and water quality and climate change. Thus, simultaneous improvement of the resource efficiency and restoration or maintenance of the natural capital in rural areas will be the challenge after 2020. Besides the main function of agriculture, which is the production of food, it will play an important role in activities supporting the bioeconomy and environmental protection, sustainability in terms of economy, society and the environment, production of energy from renewable sources, waste reduction, recovery of biomass and nutrients. The pursuit to maintain the appropriate balance between agriculture, forestry and spatial planning and reduce the greenhouse gas emissions will also be important.

[1] Dupraz, P., L.-P. Mahé and A. Thomas (2014), "Paiements pour services environnementaux, biens publics et fédéralisme fiscal: enjeux pour la PAC", in A. Langlais (sous la dir.), L'agriculture et les paiements pour services environnementaux: quels questionnements juridiques, Rennes: Presses universitaires de Rennes.

Over the last twenty years, however, we are happy to observe certain evolution of the approach to the policy. We are clearly dealing with a shift from the sectoral thinking to the holistic approach. This means that the objectives and instruments of the rural development policy, regional policy and cohesion policy come closer together, it should be noted that their compliance in the territorial dimension is insufficient, though. The current debate on the future of the EU after 2020 deals extensively with the coordination of policies and their compliance with the coherent territorial development. Over the years, the reforms implemented successively lead to a gradual shift from sectoral to horizontal programming. In the agricultural policy, the mainstream aid was gradually shifting from market-based actions to actions supporting the development of rural areas. In line with the new challenges, the public support was directed towards the actions of environmental and climate nature, the scope of actions covered the broadly defined rural communities and, besides the competitiveness and innovativeness, it focused also on the sustainable and multifunctional rural development. Owing to this, the effects of the interventions were enhanced at least in part. Within the programming dimension, the objectives of particular EU policies seem coherent; however, the synergy between the agricultural, regional and cohesion policies, in particular in the territorial dimension, is limited.

The present and, in particular, the future of the European agriculture and rural areas pose a challenge for the effective and efficient CAP. But is the science able to support the practice in the accurate identification of challenges and formulation of effective solutions? Is it ready to identify, explain and describe their consequences and, above all, is it able to develop theoretical bases for the selection of strategies for the future? These questions were faced by the Institute of Agricultural and Food Economics – National Research Institute (IERiGŻ-PIB) when organizing the international scientific conference "The CAP of the European Union – the present and the future" on 5-7 December 2017 in Stare Jabłonki. The main objective of the conference was to present the results of the implementation of the CAP in the past periods in respective EU Member States, discuss and submit proposals for the Common Agricultural Policy after 2020. In the course of six plenary sessions, during which 34 presentations were given, and several panel discussions were held, the scientists from a dozen countries made a common assessment of the effects of the EU Common Agricultural Policy and indicated its main objectives and challenges for the future. In particular, the following topics were discussed:

- megatrends and key developmental challenges of the European and world food economy and rural areas;
- sources for growth in the agri-food sector;
- role of agricultural holdings and undertakings in actions supporting the sustainable development strategy;

- changes in rural economy and programming the rural and agricultural policy;
- innovation strategies in the sectors of agriculture, food industry and rural economy;
- problems and obstacles in the effective implementation of the principles of the rural policy and rural development;
- CAP instruments and their adaptation to the local, regional, European and world challenges.

Discussions held during the conference show that the EU agriculture is experiencing economic boom, but also has many problems which have to be solved in the nearest future. They concern e.g. structural changes such as the economic diversification of large and small holdings, developmental disproportions between the north and south of Europe, unification of the direct payments. These are the challenges that require changes in the EU agricultural policy. Realisation of these proposals, however, cannot take the form of instructions. Thus, finding the right path requires discussion to make the new agreements better than the current practice.

The CAP that we know today will probably be continued. Its first pillar (intervention in the form of direct payments and market measures conditional on compliance with basic environmental rules and objectives) and the second pillar (multiannual, flexible investment tool adapted to the local conditions of each Member State, aimed at supporting in particular the long-term projects). Most probably the current foundations and the structure of the CAP will be maintained. However, not only the internal policy but also the so-called global context will decide about the future of the European food economy to an increasing extent. The EU policy must face challenges such as: economic crises, changing process of raw materials and currency exchange rates, climatic and environmental risks and, unfortunately, also political challenges.

The monograph presented to the readers comprises of two volumes, separate it terms of the contents, however coherent in terms of the subject, entitled:

- The Common Agricultural Policy of the European Union – the present and the future – EU Member States point of view;
- The Common Agricultural Policy of the European Union – the present and the future – non-EU Member States point of view.

The Institute's intention was to deliberately divide the approach to the assessment of the current situation and the challenges of the present and the future of agriculture and the rural areas through the prism of countries which are associated in the EU or are applying for the EU membership. Due to the different perspectives of these countries, both current problems and the possible solutions are also different. The first part of the Monograph (EU Member States point of view) includes 19 chapters written by 38 academics employed in 16 different scientific and research

as well as academic centres in 9 EU Member States. The second part of the Monograph (non-EU Member States point of view) includes 8 chapters written by 18 academics employed in 10 different scientific and research as well as academic centres in 2 non-EU Member States. Articles included in the Monographs provide materials and substantive arguments in the discussion which may contribute to the political decisions regarding the future of the EU CAP after 2020. These decisions may be build on the experience of all countries from the assessment of current solutions, especially due to the large diversification of the levels of economic development, structure of the agricultural economy, environmental challenges and multifunctionality of the rural areas.

The Conference in Stare Jabłonki was the 22nd international conference organized by the Institute within the framework of the Multi-Annual Programme. The list of conferences organized so far by the IERiGŻ-PIB as part of the MP series as well as publications associated therewith is annexed at the end of this Monograph. All publications from previous conferences, scientific monographs and other material are available on www.ierigz.waw.pl. The first MP implemented by the Institute in 2005-2010 was entitled "Economic and social conditions for the development of the Polish agri-food economy after Poland's accession to the European Union". During the second MP edition implemented in 2011-2014, the Institute was focussed on the "Competitiveness of Polish food economy in the conditions of globalization and European integration". The current, third MP 2015-2019 entitled "Polish Agriculture and EU 2020+. Challenges, opportunities, threats, proposals" is of a horizontal as well as strategic nature, since it provides real circumstances for the support of the decision-making processes for the public policies.

Finally, I would like to express my sincere thanks to all those who contributed to organising the conference in Stare Jabłonki and to this publication, i.e. the scientific and organizing committee, the authors of the papers, reviewers and technical correctors. It is understandable that, despite a huge scientific and organizational effort I did not manage to exhaust all issues related to the analysed matters. One thing is sure though – the subject matter is so important that we assume that these issues should be the subject of further scientific research and substantial discussions, and the results of these work should be passed on to the society, administration and politicians.

Being aware that the human efforts are not always perfect, as the editors of the publication, we take full responsibility and sincerely apologize for any possible shortcomings which occurred in this Monograph. At the same time, we strongly encourage you to the lecture of both volumes.

Dr Marek Wigier,

IERiGŻ-PIB

1. Tasks of the CAP after 2020

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Abstract

In the current discussion on the future of CAP after 2020, not much is being said on the issues of real importance for agriculture and rural development in the EU Member States. The EU exposes mainly the passive protection and simplification tasks. No expansion vision is in place. We may assume that the chief CAP objective is assurance of sustainable development. This type of development has numerous exogenous determinants: global, economic, environmental, and endogenous, existing in agriculture. It results from the EU membership as well as greater links between European and world agriculture. We have also internal determinants both in the rural environment and production process. The external and internal situation imposes drawing of ambitious and expansive goals and tasks for CAP. One has to remember that goals that justify existence of CAP for taxpayers cannot obscure the ideas that are basic for agricultural and rural development.

Keywords: agriculture, European Union, CAP, sustainable development

JEL codes: A10, E00, F10, F15, F53, Q18

1.1. Introduction

Among the various concepts related to the economic integration, including the integration in agriculture, considerations regarding scientific foundations for the Common Agricultural Policy we can also find theories on the CAP reform. In analysing the modern hypotheses, the theory of the reform of the Common Agricultural Policy by A. Kay [2000] should be invoked. According to the English scientist "the interactions of different EU institutions and Member State governments is the main dynamic behind a reform process". This paper is one of the proofs of this hypothesis.

A discussion on the future of the European Union's Common Agricultural Policy after 2020, initiated by the European Commission some time ago, has intensified in the last two years (2016-2017). A public consultation on "Modern-

isation and simplification of the CAP" [Council of the European Union , 2017] was launched, with a number of debates such as an informal meeting of the Ministers of Agriculture in Amsterdam, meeting of the Ministers of Agriculture in Chambord, meeting of the Council for Agriculture and Fisheries in November 2016, European Conference on Rural Development Cork 2.0 in September 2016 [CORK 2.0, 2016], many debates in the European Parliament, to name a few.

1.2. Objectives and methods

The objective of this paper is to present the tasks which should be implemented by the Common Agricultural Policy after 2020. These tasks are presented on various forums and discussed. The author of the concept is either the European Commission or the European Union Member State, currently presiding the Council. The formulated tasks have been confronted by the author with the provisions of the Treaties, from the Treaty of Rome to the Treaty on the Functioning of the European Union. Then, the opinions of the individual Member States as to the proposal of the Maltese presidency were presented. Also, the provisions formulated in the Communication from the European Commission on "The Future of Food and Farming" of 29.11.2017 have been presented. On this basis, it is attempted to formulate conclusions on the CAP objectives to be defined and adopted, taking into account various current conditions for the rural and agricultural development. The paper used the method of analysis of the European Union documents.

1.3. Study results and discussion

The quoted document [Council of the European Union, 2017] collects, proposals developed at various meetings and presents priorities for further work, which include:

- Resilience building: this includes issues such as risk management in relation to weather, health or sanitary risks, access to financial instruments, income/price volatility, competitiveness and innovation and food security;
- Responding to environmental challenges: by increasing the sustainability of agriculture, implementing international commitments on climate after the Conference of the Parties (COP) [The International..., 2015], United Nations Framework Convention on Climate Change [UNFCCC, 2017] or the broader objectives included in the 2030 Agenda for Sustainable Development [UNIC, 2016];
- Guaranteeing the exchange of generations: by facilitating access to financial resources, land, through transfer of knowledge, vocational training and reducing administrative barriers;

- Maintaining market orientation: which includes issues such as promoting competitiveness, finding the right balance between opening new markets and protecting sensitive sectors and improving the competitiveness of export;
- Empowering farmers: by addressing the issues of transparency, contractual relations and unfair commercial practices.
- Simplification should remain the overriding principle of the future CAP, not only at the legislative level, but also as regards the implementation and controls, as indicated in the Council Conclusions of May 2015 [Special Committee on Agriculture, 2015].

The Maltese Presidency, which was the basisfor the document, asked the Member States two questions: whether they agree with the above-mentioned set of priorities and whether it should be supplemented. Before we quote the responses of the individual countries, the more general question can be asked: **are these the most important objectives for agriculture and rural development? has this been written in the TFEU like that?**

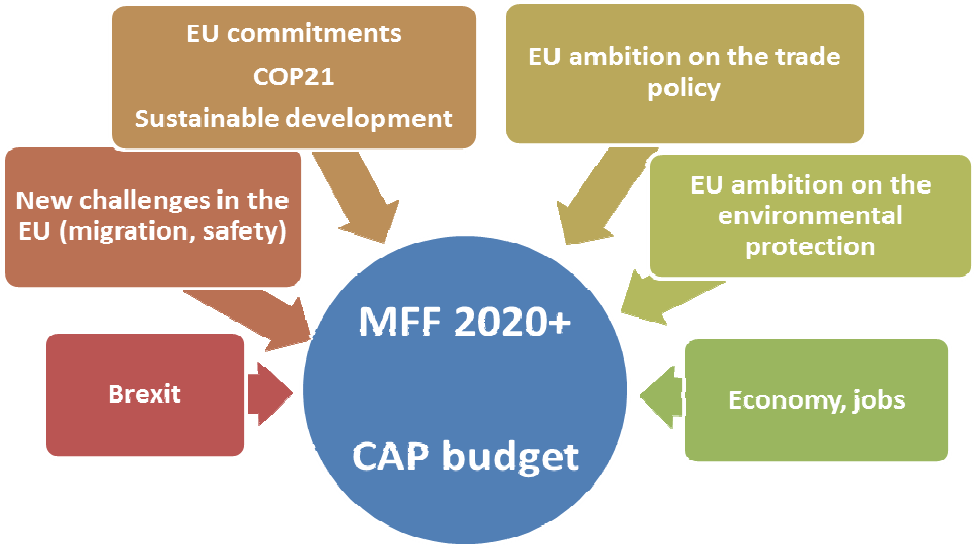
It can be concluded that in their responses the Member States retained the presence of mind and knowledge of the principles of the Common Agricultural Policy. Let us remind that Article 39 of the Treaty on the Functioning of the European Union, repeating the provisions of the Treaties of Rome, sets out the specific objectives of the CAP [Damen and Przetacznik, 2017]:

- To increase agricultural productivity by promoting technical progress and the optimum utilisation of the factors of production, in particular labour;
- To ensure a fair standard of living for the agricultural community;
- To stabilise markets;
- To assure the availability of supplies;
- To ensure that supplies reach consumers at reasonable prices.

These are both economic and social objectives aimed at protecting the interests of producers and consumers. In addition to the specific objectives of the CAP, as provided in Article 39 of the TFEU, many provisions of the Treaty provide for additional objectives applicable to all policy areas and to all Union actions. Consequently, the promotion of the high level of employment (Article 9), environmental protection to promote the sustainable development (Article 11), consumer protection (Article 12), animal welfare requirements (Article 13), protection of public health (Article 168(1)) or economic, social and territorial cohesion (Articles 174-178) become fully the CAP objectives. Moreover, in the context of the opening and globalisation, Article 207 lays down the principles of the common commercial policy relating to trade in agricultural products. However, should the additional objectives dominate the basic objectives?

It can be said that this has actually happened. The so-called "greening", introduced by the reform of 2013 and, in fact, a discussion taking place in the EU forum since 2010, officially advocated the sustainable development and dominated the tasks of the CAP at the beginning of the present perspective [Krzyżanowski, 2015]. Regardless of introducing the noble environmental protection objectives [Communication, 2010], the point was to justify the need to pay for the Common Agricultural Policy, i.e. agriculture and rural development, in the eyes of taxpayers in the Member States.

Figure 1. Elements of the debate on the CAP after 2020



Source: Common Agricultural Policy after 2020 – Polish priorities, Ministry of Agriculture and Rural Development, Łomża 2017.

The Member States in their statements at the meeting of the Council of Ministers [Report, 2017], in the vast majority opted for the classic model of the CAP (two pillars). This was not mentioned only by Germany, Denmark, the Netherlands and Portugal. Most countries also stress the importance of direct payments to the amount of agricultural income and production. Only four above-mentioned countries do not comment on this. In analysing the discussion of the Member States on the Presidency's document [Report, 2017], it can be concluded that the Member States were almost fully unanimous in relation to one priority only, i.e. simplification of the CAP. The simplification was not mentioned as an important priority only by six countries: Austria, Bulgaria, Cyprus, Estonia, Spain and Ireland. The opinions were more divided in terms of the issue of risk management: 17 countries, including Poland, opted for recognising this instruments as a priority and important task for the CAP.

The importance of the problem is well illustrated by the position of Germany: "Focusing on the environmental issues only, is an excessively restricted view of the needs of the agricultural sector." In the course of numerous discussions on the future of the CAP, which have taken place in recent years, also the challenges that the Common Agricultural Policy can/should face, have been mentioned (Fig. 1).

As we can see, there is neither agriculture nor farmers here. Both categories are buried deeply under a layer of general tasks and commitments.

Another light on the tasks of the CAP in the next financial perspective is cast by the European Commission's Communication "The Future of Food and Farming" published at the end of November 2017 [Communication, 2017]. The CAP is to play an important role in achieving the priorities of Jean-Claude Juncker in full cohesion with other policy areas, in particular by:

- Increasing the number of high-quality jobs and stimulating growth and investment;
- Using the potential of the Energy Union, circular economy and bioeconomy, while increasing the environmental concern and mitigating and adapting to climate change;
- Transfer of research and innovation from laboratories to fields and markets;
- Full inclusion of farmers and rural areas in the digital economy; and
- Contributing to the implementation of the European Commission's Programme on migration.

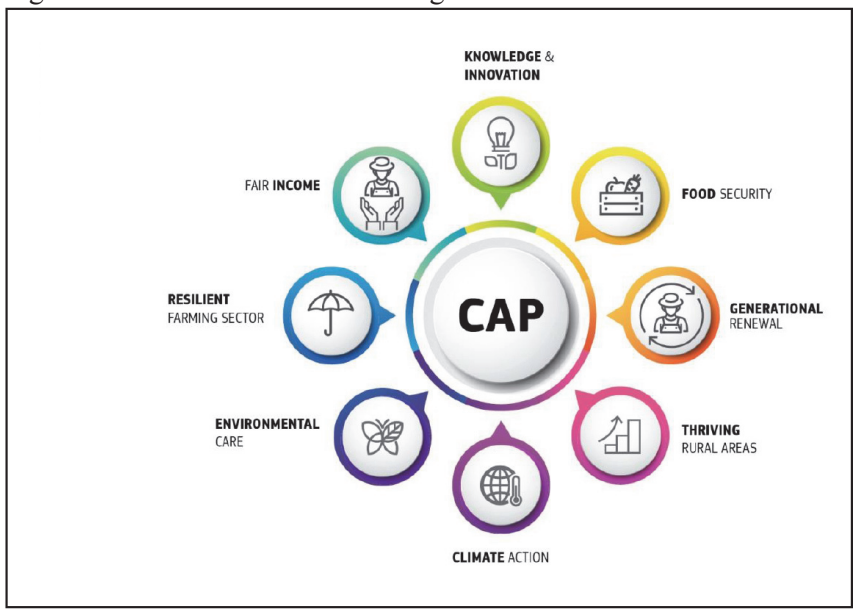
Among 17 Sustainable Development Goals by 2030, promoted by the United Nations, 12 are directly or indirectly implemented through the activities of the Common Agricultural Policy.

The further part of the Communication lists the main objectives of the future CAP [Communication, 2017, p. 12]:

- Promoting smart and resilient agricultural sector;
- Increasing the environmental concern and stepping up climate action to contribute to achieving the EU environmental and climate change objectives;
- Strengthening the socio-economic structure of rural areas.

The same is shown in the Figure 2. As directly visible, the farmer is indicated only twice, but he is to be the beneficiary of all other actions.

Figure 2. Future of food and farming



Source: Communication, 2017.

1.4. Summary and conclusions

Unfortunately, the priorities indicated in the Presidency's document, and above all in the Communication, do not take into account the essential tasks of the Common Agricultural Policy, which are also important for Polish agriculture and rural development. Firstly, it is important to ensure a level playing field in the European market. The Common Agricultural Policy should, in fact, create a common legal and financial framework for the functioning of the agricultural sector in the EU. This task is now gaining importance, *inter alia*, due to the fact that the instability in the agricultural markets and the increasing price and cost pressure make some countries take protectionist action in the EU single market.

The second, still up-to-date task of the CAP, is to strengthen cohesion in the EU, in economic, social and political terms. The CAP should reduce disparities in the agricultural and rural development levels, both among the regions and Member States.

How can these tasks be accomplished? A key issue is to provide an adequate, fully Community budget for this policy. The relevant CAP budget is a prerequisite for the implementation of the priorities identified by the Presidency. In order to ensure a level playing field in the EU single market, it is necessary to complete the process of full alignment of direct payment rates. One of the possible solutions is the proposed distribution of direct support among the

Member States on the basis of a flat-rate throughout the EU [Krzyżanowski, 2015]. The flat- rate corresponds well to the current and future objectives of the CAP – in particular, with the environmental and climate objectives [Common 2017]. The issue of alignment of payments was also raised in the subsequent versions of the Communication "The Future of Food and Farming". Unfortunately, the later is the version of the document, the more imprecise are the initial provisions. The authors refer to the words by President Juncker who stated "that we need to implement the principle of equality among the large and small countries, East and West, North and South, even though labour costs differ, the challenges faced by farmers are similar". The first versions of the Communication talk about the "reduction in the differences among average payment rates in the Member States", which is to be understood as alignment of the level of payment and the final version generally talks about the "reduction in the differences of support under the CAP" which does not necessarily mean alignment of payments, but support e.g. for climate change measures.

When looking at the new solutions through the prism of the interests of Polish agriculture, it should be assumed that the fund allocation criteria in the second pillar of the CAP should (as it has been so far) take account of the differences in the wealth of rural residents, their population and the area of agricultural land. Instruments of the common organisation of agricultural markets should be used more rapidly and actively so as to counter agricultural crisis situations.

The European Union should go with the CAP rules beyond the grouping and be a challenge in relation to the policies of other regions of the world. In particular, the EU countries are to be treated equally. The CAP after 2020 should be implemented in such a way so that it could create opportunities for the competitiveness of the EU products in world markets, and it should also take into account the solutions used in other countries, e.g. in the field of state aid for agriculture (USA) [Krzyżanowski, 2016]. The CAP should be used not for eliminating the agricultural production but for its development, in connection with a forecast regarding the increased food demand in the world. The CAP should also include mechanisms to protect against the allocation of agricultural land for non-agricultural purposes.

Certainly, an important, yet "secondary", task is to simplify the CAP financing scheme. It would be necessary to simplify the procedures for allocating and distributing financial resources, so as to reduce bureaucracy while reducing the costs of handling the CAP. Undoubtedly, the greening obligation is a political element for the citizens of Europe. The implementation of this system points once again to the role of farmers and agriculture in the environmental protection. Hence, if the greening needs to function, its rules should be simplified as much as possible.

The above considerations fit in further analyses on the vision of the Common Agricultural Policy after 2020. The next stage of work will consist in publishing, by the Commission, of legislative proposals, which is foreseen in 2018. The new shape of the CAP will be finally determined by the Member State government (EU Council for Agriculture and Fisheries) and the European Parliament.

The Polish opinion in the discussion of the future of the CAP is a draft governmental position on the future of the Common Agricultural Policy [Ministry, 2017]. According to the Ministry of Agriculture, the Common Agricultural Policy is a comprehensive, fully Community policy of the EU, which is one of the cornerstones of the European Union. This policy implements an increasingly broader catalogue of public objectives and, through further reforms, responds to new challenges. The CAP is responsible for the level playing field in the single market, while deciding on the predictability and stability of the conditions of pursuing agricultural activities.

Also in the future, the CAP should provide the EU society with food independence, including access to high-quality food, while contributing to achieving the sustainable development goals, including the preservation of the resources of land, water and air and biodiversity for other generations.

The current legal solutions leave room for further modernisation of the CAP in an evolutionary way, without fundamental changes in the structure of this policy. The real simplification of individual instruments and of the entire CAP after 2020 requires, inter alia, greater confidence in the Member States in terms of planning, implementation and control in line with the principle of subsidiarity.

It is necessary to coordinate the CAP with other EU policies (e.g. trade, environmental, climate, energy, development, competition), which are increasingly affecting agriculture and the food production sector. The achievement of ambitious targets with regard to other Community policies will not be possible without the ambitious and fully Community agricultural policy.

May this clash of views between the Commission and the Member States bring the best possible solutions for the future of the CAP.

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2. An assessment of the regional impacts of post-2020 CAP budgetary cuts on production structures and agricultural incomes in the EU

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Abstract

The European Commission (EC) will publish its post-2020 Multi-Annual Financial Framework (MFF) for the European Union (EU) before summer 2018. The EC sees the status quo as no option for the EU. In designing the new MFF, coherence and complementarity between the different programmes and instruments will be strengthened, and flexibility would be factored in to respond to the new challenges and unexpected developments. In consequence, the funding of the Common Agricultural Policy (CAP) is expected to decrease and have a lower share in the overall EU spending after 2020.

This paper assesses the regional impacts of a hypothetical 30% and 15% cut in the EU CAP budget, supplemented by a BREXIT scenario (the United Kingdom (UK) being a net budgetary contributor), on both agricultural production structures and incomes in the EU. To this end, projections by the Common Agricultural Policy Regional Impact Analysis (CAPRI) simulation model were prepared, and shifts in agricultural production and changes in income distribution were briefly evaluated.

Keywords: Common Agricultural Policy, post-2020 Multi-Annual Financial Framework, direct payments, CAPRI model

JEL codes: C53, Q11, Q18

2.1. Introduction

Any restructuring of the CAP is dependent on the finalisation of the next (2021-2027) EU budget framework. The MFF provides the basis for the EU to implement common policies with European value added. The White Paper on the Future of Europe [European Commission, 2017a] set out several possible scenarios for Europe's future. The Reflection Paper on the Future of the EU Finances [European Commission, 2017b] looked at what each of these scenarios could mean for the EU budget, from 'step back to only the Single Market' to the 'lot more together' option, accompanied by a reliable budget that allows the

efficient delivery of priorities. The leaders of the EU and its Member States agreed on a positive agenda for the Europe of 27 in Bratislava on 16 September 2016 and in the Rome Declaration of 25 March 2017.

The withdrawal of the UK from the EU will mean the loss of a significant contributor to the financing of the EU's policies and programmes. Haas and Rubio [2017] calculated the UK annual net contribution to the CAP at around EUR 3 billion above the allocated expenditures. There is no easy way of adjusting CAP spending to fill in the 'Brexit' gap. They also estimated that higher contributions would affect the biggest net contributors the most, while reducing CAP spending puts a higher burden of adjustment on CAP net recipients. This means that a critical look must be taken at where savings can be made and priorities delivered more efficiently. This is an essential part of the preparation of any budget proposal and the EC is fully committed to modernising and streamlining wherever possible. In the 'Brexit' negotiations, disadvantages for the future MFF have to be minimised. In the MFF negotiations, the increase of the resources and the cutbacks should not be limited to any particular spending area due to mitigating adverse effects on the different policies.

In the view of the EC [European Commission, 2017c], the CAP has successfully integrated the related horizontal and sectoral policies and, at the same time, serves to realise commercial, environmental, climate, and research and innovation goals. The CAP has also strengthened the EU's leadership role in the world market for agricultural and food products; adjusted prices to the world market and ensured income stability in the volatile market environment. Most EU citizens agree that the CAP generates significant EU added value and functions as a public good [ECORYS, 2017]. According to the public opinion, the CAP guarantees the high quality and safety of food, and there is an expectation that the EU will raise farmers' living standards and strengthen their role in the food chain. In the EC's vision, besides the results, more emphasis should be placed on both the environmental and economic sustainability of the CAP. In addition to covering the cost of 'Brexit' and the new challenges (common defence, migration and counter-terrorism), resources from traditional policies (i.e. the CAP and Cohesion Policy) may also be necessary in the context of the negotiation of the 2021-2027 MFF.

After the adoption of the EC's Communication [European Commission, 2017c] on the future CAP in November 2017, the Committee on Agriculture and Rural Development of the European Parliament was convened on 4 December 2017. In its opinion, the Committee urged the EC to increase, or at the very least to maintain at its current level, the EU CAP budget post-2020 [Ribiero, 2018]. In the Agriculture Council meeting of 11-12 December 2017, Ministers had their

first opportunity to react to the Communication and highlight the strategic issues for the future CAP. Many Ministers stressed the need for an adequate future budget to match the high expectations placed on the agri-food sector. The Committee also stressed the need for the EC to keep direct payments intact, as they help to avoid distortions of competition between Member States, and to maintain the external competitiveness of the EU agricultural products. Impact assessment on the implementation of the current Common Monitoring and Evaluation Framework of the CAP, including the first results on the performance, will be presented to the European Parliament and the European Council in April 2018. Discussions on the MFF beyond 2020 could start at the earliest in May 2018. The negotiations on the legislative proposal are planned to begin in the second half of 2018.

The EU Budget Commissioner Günther Oettinger highlighted the need for proportionate budgetary cuts to 'plug the gap' as a result of 'Brexit', and for extra financial contributions from Member States to add to the challenges of the refugee crisis, the protection and monitoring of borders and security concerns [Agra Facts, 2017].

In this paper, the regional impacts of hypothetical cuts in the CAP budget due to 'Brexit' and to the restructuring of the EU budget after 2020 are assessed. To this end, three different scenarios were developed for which projections by the CAPRI simulation model were prepared. The estimated shifts in both agricultural production structures and agricultural incomes in the EU are briefly evaluated in the paper.

2.2. Methodology

For estimating the regional impacts of cuts in the post-2020 CAP budget on both production structures and agricultural incomes in the EU, the CAPRI simulation model was used. CAPRI is a global, comparative static, partial equilibrium model for primary and secondary agricultural commodities designed for the *ex ante* assessment of impacts caused by changes in the EU's CAP instruments with a focus on the EU Member States and NUTS 2 level [Leip et al., 2011].

The main assumptions of the CAPRI baseline ('CAP 2014-2020' as of 2016) used for this assessment were that the CAP 2014-2020 remains unchanged, except for its financing; agricultural trade policy measures of the EU are governed by the Uruguay Round Agreement on Agriculture without considering any bilateral trade agreements still under negotiation in 2016; and the EU Renewable Energy Directive [2009] continues in effect.

The following three different scenarios were developed and assessed:

- BREXIT: The assumption was that the UK formally departs the EU in 2019 and its financial contribution to the EU CAP budget, estimated at around EUR 4.44 billion, will be not compensated. Therefore, the UK's net contribution of around EUR 3 billion [Haas and Rubio, 2017] missing from the CAP for the remaining 27 Member States was distributed between Pillar 1 and Pillar 2 as per the weights of the EU direct payments and the EU rural development support, resulting in, respectively, 5.94% and 6.39% decrease in the two EU CAP financial envelopes for 2020. The financial ceilings for the EU direct payments and the EU rural development support of the 27 Member States were reduced evenly by the same percentages. The share of each not fully exploited EU direct support scheme (i.e. redistributive payments, voluntary coupled support schemes, payments for young farmers, etc.) was allowed to increase up to the limits in each Member State as laid down in Regulation (EU) No. 1307/2013.
- CAP -15%: Based on Agence Europe [2017], an overall cut of 15% in the EU CAP budget was assumed, including BREXIT. Above the commitments allocated to the UK, the EU CAP spending for the remaining 27 Member States was reduced by EUR 3.41 billion, resulting in a further 6.77% and 7.28% decrease in the funding of Pillar 1 and Pillar 2, respectively, for 2020. The financial ceilings for the EU direct payments and the EU rural development support of the 27 Member States were reduced evenly by the same percentages. The share of each not fully exploited EU direct support scheme was allowed to increase up to the limits in each Member State as laid down in Regulation (EU) No. 1307/2013.
- CAP -30%: an overall cut of 30% in the EU CAP budget was assumed, including BREXIT. Above the commitments allocated to the UK, EU CAP spending for the remaining 27 Member States was reduced by EUR 11.58 billion, resulting in a further 22.93% and 24.66% decrease in the funding of Pillar 1 and Pillar 2, respectively, for 2020. The financial ceilings for the EU direct payments and the EU rural development support of the remaining 27 Member States were reduced evenly by the same percentages. Again, the share of each not fully exploited direct support scheme was allowed to increase up to the limits in each Member State as laid down in Regulation (EU) No. 1307/2013.

In each scenario, the financial transfers between the EU direct payments and the EU rural development support for each Member State were considered as laid down in Article 14 of Regulation (EU) No. 1307/2013.

2.3. Results

Table 1 summarizes the model results for those arable crops which are of significant importance from the perspective of Hungary. In each of the above scenarios, relatively small adjustments in the sowing areas for these crops are projected versus the CAPRI baseline, except for soybeans. The area under soybeans is expected to shrink by over 9% (CAP -30%) in the EU-13 (Member States joining the EU since 2004). Soybean production has been encouraged by voluntary coupled support, often exceeding the basic or single area payment, in various Member States (e.g. including Hungary and Romania) since 2015, but its competitiveness still lags behind rapeseed and sunflower seed production. As for soft wheat and grain maize production, the EU-14 ('old' Member States less the UK) could gain some comparative advantage by cuts in CAP spending, while for rapeseed and especially for sunflower seed production, the opposite would be true. At the level of the EU-27, the area under cereals and oilseed are expected to decrease by up to 1.7% and slightly over 1%, respectively (CAP -30%). As for changes in producer incomes, a decline in the EU financial support could have aworse impact on arable farmers in the EU-13, especially in the case of soft wheat production.

Table 1. CAPRI model results for crop production: changes versus the baseline

	BREXIT			**CAP -15%**			**CAP -30%**		
	Changes in cropping area (%)								
	EU-27	**EU-13**	**EU-14**	**EU-27**	**EU-13**	**EU-14**	**EU-27**	**EU-13**	**EU-14**
Cereals	*-0.91*	*-0.79*	*-0.99*	*-0.93*	*-0.81*	*-1.03*	*-1.54*	*-1.34*	*-1.69*
Soft wheat	0.32	-0.09	0.62	0.31	-0.10	0.60	-0.03	-0.41	0.24
Grain maize	0.14	0.05	0.26	0.14	0.06	0.26	0.09	-0.04	0.26
Oilseeds	*-0.55*	*-0.45*	*-0.63*	*-0.56*	*-0.46*	*-0.65*	*-0.95*	*-0.82*	*-1.04*
Rapeseed	-0.49	-0.39	-0.55	-0.50	-0.39	-0.57	-0.64	-0.41	-0.78
Sunflower	-0.43	-0.14	-0.77	-0.44	-0.12	-0.80	-0.59	-0.05	-1.34
Soybeans	-1.88	-2.82	-0.78	-2.10	-3.14	-0.89	-6.34	-9.25	-2.98
	Changes in producer incomes (%)								
Cereals	*-5.12*	*-6.47*	*-4.39*	*-5.48*	*-6.88*	*-4.72*	*-14.06*	*-14.75*	*-13.65*
Soft wheat	-3.50	-6.49	-2.09	-3.84	-6.91	-2.38	-12.67	-15.07	-11.55
Grain maize	-3.38	-3.54	-3.28	-3.65	-3.86	-3.50	-10.04	-9.97	-10.17
Oilseeds	*-5.50*	*-6.72*	*-4.90*	*-5.77*	*-7.17*	*-5.09*	*-13.88*	*-15.71*	*-13.00*
Rapeseed	-5.06	-6.96	-4.30	-5.27	-7.35	-4.45	-12.84	-14.71	-12.07
Sunflower	-6.18	-6.48	-5.84	-6.58	-7.03	-6.14	-15.95	-17.38	-14.80
Soybeans	-6.64	-5.93	-7.55	-6.93	-6.40	-7.78	-14.49	-15.26	-15.46

Source: own calculations.

Table 2 summarizes the model results for the major livestock sectors, excluding sheep and goats. In the CAPRI baseline, incomes for beef farmers are projected to be negative, this explains the decline in the beef herd in each of the scenarios. Beef production is strongly subsidized in most Member States by the means

of coupled support. The apparent gain in incomes for beef farmers in the EU-14 hints at their relative competitiveness improving when CAP spending is reduced, although beef farming is still expected to yield, on average, no profit for them.

An anticipated increase in milk producer prices in the CAPRI baseline compensates for the cuts in the EU direct payments received by dairy farmers, including voluntary coupled support applied extensively by many Member States. Therefore, both milk production and incomes of dairy farming are expected to grow in each of the scenarios.

Pig fattening is indirectly impacted by the cuts in the EU area-based payments. A slight increase in feed costs due to the decline in cereals and oilseeds area would substantially affect this sector, which is to be explained by the very low absolute value of unit income generated as per the CAPRI baseline. Pig fattening would, on average, continue making losses.

The exposure of the laying-hens sector to changes in the EU direct support seems to be limited compared to the production of broilers. In the CAPRI baseline, incomes for broiler producers in the EU are, on average, projected as negative, although the absolute values in unit terms are, just as in the case of pig fattening, rather low. Hence the high changes in percentage terms. Negative changes in the number of broilers mean that cuts in the EU direct payments would put a brake on the increase in the production of broilers as projected in the CAPRI baseline, driven by only a few Member States (e.g. Poland or Spain) where production yields profit.

Table 2. CAPRI model results for livestock farming: changes versus the baseline

	BREXIT			**CAP –15%**			**CAP –30%**		
	Changes in livestock numbers (%)								
	EU-27	**EU-13**	**EU-14**	**EU-27**	**EU-13**	**EU-14**	**EU-27**	**EU-13**	**EU-14**
Beef*	-1.06	-1.12	-1.05	-1.09	-1.14	-1.08	-1.59	-1.61	-1.59
Milk**	0.57	0.37	0.62	0.57	0.37	0.62	0.55	0.23	0.62
Pig fattening	-1.50	-0.63	-1.65	-1.50	-0.63	-1.66	-1.54	-0.68	-1.69
Laying hens	-0.29	-0.12	-0.38	-0.30	-0.12	-0.39	-0.34	-0.15	-0.44
Broilers	-4.93	-3.29	-5.55	-4.93	-3.29	-5.55	-4.98	-3.34	-5.59
	Changes in producer incomes (%)								
Beef*	3.92	-2.97	5.96	3.78	-3.06	5.80	0.82	-4.89	2.50
Dairy***	3.34	9.48	2.93	3.34	9.40	2.94	3.22	7.50	2.92
Pig fattening	-23.12	-29.64	-22.97	-23.13	-29.67	-22.97	-23.42	-31.05	-23.21
Laying hens	-1.59	-0.54	-2.31	-1.59	-0.55	-2.31	-1.73	-0.66	-2.47
Broilers	-17.31	-21.38	-17.11	-17.31	-21.39	-17.11	-17.44	-21.67	-17.22

* Other cows, heifers for fattening low/high weight, male adult cattle low/high weight.

** Milk production.

*** Dairy cows low/high yield, heifers breeding, raising male/female calves, fattening male/female calves.

Source: own calculations.

2.4. Summary and conclusions

In the three scenarios developed for assessing the impacts of cuts in the CAP budget due to 'Brexit' and to the restructuring of the EU budget after 2020 on both agricultural production structures and incomes in the EU, there were relatively small adjustments in the sowing areas of the major cereals and oilseeds, except for soybeans. Our modelling results showed a much wider diversity for the possible structural changes in the livestock sectors. In general, a larger decline in incomes for all agricultural sectors, except for milk production, might be expected in the EU-13 due to a shrinking CAP budget, which hints at the EU agricultural subsidies playing a more pronounced role in ensuring a stable source of income for farmers in the 'new' Member States. However, the CAPRI baseline market assumptions were found to have a strong influence on the estimated impacts of changes in the EU CAP budget, therefore, especially in the case of the livestock sectors, the modelling results should be interpreted with much caution.

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3. Is there room for financial instruments in the Common Agricultural Policy? Casus of Poland

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Abstract

A number of new geopolitical conditions, new EU priorities, reform of the euro area with the possibility of establishing a separate budget, fiscal consolidation of most of the EU countries, constitute difficulties in terms of the construction of the EU budget. The aim of the study was to identify the possibility of using financial instruments under the CAP. The analyses concerned mainly Poland. The considerations, illustrated with theoretical and empirical materials, were focused around the following thesis: the permanent domination of the subsidies under CAP and its first pillar radically narrows down the space for using financial instruments. An eclectic approach was applied, using elements of the theory of economics of the public sector, public finances, financial economics and institutional economics. Some justifications of financial instruments do not seem well-founded in theory and probably would not pass the rigorous empirical verification. In order to avoid over-reimbursement and re-promotion of agriculture, it is not advisable to start identifying development barriers to this sector with financial issues. Financial instruments are adjusted mainly to achieve allocation and stabilisation objectives under thr CAP and national agricultural policies. Only larger farms may be interested in financial instruments.

Keywords: financial instruments, agricultural finances, EU subsidies, agricultural credit, Common Agricultural Policy

JEL codes: Q14, Q18, G23

3.1. Introduction

A series of new geopolitical conditions (including Brexit, the US expectations, articulated by President D. Trump, to increase the contribution of the Europeans to the NATO funding), new EU priorities (common defence policy, combating climate change, protection of external borders and the problem of immigrants), reform of the euro area with the possibility of establishing a separate budget, fiscal consolidation of most of the EU countries, constitute signifi-

cant and noticeable difficulties in terms of construction of the EU budget. Due to the social pressure of farmers in the countries of the fragmented agrarian structure, the change of course in the case of the "agricultural budget" may turn out to be very difficult. Naturally, it would seem that there should be increased interest in financial instruments (FI).

However, previous experience in the application of financial instruments in rural development programmes is very limited, although their use has been possible for several programming periods. A key drawback is the complexity of their implementation related to the need to involve entities from the financial sector, which means a longer process of preparing a given support instrument for implementation. At the same time, the possibilities and the manner of shaping these instruments are very wide. Until the end of the previous programming period, a significant barrier to the development of the use of these instruments lied in their limitation to a given programming period, as there were no mechanisms to change from one programming period to the next without extinguishing the action, which reduced the possibility of generating multiplier effects and was associated with the re-creation of infrastructure for the implementation of the action in the next period.

Although solutions are introduced in each subsequent programming period based on previous experience, which aimed at facilitating the implementation of financial instruments, complicated implementation procedures remain the key problem. Therefore, changes are proposed to simplify the operation of financial instruments, such as more transparent standards for the selection of financial intermediaries or uniform solutions for grants and financial instruments facilitating to combine these two forms in one project.

The aim of the study is to try to identify the possibility of using financial instruments under the CAP. The analyses will mainly concern Poland. The axis of considerations is as follows: permanent domination of subsidies under the CAP and its first pillar drastically narrows down the space for using financial instruments. The authors applied the eclectic approach, using the method of literature studies, documentary studies, case studies, and – in the discussion – elements of the theory of economics in the public sector, public finances, financial economics and institutional economics. The present analysis is a review study.

3.2. Financial instruments versus subsidies – key problems

There is no universally accepted definition of "financial instruments". Accounting, financial reporting, and securities law have developed different classification approaches. For example, the Polish balance sheet law (Article 3, paragraph 1 point 23 of the Act on Accounting; Dz.U. of 1994 No. 121, item

591) defines financial instruments as "contracts resulting in financial assets being created by one party and financial liabilities or equity instruments on the other". A financial instrument will, therefore, be a financial contract that documents the title of ownership or the right to provide or receive monetary values. Generally, financial instruments, as indicated by typologies of various financial institutions (e.g. BGK), refer to a broad set of loan guarantees, mezzanine (quasi-equity funds), equity and venture funds, microcredits [BGK, 2014].

Table 1 presents the advantages and disadvantages of financial instruments against the background of subsidies. It should be emphasised that the positives include the so-called quantitative and qualitative added value, fairly well recognised by the EU institutions (including the European Investment Bank). In turn, the disadvantages refer to the imperfect mechanisms and ineffective institutional frameworks.

Table 1. Advantages and disadvantages of financial instruments – as compared to subsidies

Advantages	Disadvantages
Quantitative added value	▪ imperfect, ineffective organisational model of existing guarantee funds in Poland ▪ creating an institutional, agriculture-oriented and rural SME-based system "from the scratch" ▪ traditional, neoclassical investment assessment, using financial efficiency criteria
▪ the multiplier effect, ME – only credit guarantees ▪ the leverage effect, LE ▪ the revolving effect, RE	
Qualitative added value	
▪ minimisation of distortions present on the credit market ▪ innovation of the offer ▪ strengthening the potential of some entities with low credit rating ▪ reducing the imperfections of the market typical only for the region or only for the agricultural sector ▪ attracting new sources of knowledge and know-how ▪ supporting the development of "business mentality"	

Source: own elaboration on the basis of EIPA-Ecorys-PwC, 2014, Loriz-Hoffmann 2012; European Commission, European Investment Bank 2016, p. 54-55; Kulawik, Soliwoda, Wieliczko, 2017, p. 76-78.

The neoclassical theory draws attention to the information excellence and completeness of financial markets. However, a deeper analysis has shown that in practice we are dealing with incompleteness and imperfection of financial markets. The institutional theory and its successors distinguished the temptation to abuse and negative selection as two important implications of information asymmetry. The occurrence of credit and liquidity restrictions is a symptom of imperfection and incompleteness of financial markets [Stiglitz, 1994; Stiglitz, 2008]. External credit rationing refers to the policy of financial institutions

which allows for the refusal to grant loans to entities that are too heavily indebted. In turn, internal credit rationing results from various types of barriers inherent in the psyche of a potential borrower: excessive level of financial leverage discourages the use of additional amounts of foreign capital [Kulawik, 1997].

Although there have been and still are numerous empirical studies[2], referred to even in the work of Ciaian et al. [2012] concerning the identification of determinants of the farms' demand for loans, the estimates of the demand for financial instruments (e.g. for the EU institutions) have remained quite uncertain. This is due to the fact that at the micro level, credit restrictions may have a varied impact on the farmers' decisions regarding the allocation of resources.

Summing up, the arguments for interventionism constitutes the basis for the use of financial instruments under the CAP (for more on the subject see: Kulawik et al. [2017]). In the case of Poland, many prerequisites apply to countries with medium development (Table 2).

Table 2. Rationale for credit intervention in agriculture depending on the level of socio-economic development of the country – developed countries/countries with medium development level

Developed countries	Countries with medium development level
• Imperfection (unreliability, inefficiency) and incompleteness of financial and credit markets • Improving the efficiency of non-financial markets • Social justice and inter-regional equal opportunities	• Mitigation of credit rationing effects • Elimination of underinvesting in agriculture • Counteracting the negative effects of the monopolistic position of financial institutions • Reduction of insolvency costs as well as loss of credit rating by farmers • Subsidising certain groups of agricultural population

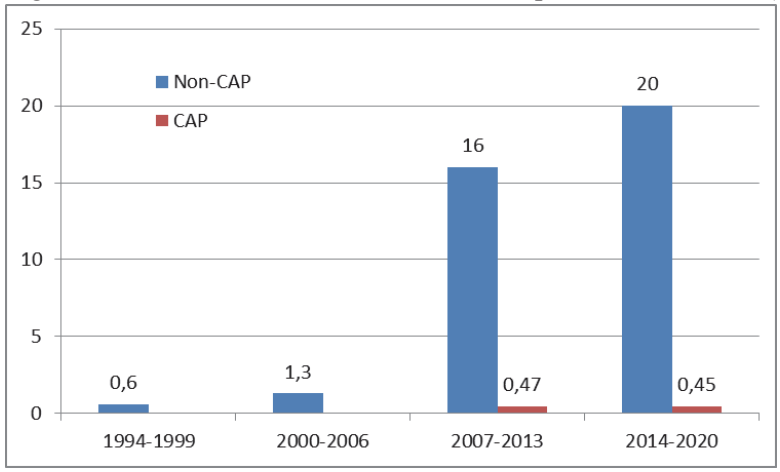
Source: own elaboration based on literature studies.

3.3. The use of financial instruments under the EU policy

Financial instruments, formerly known as financial engineering instruments, are used in the ERDF, ESF and CF funds from the period of 1994-1999, and in the second pillar of the CAP from the 2000-2006 period. There is no significant differentiation between the 'old' and 'new' EU Member States as far as the scale of their application is concerned. In the case of the EAFRD, for the 2007-2013 period, financial instruments amounted to 1.3% of EAFRD resources at that time. Financial instruments may be used for investment activities, i.e. in the case of RDPs to support investments in agricultural holdings and processing sector entities (Figure 1).

[2] Studies conducted in the USA [e.g. Benjamin and Phimister, 2002; Briggeman, Towe and Morehart, 2009] should be mentioned here, as well as in the EU [Petrick and Latruffe, 2003; Latruffe, 2005], referred to by Ciaian et al. [2012]. The set of statistically significant determinants should include: value of own assets, area, profitability, value of fixed assets, level of equity, obtained subsidies (subsidy rate).

Figure 1. Level of funds allocated for the implementation of FI (EUR billion)



Source: own elaboration on the basis of data from the European Commission [2017a] and European Court of Auditors [2015].

The use of financial instruments is still not popular, although the estimated financial gap is significant. In the EU agriculture alone, it amounts to EUR 7.1-18.6 billion, while in Poland it is EUR 788-1732 million [European Commission, 2018].

3.4. Example of the use of FI in the 2014-2020 programming period

French Occitania serves as an example of using a wide range of financial instruments in the current programming period. Based on the previous experience, the scope of application of FI with the use of the ERDF and the EAFRD has been extended. A total support of 5000 SMEs is planned, including agriculture. The budget for this purpose is EUR 143 million (combined resources of both funds, funds from the European Fund for Strategic Investments and public funds from France). It is expected that EUR 900 million will be allocated to entities from the SME sector. The instruments implemented include:

- Loans for seed capital,
- Loan guarantees,
- Co-investment instrument.

With regard to agriculture loan guarantees have been planned for selected measures of the local rural development programme. These activities include: investments in fixed assets; development of farms and economic activity; investments in the development of forest areas and improvement of the viability of forests. Moreover, EUR 27 million of public resources, including EUR 15.81 million in EAFRD funds, will be earmarked for guarantees. It is assumed that on

the basis of these funds, EUR 135 million will be generated in the form of loans, which means that the leverage needs to be 5. The guarantees shall reach 80% of the loan amount, but no more than the established ceiling resulting from the regulations concerning State aid in the agricultural sector. The minimum loan amount is EUR 25,000. Guarantees are granted free of charge, and loans are charged with an average interest rate of 0.4% lower than the average interest rate [Robino, 2017].

3.5. How to improve the implementation of FI in the EU?

In subsequent programming periods, changes are introduced in the functioning of the FI to eliminate shortcomings from the previous period. As part of the changes introduced to the 2014-2020 programming period, mandatory *ex ante* inspections have been introduced to determine the actual need for this form of support (Table 3).

Table 3. Changes in the functioning of the FI as part of Cohesion Policy in the 2014-2020 programming period in relation to the 2007-2013 period

Specification	2007-2013	2014-2020
Scope	Support for enterprises, urban development, energy efficiency and renewable energy in construction	Support for all thematic objectives implemented under the programme
Before creation	Voluntary analysis of the size of the financial gap for enterprises and at holding fund level	Mandatory *ex ante* evaluation
Deployment options	FI at the national or regional level – tailor-made	FI at the national, regional or international level. Individually designed or ready, loans/guarantees from the managing authority Addition to instruments at the EU level
Payments	The ability to declare to the Commission 100% of the amount contributed to the fund – not related to payments to final beneficiaries	Periodic payments related to the payment to final beneficiaries. National co-financing may be included in periodic payment applications.
Management costs, fees, interest rates	Legal basis defined in subsequent amendments to regulations/ interpretations specified in three subsequent notes	Detailed solutions available in EU regulations from the very start
Reporting	Mandatory reporting only from 2011. Only selected indicators	Mandatory reporting from the very start. A wide range of indicators

Source: European Commission [2017b], p. 183.

Still, many solutions applied to FI are not conducive to their widespread use. In connection with this, further changes are proposed regarding various areas of FI functioning (Table 4).

Table 4. Issues that need simplification and proposals for change

Area	Proposals
Financial intermediaries and their selection Public procurement rules hinder implementation. The selection process is too long and excessively regulated. Transparent standards for the selection process are necessary.	Direct indication in Regulation No. 1303/2013 and amendment of the Public Procurement Directive to unambiguously exempt FI from public procurement rules. Simplification of rules when implementation is entrusted to national financial institutions that implement national policy instruments. Selection procedure containing minimum requirements without the need to apply public procurement rules.
State aid rules applicable to FI The rules on State aid are applied despite their complexity, which often leads to illogical results. Different application of State aid rules to individual parts of the same project or similar financial projects from the EFSI to centrally managed programmes. Unresolved question of repayable assistance – which rules of State aid should be applied when repayable assistance is not FI *per se*, but does contain some elements of FI and grants?	Simplified State aid rules for FI, modification of block exemption regulation. Same rules for grants and FI implemented at the national level.
Combination of grants and FI Difficulties in linking grants to FI in a single operation. Different level of costs and fees, various rules regarding State aid and the requirement to maintain separate registers.	Simplified system for two separate operations or allowing a combination within one.

Source: Committee of Regions [2016], pp. 7-8 and 12-13.

3.6. Summary and conclusions

Key conclusions from the current application of FI and the possibilities of their wider and more effective use and application in Poland are as follows:

- Some justifications of financial instruments do not seem well-founded in theory and probably would not pass the rigorous empirical verification.
- In order to avoid over-reimbursement and re-promotion of agriculture, it is not advisable to start identifying development barriers to this sector with financial issues.
- Before actions are initiated aiming at wider application of financial instruments under the CAP, it should be checked whether the private financial sector will offer at least some of them more effectively. This case is taking place in Poland.
- Financial instruments are adjusted mainly to achieve allocation and stabilisation objectives under the CAP and national agricultural policies. On

the other hand, their direct impact on the degree of implementation of environmental objectives of these policies is debatable.

- Only larger, market-oriented and development-oriented farms may be interested in financial instruments. Also only such farms are able to efficiently handle the foreign capital offered to them in this way.
- Simplification of the procedures for the application of financial instruments is an important element to increase the demand for such financial instruments. This applies to both the procedures of public administration and financial intermediaries as well as final beneficiaries.
- Previous experience with the implementation of FI under the RDPs is limited, however, all of them (similarly as in the case of other EU funds) indicate that much more time is needed to launch the FI than in the case of grants (subsidies).

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4. The past, present and future of the CAP – the Hungarian viewpoint

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Abstract

The Common Agricultural Policy (CAP) was one of the first common policies of the European Community and it still allocates significant share of the common budget. With its initial objectives, CAP gnerated even more problems than it solved. The past several decades was dedicated to problem solving by different reforms.
Hungary accessed the EU on May 1, 2004 in the 2000-2006 financial planning period. The CAP provided and still provides enormous support to the Hungarian agricultural sector, however, it can be seen that it was in favour of the crop sector at the expense of the animal husbandry sector. The reforms definitely have impact on the sector, albeit to different extent. The future of this high level support is quite insecure which requires instant competitiveness actions from agricultural producers.

Keywords: Common Agricultural Policy, agricultural employment, farm structure

JEL codes: J21, N54, Q15, Q18

4.1. Introduction

The Common Agricultural Policy (CAP) was one of the first common policies of the European Community launched in 1962. It allocates a continuously decreasing, but still one of the highest shares of the common budget. The basis of the CAP was officially established in Paragraph 39 of the Treaty of Rome. The main objectives were the followings [The Treaty of Rome, 1957]:

- To increase the production and the productivity of the agricultural sector,
- To provide a fair standard of living,
- To set up stable market for agricultural products,
- To guarantee food supplies,
- To guarantee fair food prices for the consumers.

Due to its production oriented nature, the CAP resulted in self-sufficiency in a relatively short time (within 10 years) and overproduction for decades. Several reforms were dedicated to solve this problem with more or mostly less success.

The CAP is still one of the greatest part of the EU from financial point of view and affects 8.7 million farmers [Eurostat database, 2016]. Therefore, it earns much attention, several researchers and academics are dealing with this issue. Besides the continuous communications and analyses of the European Commission, Ackrill [2000] or Burell and Oskam [2000] gave a detailed overview of the first couple of decades of the CAP. Swinnen has published many books and articles on different aspects of the CAP, assessed the previous reforms [e.g. Swinnen, 2008], the future of the direct payments [e.g. Swinnen, 2009] or its impacts on land prices [Cianian et al., 2014]. Land issues are analysed also on Member State level, as CAP payments have direct impact on land prices via capitalization. It was particularly high e.g. for the least urbanized regions with small farms in Poland and motivated farmers to sell their land [Milczarek-Andrzejewska et al., 2018]. In contrast with these findings, Guastella and his fellows have not found strong evidences of capitalization into farmland rents in Italy based on Farm Accountancy Data Network (FADN) [Guastella et al., 2018]. According to their result, there was no capitalization in case of coupled payments and only limited one in case of decoupled payments. It may be connected to the land price and rent differences between the old and new Member States. Although it is not that clear, as O'Neill and Hanrahan found very high (67-90%) capitalization of coupled payments and somewhat lower of decoupled payments in Ireland [O'Neill-Hanrahan, 2016].

Unlike the Fischler reform, the Ciolos reform is labelled imperfect storm due to reasons like change in the decision making process (co-decision procedure) or less substantive changes [Swinnen, 2015]. Matthews paid attention on every stage of the CAP, analyzed the greening [Matthews, 2013] or the effects of the most recent significant change in the history of the EU, the so-called Brexit [Matthews, 2016]. It a question of how the EU can deal with it, but basically there are two options: lower budget or higher national contribution because UK is the second largest /net contributor of the budget. Greening was heavily criticized as it may not result as environmental benefits as it was planned, it is more of a greenwash rather than a greening [Alons, 2017]. Tangermann linked the future of the CAP to the risk management as agriculture faces various risk outside the control of farmers [Tangermann, 2011]. Due to the climate change, this issue becomes even more important.

As Hungary has accessed the European Union (EU) in 2004, the time horizon of the research starts from the initial accessing issues, Copenhagen Summit (2002) and the Fischler reform (2003). They are followed by the Health

Check (2008). These reforms have affected the Hungarian agriculture as aims and targets of the CAP were partly changed. Most notably the phasing-in of direct payments resulted in long lasting competitiveness disadvantages in new Member States (NMSs).

Present issues are based on the latest CAP reform in 2013, the so-called Coilos reform. It affected the current 7-year (2014-2020) period, the actual Multi--Annual Financial Framework (MFF) by setting up the CAP budget and its distribution. It has introduced some new elements, the most important ones were basic payment and greening.

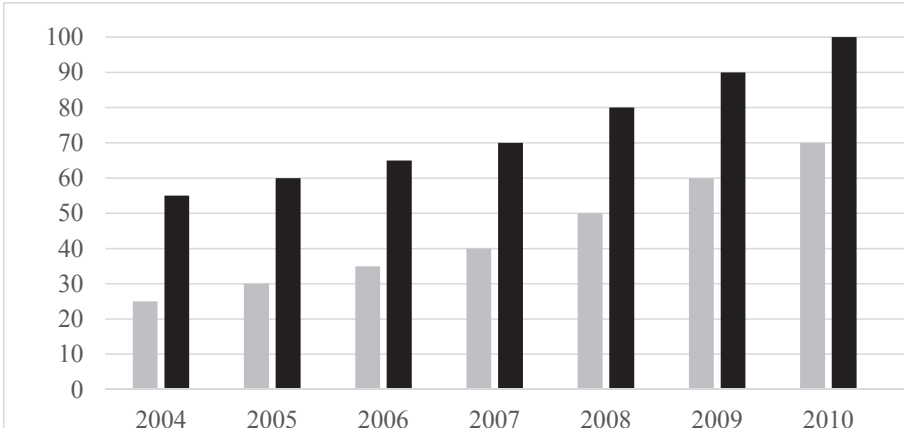
The European Commission's latest communication on the future of the CAP (The Future of Food and Farming) contains mostly general issues, however, the future directions can be perceived [EC, 2017a].

The final chapter gives an overview of the results together with conclusions.

4.2. The past issues of the CAP

Hungary has become the member of the European Union in 2004. The agreement on the accession of the NMSs was reached at the Copenhagen Summit in 2002. It contained the phasing-in schedule for the new direct payments with the option of topping-up at the expense of national budget. Figure 1 summarizes the phasing-in process.

Figure 1. Phasing-in of direct payments (%)



Source: author's study.

In practice, phasing-in means a 10-year gradual increase of direct payments, started with additional 5 percentage points in the first four years and continued with 10 percentage points in the last six years compared to the average of the old Member States (OMSs). Although 30 percentage points topping-up was

granted for the NMSs[3], but the condition of national budgets did not allow them to fully use it in this transition period. It has finished in 2016 in Bulgaria and Romania and will be finished in 2022 in Croatia. This process did not help NMSs to catch up with the OMSs, however, area payments became far higher than they were before the accession.

Table 1. Reference yields of the Member States (EU-27)

Member States	Reference yield (t/ha)	Difference from the EU-27 average	Difference from the EU-15 average
Austria	5.27	29%	11%
Belgium	6.24	53%	32%
Bulgaria	2.90	-29%	-39%
Cyprus	2.30	-43%	-52%
Czech Republic	4.20	3%	-11%
Denmark	5.22	28%	10%
Estonia	2.40	-41%	-49%
Finland	2.82	-31%	-41%
France	6.02	48%	27%
Germany	5.66	39%	19%
Greece	3.39	-17%	-29%
Hungary	4.73	16%	0%
Ireland	6.08	49%	28%
Italy	3.90	-4%	-18%
Latvia	2.50	-39%	-47%
Lithuania	2.70	-34%	-43%
Luxembourg	4.26	5%	-10%
Malta	2.02	-50%	-57%
Netherlands	6.66	64%	40%
Poland	3.00	-26%	-37%
Portugal	2.90	-29%	-39%
Romania	2.65	-35%	-44%
Slovakia	4.06	0%	-14%
Slovenia	5.27	29%	11%
Spain	2.90	-29%	-39%
Sweden	4.02	-1%	-15%
United Kingdom	5.83	43%	23%
EU-15 average	4.74	17%	0%
EU-12 average	3.23	-21%	-32%
EU-27 average	4.07	0%	-14%

Source: authors' calculations based on DG Agri Country Reports.

[3] It is also called Complementary National Direct Payment (CNDP). The total percentage of direct payments (direct support plus top-up) was limited to 100%. It means that the maximum percentage of CNDP could have been 20% in 2011, 10% in 2012 and zero in 2013 as new Member States have reached 100% of the EU financed Pillar 1 support level.

In addition to the impacts of phasing-in, it should be kept in mind that area payments were linked to historical reference yields which were significantly lower in most of the NMSs and resulted/results in continuous competitiveness disadvantage. In the old Member States this inequality was conserved on 1986--1990 basis, while in the majority of new Member States this period was 1999--2001. Table 1 shows the reference yields of the Member States together with the EU level averages and their positive or negative difference from the EU-27 and EU-15 averages.

It can be seen from Table 1 that there are four 6-tonne countries (Belgium, France, Ireland and the Netherlands), their yields exceed even the EU-15 average by 27-40%. As a matter of fac, the NMSs, Slovenia (5.27 t/ha), Hungary (4.73 t/ha), the Czech Republic (4.20 t/ha) and Slovakia (4.06 t/ha) were able to reach a reference yield that compares to the EU-27 average. The remarkable difference between NMSs and OMSs can be seen in the last three rows, the EU-12 average is 21% lower than the EU-27 average and 32% lower than the EU-15 average.

The calculation of area payment is simple, basic amount (EUR 63 per t) is multiplied by the above-mentioned reference yield determined in the regionalisation plan for the region concerned [EC, 2003, Article 104]. If the base areas are exceeded, the payment is reduced proportionally for all farmers. Table 2 gives an overview of the evolution of the direct supports in the Visegrad 4 countries.

Table 2. The evolution of the direct supports [(SAPS + top-up)/ha] in the V4 countries (EUR/ha)

Member States	2004	2005	2006	2007	2008	2009	2010-2013
Czech Republic	145.7	159.0	172.2	185.5	212.0	238.5	265
Hungary	149.5	161.0	174.3	208.6	238.4	268.2	298
Poland	104.0	113.4	122.9	132.3	151.2	170.1	189
Slovakia	140.8	153.6	166.4	179.2	204.8	230.4	256
EU-10	138.6	151.2	163.8	176.4	201.6	226.8	252
EU-15	300.5	300.5	300.5	300.5	300.5	300.5	300.5
EU-10/EU-15	46.1	50.3	54.5	58.7	67.1	75.5	83.8

Source: authors' study based on DG AGRI, Country Reports.

Due to the differences in the reference yields, Hungarian farmers receive the highest amount of area payment (298 EUR/ha) among the Visegrad 4 countries, which almost equals to the EU-15 average (300.5 EUR/ha). Hungary is followed by the Czech Republic (265 EUR/ha) and Slovakia (256 EUR/ha). From strictly

financial point of view, Polish farmers' situation is the worse as they receive only 189 EUR/ha of direct support due to the low reference yield (3 t/ha) of the country. It should be highlighted that farmers in the OMSs receive 16.2% higher support than farmers in the NMSs on an average after the phasing-in period[4].

The first reform which had impact on the Hungarian agriculture during its membership was the so-called Fischler reform in 2003. It made fundamental changes to the system with new elements like decoupling, Single Payment Scheme (SPS), obligatory cross-compliance and modulation. Details on the different elements can be found in Swinnen ed. [2008]. It set up a dedicated payment system for those NMSs who were not able to or did not want to introduce SPS. This system was the Simplified Area Payment Scheme (SAPS).

From Hungarian point of view, cross-compliance and modulation played a significant role. Compulsory cross-compliance resulted in obligations and, therefore, higher production costs for some farmers/farms. It had two elements, Good Agricultural and Environmental Conditions (GAECs) which was about sustainability such as minimum level of maintenance (at least reaping), protection of water and soil [EC, 2009a, Annex III] and Statutory Management Requirements (SMRs) that deal with public, animal and plant health, environment and animal welfare [EC, 2009a, Annex II].

When farmers do not comply with them at any time, direct payments are reduced or even excluded. The other element, modulation, was about to redistribute financial resources from the 1st to the 2nd pillar by given percentage rates. Due to the significant share of large farms in the Hungarian agricultural production, it resulted in relatively high proportion of redistribution and, therefore, decreased their competitiveness. The presence of agricultural enterprises in the production mix in most of the NMSs is a general phenomenon of the transition countries and it is called dual production system [Mizik, 2010].

The Health Check was planned to be the mid-term review of CAP (analyzing the Fischler reform), but at the end it resulted in remarkable changes. From Hungarian aspect, substantive elements were [EC, 2009b]:

- Phasing-out of milk quotas. As Hungarian milk production was far below the national quota, it did not affect production, however, it allowed previous importer countries to raise their production and resulted in less or no import from Hungary.
- Further modulation. As it was mentioned above, modulation is not in favour of countries with large agricultural enterprises, so additional and progressive modulations had negative impact on those farms.

[4] This difference was even higher during the phasing-in period and started on 46.1%. taking into account full top-up payment which was not granted in the NMSs.

- Change of intervention system. It became administratively harder to offer commodities for intervention, however, world market prices went appreciably up during the global crisis and surpassed intervention prices. On the one hand, it became more difficult to use intervention but, on the other, it was no longer needed due to high market prices.

As a summary of the Health Check, it only partly affected most of the Member States, so does Hungary, e.g. further decoupling or phasing out milk quotas and did not cause remarkable changes.

4.3. The present issues of the CAP

The CAP had and still has huge impact on the structure of production. The earlier coupled payments resulted in continuous concentration pressure, large farms became even larger. The decoupled payments have much less concentration impact, however, economies of scale can be used at larger level, especially in the crop sector. Apart from its main reason, concentration process lasts for many decades in the OMSs and resulted in reasonable farm sizes. The NMSs are lagging behind, moreover, in some countries farms sizes have significantly declined after the transition due to the chosen way of land compensation (e.g. Hungary) or characteristic of agricultural system (e.g. Poland, where its basis is the small, individual producer).

The EU farm structure surveys (FSS) provide detailed information on production structure of the European farms. Table 3 summarises the major results of the 2007, 2010 and 2013 FSSs.

According to the Table below, two clear trends could be identified:

- Number of farms shows a continuous decreasing trend in the whole EU. In the analysed 7 years its total rate was 26.0% in the EU-15, 28.4% in the EU-13 and 27.4% in the EU-28.
- On the other hand, concentration was even larger as the average farm size increased by 28.1% in the EU-28 (25.8% in the old and 31.4% in the new Member States). Although this process accelerated in the NMSs, but their average rate is still on a very low level (only 7.82 ha/farm).

Taking a look at the country level data, differences are far higher and sometimes contradictory to the general, EU level trend. For example the number of farms were higher in the last analysed year in Ireland compared to the first year or average farm size decreased in Cyprus. In general, the largest farms can be found in the Czech Republic, their average farm size was 133.0 ha in 2013. The Czech Republic is followed by the United Kingdom (93.1 ha/farm) and Slovakia (80.7 ha/farm). On the other side, excluding Cyprus and Malta, Romanian, Slovenian and Greek farms are the smallest ones in the EU, their average

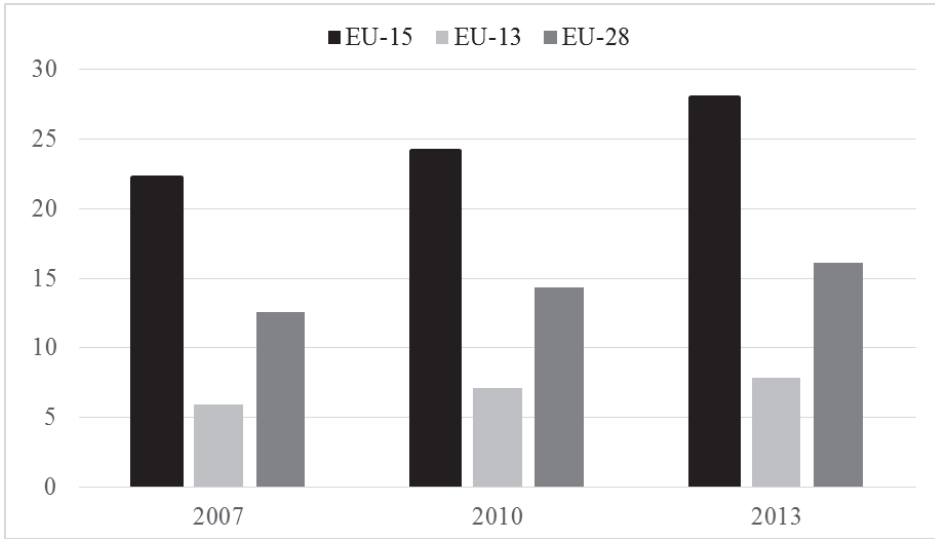
sizes are 3.6, 6.7 and 6.9, respectively. Figure 2 gives an overview of the evolution of farm sizes in the EU broken down by the EU-15 (OMSs), the EU-13 (NMSs) and the EU-28.

Table 3. Number and average size of farms in the EU

	Number of farms			Average farm size (ha)		
	2007	2010	2013	2007	2010	2013
Austria	165 420	150 170	140 430	19.28	19.17	19.42
Belgium	48 010	42 850	37 760	28.63	31.69	34.64
Bulgaria	493 130	370 490	254 410	6.19	12.08	18.28
Croatia	181 250	233 280	157 440	5.40	5.64	9.98
Cyprus	40 120	38 860	35 380	3.64	3.05	3.09
Czech Republic	39 400	22 860	26 250	89.29	152.38	133.01
Denmark	44 620	41 360	38 280	59.67	64.00	68.43
Estonia	23 340	19 610	19 190	38.85	47.98	49.90
Finland	68 230	63 870	54 400	33.60	35.87	41.50
France	527 350	516 100	472 210	52.10	53.94	58.74
Germany	370 480	299 130	285 030	45.70	55.84	58.59
Greece	860 150	723 060	709 500	4.74	7.16	6.85
Hungary	626 320	576 810	491 330	6.75	8.12	9.48
Ireland	128 240	139 890	139 600	32.28	35.68	35.53
Italy	1 679 440	1 620 880	1 010 330	7.59	7.93	11.98
Latvia	107 750	83 390	81 800	16.46	21.54	22.96
Lithuania	230 270	199 910	171 800	11.50	13.72	16.65
Luxembourg	2 300	2 200	2 080	56.90	59.60	63.00
Malta	11 020	12 530	9 360	0.94	0.91	1.16
Netherlands	76 740	72 320	67 480	24.95	25.89	27.38
Poland	2 390 960	1 506 620	1 429 010	6.47	9.59	10.08
Portugal	275 080	305 270	264 420	12.63	12.02	13.77
Romania	3 931 350	3 859 040	3 629 660	3.50	3.45	3.60
Slovakia	68 990	24 460	23 570	28.07	77.49	80.68
Slovenia	75 340	74 650	72 380	6.49	6.47	6.71
Spain	1 043 910	989 800	965 000	23.85	24.00	24.15
Sweden	72 610	71 090	67 150	42.94	43.13	45.10
United Kingdom	226 660	185 200	183 700	70.78	91.15	93.07
EU-15	5 589 240	5 223 190	4 437 370	22.27	24.14	28.01
EU-13	8 219 240	7 022 510	6 401 580	5.95	7.08	7.82
EU-28	13 808 480	12 245 700	10 838 950	12.56	14.36	16.09

Source: author's calculations based on Eurostat data.

Figure 2. Evolution of farm sizes in the EU (ha/farm)

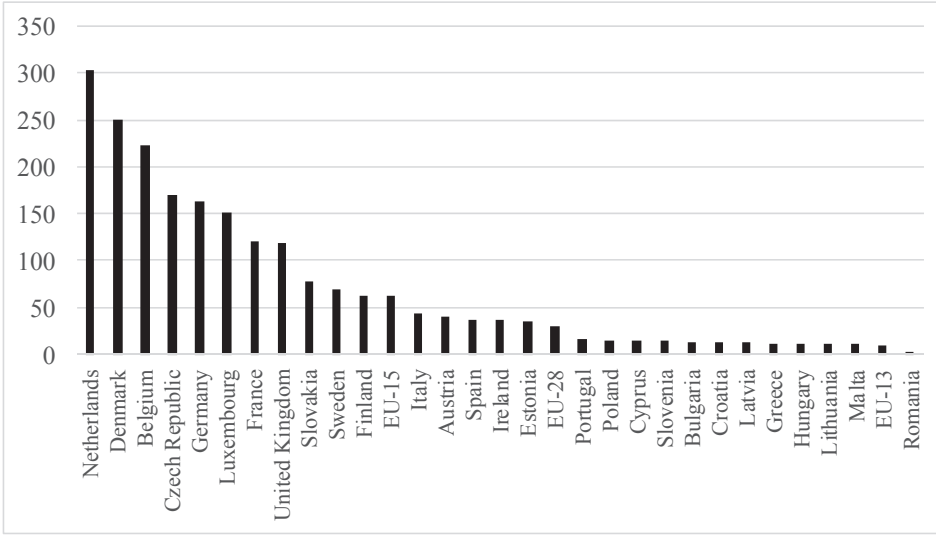


Source: author's study based on Eurostat data.

It can be concluded that a family farm in the European agriculture can be characterized by low farm size, it is only 16.1 ha in the EU-28. Taking into consideration the far longer farm/land concentration period of the OMSs, their average is still below 30 ha/farm (28.0 ha/farm). This process has accelerated in the NMSs, but due to the very low base value it was below 8 ha/farm in 2013 (7.8 ha/farm).

Average farm size is one but maybe not the best way of measuring the size of different farms. For comparisons, the EU set up a standard measuring tool, the so-called standard output (SO). It has replaced the former European Size Unit (ESU) which was based on standard gross margin (SGM). "SO is the average monetary value of the agricultural output at farm-gate price, in euro per hectare or per head of livestock" (Eurostat website – SO). It allows to classify agricultural farms by type of farming and size. Splitting farms into SO categories on country level shows the incredible divergence among the Member States. Figure 3 contains these SO averages on country level.

Figure 3. Average SO in the EU in 2013 (EUR 1000)



Source: author's study based on Eurostat data.

On the one side, there is the Netherlands (EUR 304 000 of SO), while on the other – Romania with only 1% of the Dutch value (EUR 3000 of SO). Generally, Benelux countries are among the top countries. Remarkable the fourth rak of the Czech Republic, apart from it only Slovakia has higher average economic farm size than the EU-15 average. The tail-ender OMS is Greece, its value is more or less the same as the Hungarian, Lithuanian and Maltese ones (EUR 10-11 thousand of SO). Taking a look at the OMS-NMS values, the former one is approximately 7 times higher than the latter (EUR 62 000 of SO vs EUR 9000 of SO).

Analysis of these averages by SO categories, allows for more conclusions to be drawn on farm structure and production value. Table 4 and 5 show these values for EUR 0-24 999 of SO and above EUR 25 000 of SO, respectively, based on FSS 2013.

The last 3 rows reveal the major difference between the OMSs and the NMSs: the first SO category (under EUR 2000 of SO) contains only 17.4% of farms in the former one, while more than half in the latter one (55.9%). It can be seen on their contribution to total SO as well, it is only 0.3% in the EU-15, while 4.7% in the EU-13. Among the NMSs, Romania and Hungary have the highest shares (dual production system!) of these farms, 68.7% and 67.6%, respectively. These farms have no or almost no market connections which is evidenced by their shares from total SO as well (13.9 and 4.2%). But then, their share is only 6.2% in the Czech Republic with insignificant production value (only 0.05% of total SO).

Table 4. Share of the EU farms and their SO by SO categories, 2013 (EUR)

SO	Below 2000		2000-3999		4000-7999		8000-14999		15000-24999	
	Farm	SO	Farm	SO	Farm	SO	Farm	SO	Farm	SO
AT	10.91%	0.29%	9.08%	0.67%	14.19%	2.07%	13.96%	3.86%	11.09%	5.39%
BE	0.93%	0.00%	1.67%	0.02%	4.34%	0.12%	7.47%	0.39%	7.26%	0.64%
BG	55.12%	3.89%	20.20%	4.33%	10.83%	4.53%	5.44%	4.52%	2.78%	4.05%
CY	53.93%	3.22%	16.48%	3.34%	11.96%	4.78%	6.81%	5.23%	3.17%	4.33%
CZ	6.17%	0.05%	9.49%	0.17%	17.68%	0.60%	17.22%	1.12%	11.47%	1.32%
DE	0.52%	0.00%	2.16%	0.04%	7.93%	0.30%	11.92%	0.83%	10.22%	1.24%
DK	3.32%	0.01%	2.66%	0.03%	6.35%	0.16%	13.58%	0.61%	12.04%	0.94%
EE	47.58%	0.59%	12.87%	1.06%	11.41%	1.88%	8.60%	2.68%	5.32%	2.92%
ES	24.54%	0.65%	14.63%	1.16%	15.80%	2.42%	13.19%	3.91%	8.48%	4.39%
FI	0.04%	0.00%	8.95%	0.44%	14.78%	1.41%	18.25%	3.24%	12.76%	4.01%
FR	6.58%	0.05%	5.16%	0.13%	7.38%	0.36%	7.53%	0.71%	6.70%	1.10%
GB	8.04%	0.07%	7.69%	0.19%	10.74%	0.53%	11.79%	1.11%	10.10%	1.67%
GR	31.93%	2.81%	17.72%	4.55%	17.54%	8.80%	12.89%	12.49%	8.36%	14.18%
HR	25.17%	2.20%	23.06%	5.21%	21.23%	9.34%	14.53%	12.22%	6.69%	9.91%
HU	67.57%	4.18%	11.47%	2.83%	7.69%	3.84%	5.08%	4.88%	2.92%	4.94%
IE	10.66%	0.31%	10.32%	0.86%	16.50%	2.70%	18.65%	5.80%	13.92%	7.51%
IT	11.74%	0.33%	17.80%	1.20%	17.35%	2.29%	15.33%	3.93%	10.17%	4.56%
LT	41.94%	3.16%	22.14%	5.71%	17.30%	8.66%	8.80%	8.49%	3.23%	5.53%
LU	0.96%	0.01%	3.37%	0.07%	6.25%	0.24%	6.73%	0.51%	6.25%	0.80%
LV	53.58%	2.66%	16.26%	3.87%	13.01%	6.01%	6.76%	6.06%	3.77%	6.05%
MT	59.62%	2.77%	10.36%	2.84%	11.22%	6.45%	6.41%	6.91%	4.38%	8.18%
NL	0.25%	0.00%	0.83%	0.01%	8.97%	0.18%	9.35%	0.34%	7.23%	0.46%
PL	28.18%	1.93%	19.82%	3.76%	18.30%	6.86%	12.82%	9.23%	7.89%	10.00%
PT	40.43%	2.29%	21.16%	3.53%	14.96%	4.90%	8.73%	5.59%	4.38%	4.94%
RO	68.70%	13.85%	15.91%	13.74%	10.34%	17.17%	3.15%	10.01%	0.93%	5.33%
SE	8.28%	0.10%	13.08%	0.56%	19.36%	1.61%	15.44%	2.43%	10.07%	2.81%
SI	16.86%	1.50%	21.24%	4.44%	26.64%	11.00%	15.79%	12.32%	8.08%	11.09%
SK	28.00%	0.41%	24.61%	0.92%	18.71%	1.35%	8.91%	1.25%	4.24%	1.06%
EU-15	17.44%	0.29%	13.31%	0.63%	14.50%	1.35%	12.81%	2.30%	8.92%	2.80%
EU-13	55.89%	4.67%	17.02%	5.55%	12.68%	8.08%	6.29%	7.75%	3.12%	6.83%
EU-28	40.15%	1.03%	15.50%	1.47%	13.42%	2.49%	8.96%	3.22%	5.49%	3.48%

Source: author's calculations based on Eurostat data.

Small farms (under EUR 2000 of SO) have small, less than 1% shares in Finland, the Benelux countries and Germany, while in Portugal and Greece 40.4% and 30.9%. The OMS-NMS differences are even more demonstrated by the use of cumulative shares, farms below EUR 25 000 of SO have 67% in number and only 7.4% in SO in the EU-15, while these numbers are 95% and 32.9% in the EU-13.

Moving toward larger farms (SO over EUR 25 000), Table 5 contains their detailed data.

Table 5. Share of the EU farms and their SO by SO category II, 2013 (EUR)

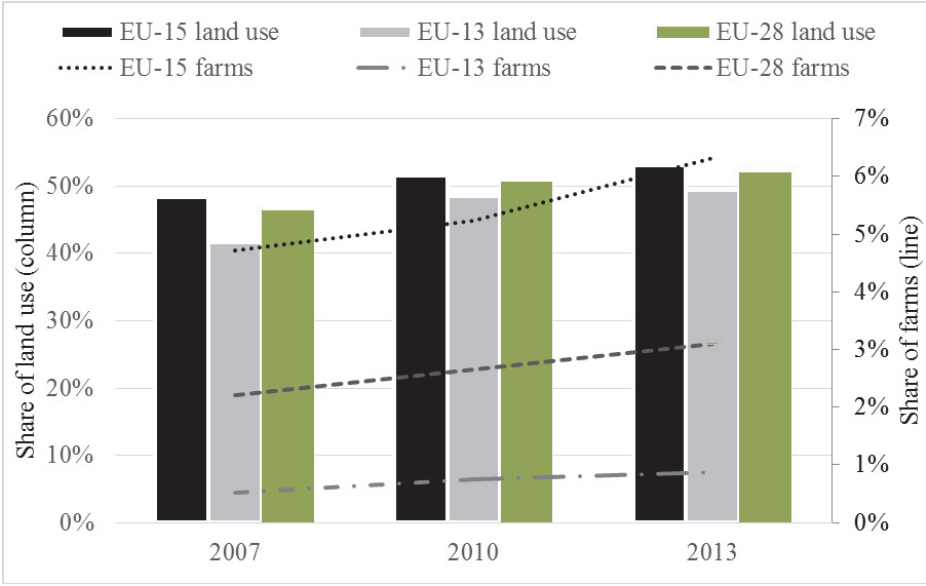
SO	25 000-49 999		50 000-99 999		100 000-249 999		250 000-499 999		500 000 and more	
	Farm	SO	Farm	SO	Farm	SO	Farm	SO	Farm	SO
AT	16.60%	14.86%	14.19%	24.61%	8.42%	30.98%	1.26%	10.06%	0.30%	7.21%
BE	11.68%	1.91%	13.48%	4.39%	24.84%	18.85%	17.32%	27.14%	11.04%	46.54%
BG	2.37%	6.33%	1.29%	6.82%	0.97%	11.60%	0.53%	14.17%	0.48%	39.76%
CY	3.11%	7.85%	2.23%	11.39%	1.50%	16.09%	0.48%	11.70%	0.34%	32.05%
CZ	10.93%	2.29%	9.26%	3.86%	7.58%	6.98%	3.24%	6.79%	6.90%	76.82%
DE	13.85%	3.08%	15.62%	6.98%	20.78%	20.72%	10.94%	23.35%	6.07%	43.46%
DK	15.99%	2.29%	12.36%	3.52%	11.52%	7.32%	7.18%	10.40%	14.99%	74.71%
EE	5.11%	5.10%	3.96%	7.99%	2.97%	13.18%	0.99%	9.67%	1.25%	54.93%
ES	8.81%	8.49%	7.10%	13.38%	5.01%	20.35%	1.41%	13.28%	1.01%	31.97%
FI	14.96%	8.58%	12.92%	15.06%	12.68%	31.14%	3.36%	18.08%	1.32%	18.04%
FR	12.21%	3.70%	16.96%	10.28%	24.52%	32.93%	9.86%	27.65%	3.11%	23.09%
GB	12.83%	3.87%	12.26%	7.42%	13.91%	18.82%	7.49%	21.99%	4.79%	44.34%
GR	7.82%	23.90%	2.90%	16.95%	0.71%	8.66%	0.09%	2.48%	0.04%	5.17%
HR	5.60%	15.03%	2.44%	12.76%	1.02%	11.52%	0.14%	3.67%	0.11%	18.14%
HU	2.46%	7.57%	1.36%	8.36%	0.90%	12.25%	0.26%	7.74%	0.29%	43.41%
IE	12.72%	12.36%	8.17%	16.30%	7.55%	31.83%	1.17%	10.75%	0.33%	11.58%
IT	11.42%	9.38%	8.08%	13.11%	5.50%	19.29%	1.58%	12.56%	1.02%	33.35%
LT	3.28%	10.33%	1.78%	11.12%	1.09%	14.47%	0.25%	7.52%	0.20%	25.00%
LU	11.54%	2.77%	13.94%	6.82%	30.29%	34.37%	17.31%	37.87%	3.37%	16.54%
LV	3.11%	8.97%	1.70%	9.73%	1.15%	14.53%	0.40%	11.64%	0.28%	30.49%
MT	3.95%	13.40%	2.14%	14.08%	1.39%	21.84%	0.32%	12.86%	0.11%	10.65%
NL	9.37%	1.11%	9.19%	2.18%	18.82%	10.82%	21.04%	24.43%	14.97%	60.48%
PL	7.59%	17.39%	3.59%	16.00%	1.32%	12.74%	0.30%	6.83%	0.17%	15.26%
PT	4.00%	8.30%	3.04%	12.69%	2.30%	20.76%	0.65%	13.00%	0.36%	23.98%
RO	0.52%	5.36%	0.22%	4.52%	0.14%	6.45%	0.06%	6.11%	0.04%	17.45%
SE	11.33%	5.76%	8.00%	8.15%	8.09%	18.50%	3.78%	18.79%	2.56%	41.28%
SI	6.49%	16.34%	3.33%	16.40%	1.31%	13.65%	0.17%	3.96%	0.07%	9.30%
SK	4.16%	1.90%	3.01%	2.82%	3.10%	6.24%	1.70%	7.92%	3.56%	76.12%
EU-15	10.39%	6.00%	8.70%	10.00%	8.51%	21.73%	3.50%	19.43%	1.93%	35.49%
EU-13	2.71%	10.76%	1.32%	10.33%	0.63%	10.73%	0.18%	7.26%	0.16%	28.03%
EU-28	5.85%	6.81%	4.34%	10.05%	3.85%	19.86%	1.54%	17.36%	0.89%	34.23%

Source: author's calculations based on Eurostat data.

It became already evident from Table 4, that the cumulative averages of large farms are 33% (number) and 92.6% (SO) in the OMSs and 5% (number) and 67.1% (SO) in the NMSs. The share of mega farms (SO over EUR 500 000) is over 10% in Denmark, the Netherlands and Belgium which provide a notable share of total SO production (74.7%, 60.5% and 46.5% respectively). As a matter of the NMSs, mega farms have the highest share in the Czech Republic (76.8%, which is the highest in the whole EU) followed by Slovakia (76.1%) and Hungary (43.4%). Contrary to these countries, share of mega farms is under 10% in Greece (5.2%), Austria (7.2%) and Slovenia (9.3%).

Average physical farm size is more important in the crop production, especially the share of large farms in land use. The largest size category in the Eurostat database is 100 ha, the results of this analysis are demonstrated in Figure 4.

Figure 4. Share of large (over 100 ha) farms in number of farms and land use in the EU, 2007-2013



Source: author's study based on Eurostat data.

Regarding land use, there is no significant difference between the old and the new Member States, large farms used around 50% of total utilized agricultural area (UAA) in 2013. It means 6% of total farms in the EU-15, while less than 1% in the EU-13, which in turn means that the average farm size is smaller in the NMSs, but far more concentrated.

The Ciolos reform has introduced basic payment along with compulsory greening component (30% of total direct payments). Greening can be considered as further expansion of cross-compliance, although the latter one has not fully reached its desired impact [ECA, 2008]. The application of the reform varied from country to country, the major characteristics of the distribution of the Hungarian envelope is the highest possible share of voluntary coupled support (13+2%). It is summarized in Table 6.

Table 6. Distribution of the Hungarian envelope

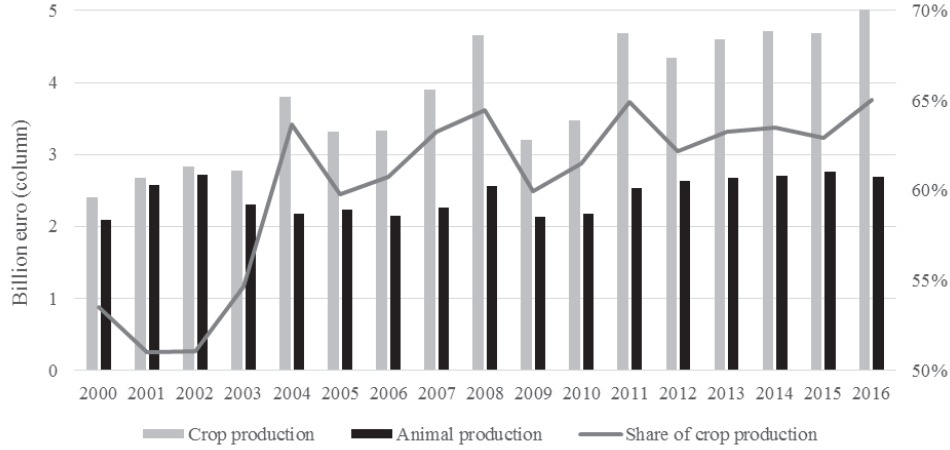
Hungarian envelope	100%
- Greening	30.00%
- Young farmers	0.62%
- Voluntary coupled support	13.00%
- Voluntary coupled protein support	2.00%
- Small farmers scheme	0.55%
- Basic Payment (SAPS)	53.83%

Source: author's calculations based on Ministry of Agriculture data.

A key issue of the reform was degressivity/capping in order to ensure more fair distribution of support. Member States had to reduce basic payments over EUR 150 000 per farm by a minimum of 5%, but they could opt up to 100%[5]. This element has made hardly any impact on distribution, it amounted to only EUR 109 million in 2015, but Hungary accounted for two-thirds of it [DG IP, 2016]. This was caused by the Hungarian implementation of the capping as the Hungarian authorities have introduced a basic payment ceiling of EUR 176 000 per individual farm (physical farm size is 1200 ha), meaning 100% reduction of support over that threshold [Szabó, 2017].

The CAP has enormous impact on agriculture and its support system can divert agricultural production. As it is more in favour of crop production, it has resulted in a significant sectoral change within the Hungarian agriculture. Figure 5 shows it between 2000 and 2016.

Figure 5. Change of distribution of agricultural production (current prices)



Source: author's study based on data of the National Statistical Office (production) and Hungarian National Bank (exchange rate).

As it can be seen from the Figure above, size of animal production has not changed a lot over these years, however, crop production has more than doubled compared to the beginning of the period. Altogether it resulted in an increasing share of crop production from an initial value of approximately 50% to around 65%. It might not be a good direction for the Hungarian agriculture as it should be kept in mind that significant part of the crop production is input for animal production. Hungary has no opportunity for cheap sea transport and bulk products cannot be transported at long distances, so they should be used locally/ re-

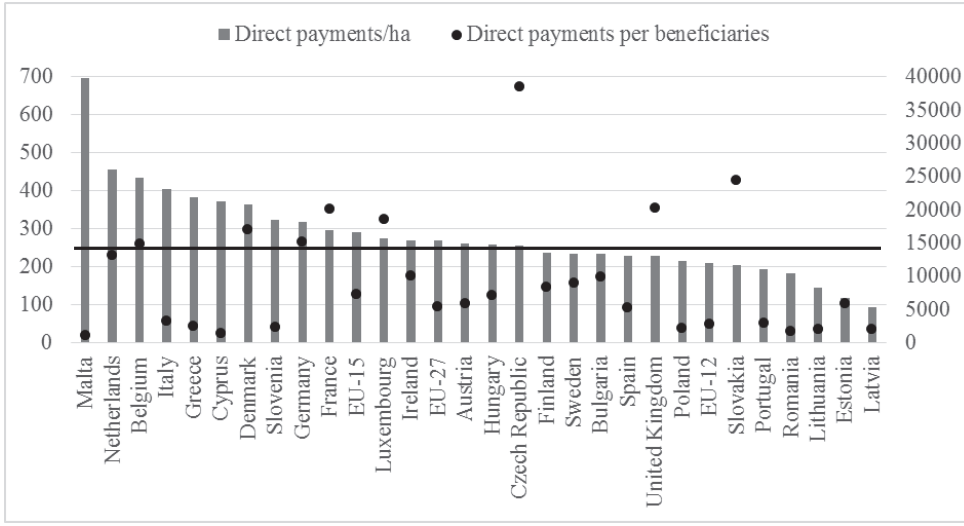
[5] Shifting direct payments to smaller farms does not necessarily lead to more fair distribution because they have off-farm income, plus it results in uncompetitive agricultural structure [Matthews, 2017].

gionally as much as possible. Competitive crop sector cannot live without notable animal sector. In addition, it can cause worse market price opportunities in the long run for the crop sector.

4.4. The future issues of the CAP

The Ciolos reform has already made remarkable steps toward more fair redistribution of direct payments. The major aim by 2020 is to decrease the gap with one-third in those Member States where the level of direct payments is below 90% of the EU average [EC, 2011a]. The current level of direct payments per hectare and per beneficiaries can be seen in Figure 6.

Figure 6. Distribution of direct payments among the Member States (EUR)



Source: author's study based on EC [2011b].

The black line represents 90% of the EU average, Member States below that line will receive higher support by the end of the current MFF (external convergence), while Member States above it will receive less[6]. The overall redistribution effect is limited, the biggest expected beneficiaries are Romania, Poland and Spain, while the biggest contributors – Italy, Germany and France [EC, 2011a]. Still, both number of beneficiaries and expenditure decreased in the extreme classes (below EUR 1250 and over EUR 100 000) by ca. 10% in the majority of

[6] Besides, the minimum rate will be 196 EUR/ha by 2020 and it will be financed by those Member States where this rate exceeds the EU average [EC, 2013].

Member States in 2016 compared to the previous year [EC, 2017b][7]. As Hungary is a bit above the EU average, it does not affect its position significantly.

Although the gap will shrink, but concentration of direct payments will remain. It varies between EUR 1067 (Malta) and EUR 38 591 (the Czech Republic) per beneficiary. Further reforms may pertain to this issue as well.

The Hungarian standpoint is very clear about the future of the CAP, the bases of the governmental communication are as follows [e.g. Kiss, 2018, Ministry of Agriculture website]:

- No major changes or at least keep the good elements of the CAP (e.g. two-pillar system);
- Preserve the financial resources of the CAP and the Hungarian share in it;
- Introduce new objectives accompanied by new resources;
- No renationalization of funds;
- Maintain the shifting option of funds from the 2nd to the 1st Pillar.

Regarding the financial resources, at this moment 3 scenarios are on the table: no change, 15% and 30% cut. Due to different reasons (other priorities/challenges, Brexit, smaller and more economical EU governance, etc.), the second option seems to be the most probable. The MFF debate starts in May when the impacts of Brexit will become clearer. According to the latest communication of the Commission, the expected changes will be the followings [EC, 2017a]:

- Greater responsibility of Member States to meet common goals (environment, climate change and sustainability) – own strategic plans covering intervention in both pillars;
- Basic policy parameters set by the EU and greater responsibility of member states how to meet them (greater subsidiarity), which could result in some difficulties in Hungary where two separated ministries are responsible for the 1st and the 2nd Pillar;
- Greater market orientation (investment supports, risk management, etc.);
- Two-pillar system;
- Smart and modern agriculture, because "support for knowledge, innovation and technology will be crucial to future-proofing the CAP";
- Greening is planned to be replaced by higher level of environmental and climate ambition;
- Generational renewal: ageing of the European farmers is still a big problem, according to FSS [2013], share of farmers aged 55 or more was 55.8%.

[7] Despite the continuous (external and internal) convergence, the EU-28 average of direct payments concentration is still high as 20% of large farms received 80% of payments in 2015 [EC, 2017b].

The communication hardly contains concrete information and almost nothing on how to execute them, even though the devil is in the detail.

4.5. Summary and conclusions

The CAP support plays a crucial role in the agricultural sector, average support can have more than 50% in average farmer income in some Member States. It is shaping all the time due to changes in the agricultural sector and new challenges. My personal expectations for the CAP beyond 2020 are the following:

- Two-pillar system;
- Possible, but the lowest level, budget cut;
- More equal distribution of direct payments among the Member States and farms;
- Greening will be replaced by enhanced cross-compliance requirements;
- New directions due to new challenges (smart farming, environmental and climate actions, sustainability, etc.), which requires better targeting, because it should be carried out from possibly lower budget.

As for competitiveness, there are contradictory proposals in the communication. As greening is considered to be burdensome, too complex and ineffective element of the CAP [EC, 2017a], its abolition would have positive impact on competitiveness. Promotion of smarter agriculture points to the same direction, as well as generational renewal and market orientation. However, the latter one increases market competition which can be borne only by well-performing efficient farms. In case of abolition of greening, new rules or regulations are expected to take its place in order to support higher level of environmental and climate ambition. It will also gain in competitiveness. Finally, the probable (only to a small extent) budget cut and more fair redistribution (especially among farms) leads to less competitiveness. It was clear from FSSs that large farms could be the engine of growth. Hungarian agriculture is heavily dependent on the CAP payments, especially on direct payments, therefore, the future CAP is expected to be less advantageous without instant competitiveness actions from agricultural producers.

It was realized several times in the history of the CAP that one solution does not fit all. National interests are diverse, so the debate period should be used as efficiently as possible to form the future CAP according to our interest. NMSs seem to be partners in this process, but it may not be enough, some of the OMSs should also be involved. In the present MFF Hungary's position is very good (budget share is higher than the share of agriculture in production), so it will be hard to keep this position.

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5. Going beyond the Rural Development Programme: a Master Plan for Austria's rural areas in the framework of the CAP

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Abstract

In each of the CAP periods the Austrian Rural Development Programmes have acquired a more integrative character. Starting with measures concerning farms, they have been enlarged with soil, biodiversity and water protection measures, then included also local developments, diversification beyond the agricultural sector and more general quality of life measures and in the recent period putting the focus on knowledge transfer, innovation and climate change. In continuation of this approach the Austrian Ministry of Agriculture has been the driver to create the Master Plan for Rural Areas, which was elaborated on the basis of a broad participation process and seeks to integrate economics, environment, administration, social life and responsibility, infrastructure, mobility and digitisation. Of course, there are many challenges in implementation, as for example the integrative character of objectives and measures faces governance structures based on conventional sectoral divisions. The concepts behind the CAP measures and strategies are discussed on the basis of regional science criteria.

Keywords: rural development, integrative development, agricultural policy, master plan

JEL codes: Q18, Q19, R58

5.1. Introduction

Since Austria's accession to the European Union (EU) it has used most of the possibilities provided by the Common Agricultural Policy (CAP) guidelines. In each of the CAP periods, the Austrian Rural Development Programmes have acquired a more integrative character. Starting almost only with measures concerning agricultural enterprises, the programmes have been extended with soil, biodiversity and water protection measures, including local developments, diversification beyond the agricultural sector, more general quality of life measures and, in the recent period, they have put the focus on knowledge transfer, innovation and climate change. In continuation of this approach and as an input to ideas and strategies for the next programming period,

the Austrian Ministry of Agriculture has called for development of the Master Plan for Rural Areas, with a wider, more holistic and complex view of rural development.

5.2. Objective and method

The objective of this paper is to give a short overview of the CAP and especially rural development in the recent periods as background information and to understand the further step – the Master Plan for Rural Areas, which will be explained in a comprehensive form. In addition, the whole CAP approach will be questioned and discussed by means of regional science concepts – for example in Trippl et al. [2015] or Bökemann [1999] – which ask different questions than the evaluation of effects, impacts and efficiency in figures. This view shows possible polarities and conflicts of objectives, concepts or strategies.

5.3. Recent CAP implementation in Austria

From the beginning of the CAP in Austria in 1995, more funds were dedicated to the second pillar (rural development) than to the first pillar (direct payments, market organisation) – in contrast to the EU average payments. In the current 2014-2020 period, too, around two thirds of the budget is dedicated to the second pillar, with a huge rural development programme, while in the EU all the second pillar makes up only a quarter of the total CAP budget. Of the 140 400 farms in the official Austrian statistics for 2013, 114 000 received CAP payments in 2016 and are registered in the IACS [BMLFUW, 2017a]. All the farms received EUR 1.59 billion in 2016, an average payment of EUR 14 000 per farm. The most important measures are direct payments, agri-environment-climate payments (with 19 sub-measures), payments for areas facing natural or other specific constraints, followed by investments in physical assets, organic farming as well as basic services and village renewal.

Table 1. Most important CAP payments in Austria, 2016

Measure	Subsidy cases, number	Average payment per subsidy case, EUR
Direct payments (1st pillar)	108 567	6361
Agri-environmental-climate payments (2nd pillar, M10)	91 942	4425
Areas facing natural or other specific constraints (2nd pillar, M13)	83 234	3130

Source: BMLFUW, 2017a.

5.4. The Master Plan for Austria's rural areas

At the beginning of 2017, the Austrian Minister for Agriculture, Forestry, Environment and Water Management initiated the formulation of a Master Plan for the Rural Area. The background was the still unsatisfactory situation in rural regions. Despite many years of support for rural areas with a diverse set of measures, the general development lags behind urban or central regions. Austria's demographic development is characterised by strong growth in urban centres, while the population in rural areas is declining. In terms of education and career opportunities, moving to central hubs that are home to companies and educational institutions is appealing. But two thirds of Austrians still live in rural regions, and more than 50% of the population live in municipalities with less than 10 000 inhabitants [BMLFUW, 2017b]. The importance and the potential of the rural areas is evident.

The process for the development of this Master Plan, as a strategic paper for development, involved 200 experts, 2000 citizens and comprised more than 2000 ideas and concepts [BMLFUW, 2017b]. The interministerial strategy intends to overcome sectoral and bureaucratic boundaries and serve systematic improvement of economic and living conditions for safeguarding the future of rural areas. Twenty fields of action were identified and listed – not in a hierarchical or priority order, sometimes overlapping and probably not all with the same importance. But in the view of those participating, they are seen as crucial for rural development:

- Decentralisation (shifting public administration, reduction of bureaucracy, e-government);
- Joint projects across municipalities (competence centres, inter-municipal financial compensation and tax splitting);
- Digitisation (adapted telecommunication, certified digital municipalities, competences, education);
- Resources (circular economy, renewable energy, innovation, bio-economy);
- Land use (regional planning, re-use, modernisation);
- Mobility (novel concepts for private and public transport, adapted settlement developments, adaptation of the tax system, network of providers);
- Healthcare (sector-integrating planning, family practices, e-health, prevention, cooperation between health professions);
- Taking care of the elderly (innovative models, flexible forms);
- Energy (energy saving, reduction of bureaucracy, renewable energy, harmonised policy, efficient climate protection);

- Economic activity (regional chains, new rural entrepreneurs, multifunctional local supply, regional added-value, regional banks, cooperatives);
- Voluntary work (motivation, information);
- Social services (green-care services, social innovations);
- Women (incentives for qualified workplaces, compatibility of family and work-life, female business creation, online education);
- Education (lifelong learning, support in career decisions, better networking);
- Rural exodus (modern infrastructure, business creation, services for returning people, social networks, affordable housing);
- Tourism (reduction of bureaucracy, regional brands, culinary profiles, Alpine health and wellness, farm-based products);
- Childcare (improvement of childcare services for various ages);
- Regional strategies (tailor-made strategies, cross-sectoral priority topics, efficiency and efficacy in cooperation);
- Catering (Austrian culinary network, umbrella brand);
- Culture (regional strategies, incentives for creativity).

The implementation of such a strategy is a great challenge because the competences of various sectors and ministries, various political backgrounds and regional interests have to be coordinated, adapted and compromises have to be found. As the government and all of the ministers changed after the 2017 Austrian general election, there is the risk that the Master Plan and its efforts will become stuck in its initial phase. Nevertheless, it is a good basis for discussion about the design of the next period's CAP.

5.5. CAP in the system of the EU policy objectives and in the view of regional science concepts

For the current period of the EU structural policy, the Commission sought to create a consistent system of objectives, strategies and measures to generate synergies and greater efficiency. Contradictory objectives and activities were to be avoided. Smart, sustainable and integrative growth is, therefore, the overall priority in the Europe 2020 strategy. Below this level, more concrete objectives of employment, innovation, knowledge, social integration and climate/energy have been formulated. At a further subsidiary level, the common strategic framework comprises 11 thematic objectives and structures of the budget for the policy fields. This is the link to national strategic plans. Concerning agriculture and rural development, 3 objectives, 6 priorities and 18 focus areas at the EU level provide the framework for the national implementation of the CAP. This complexity and the vertical and horizontal links between objectives look good in

theory, but are difficult to follow as regards implementation, and evaluation of the CAP measures and it is even more difficult to prove that each individual measure serves all the various objectives.

Conflicts in systems of strategies and objectives can occur on various levels. In principle, already on a very abstract level it has to be decided how to influence regional development. There are various approaches in regional science, which are subject to certain developments and contemporary trends. Neoclassical theories rely on balanced markets and seek to influence only to avoid certain disadvantages and disparities, in order to enable a "regionally justified" development [Eltges, 2013]. But the marginal utility of invested capital in this case, is not optimal [Bökemann, 1999]. Focus and hope rely on sum effects and long-term balanced developments. On the other hand, growth-pole theories [Gabler, 2015] count on efficient investment of limited budgets in e.g. "lighthouse" projects and hope for cumulative and spreading effects with the risk of increasing the regional disparities. The recent trends in regional development promise endogenous development approaches, regional circular economies, bottom-up initiatives, creating networks and providing incentives to foster knowledge transfer and innovation.

These considerations and the related regional development criteria have led to the following rough qualitative assessment of the CAP measures on the part of regional science criteria with the purpose of showing the great variety and diversity of strategies and measures. For example, the CAP comprises measures to preserve small farms and, on the other hand, measures to preserve big farms and to increase farm sizes. It includes measures to strengthen competitiveness, but at the same time it preserves uncompetitive structures through direct payments and small-farm supports. The CAP has objectives concerning social aspects, environmental aspects and economic aspects, but often they cannot be combined, if we think of terms like labour productivity or other efficiency criteria, in contrast to social measures. But objectives can also contradict each other within one of these sectors. For example, the positively rated renunciation of pesticides leads to increasing mechanical processes, which, unfortunately, cause additional greenhouse-gas emissions and may increase the risk of soil erosion. Specifically targeted measures, but also broad all-around measures exist. Some examples of regional science concepts and their related CAP measures are listed here:

- Balancing development strategy versus growth-pole-oriented strategy: market organisation payments have a balancing effect while the support for quality schemes seems to follow growth-pole theory.
- Concerning the path-development (continuing, renewal, new creation of paths): the first pillar measures clearly support the continuation of historic

paths, while measures supporting knowledge transfer or investments stand for the renewal or creation of new paths.

- In case of sustainable development considerations, all three aspects (economics, ecology, social aspects) are in focus. But per definition they cannot always steer in the same direction. There are environmental payments, and, on the other hand, market organisation payments and support for investment that focus directly on economic benchmarks. And in contrast – local development subsidies often foster social aspects.
- Most of the CAP measures seem top-down driven (e.g. direct payments, investment support), only a few follow a bottom-up approach (community-led local development or partly the European innovation partnership).
- The payments to areas facing natural constraints support regional convergence, while for example environmental payments can lead to greater divergence.
- Direct payments or market organisation payments, payments to areas facing natural constraints have a clear structure-preserving effect, while the support for knowledge transfer or farm and business development may have structure-changing effects.
- Some measures take effect in the direction of agricultural monostructures (mostly pillar-one measures) others have diversification as an explicit objective (e.g. Natura 2000 and the Water Framework Directive payments).
- Many of the measures can be used to strengthen the market power of farmers, but there are also some with no or negative influence on the market power of farmers in relation to the food processing industry or food trading companies.

5.6. Summary and conclusions

There is no clear evidence whether or not the one or other theoretical basis leads to success in regional development. The above list is not intended as classification of good or bad. It should raise the awareness that among so many objectives and measures in such a wide variety of theoretical approaches the risk of conflicts or contradictory impacts is very high. Specific societal objectives are *per se* divergent, and compromises have to be found. Sometimes a specific regional situation or a current political issue acts as a trigger for measures that do not fit into a given theoretical concept. For example, the objective of a regional circular economy is to strengthen autonomy and resilience and minimise transport and CO_2 balances. But it can also be seen that if it seems economically promising, exports to most distant regions are also supported. Conflicts of objec-

tives are also addressed in Commission papers [European Commission, 2013]: while payments for market organisation hinder the development of competitiveness, other measures explicitly support the competitiveness of farm enterprises. In reality the CAP is a large system of historically developed and grown strategies and measures that do not pursue just one objective or theory. It is relatively easy (assuming no budget constraints) to introduce new measures but enormously difficult to drop measures against the will of lobbies. There is the risk of prolonging existing payments with new justifications, as is discussed by Tangermann [2014] using the example of direct payments. In every case the strategies and measures have to be very well adapted to specific regional situations, bearing in mind not only the effects on farmers and rural areas but also the effects on potential shifts of regional competitiveness and rankings. The notion of "agricultural" policy can be misleading when analysing all the objectives and measures. In reality it comprises general economic, environmental and social policy. Probably it would be more transparent to change the title of this policy.

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6. Possibilities to connect the Romanian agricultural research to the market requirements

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Abstract

On the knowledge market, the demand for information and knowledge is determined by a series of factors, of which some have a significant role: the implementation stage of the elements of scientific and technical progress in agriculture; the profile of agricultural producers; the relationship between the cost of information and knowledge, on the one hand, and the prices of agricultural products and, respectively, the ability of farmers to access knowledge in the field of research, on the other hand. The dysfunctions induced in the socio-economic structures after 1990 led to a strong fragmentation and isolation of most agricultural holdings. At the same time, for many management reasons, the agronomic research in Romania, i.e. lost touch with the mass of agricultural producers. Thus, the cooperation that should have occurred between most agricultural holdings and research units not only dwindled to disappearance, but also generated significant losses.

In this context, it is appreciated that the return to the functional parameters of the Romanian research may result from: linking the research, as a priority, to the knowledge market; awareness of the fact that yield increases – per hectare or animal head – will still call for scientific and technical progress; taking the example of foreign, large-scale suppliers of progress factors, which cooperate with farmers in the most diverse forms; studying, assessing and enhancing the vectors of operationalization in the knowledge market, connecting producers and consumers of information; the involvement of information producers, research, the more active dissemination of their results, etc.

Keywords: agricultural policy, knowledge market, market requirements, progress factors

JEL codes: O13, Q10, Q14, Q18

6.1. Introduction – the state of Romanian agricultural research

Modern Romanian agricultural research began in the years leading up to the First World War. The subsequent development was relatively upward with stagnation and inherent returns generated by system changes to which Romanian society was subjected over time. Nevertheless, in almost a century of existence,

the most important agricultural and forestry research institution in Romania, namely the Academy of Agricultural and Forestry Sciences "Gheorghe Ionescu-Sisesti" (ASAS), recorded considerable scientific and material accumulations.

Currently, ASAS is a specialized, autonomous public institution of academic consecration and scientific coordination, with legal personality, functioning according to its own statute and it is coordinated by the Ministry of Agriculture and Rural Development and the Ministry of National Education. From the point of view of the institutional architecture of the Romanian agricultural research, we specify that ASAS maintained its configuration specific to the communist period. This phenomenon explains why the dynamics of Romanian agricultural research has entered a declining slope, and there are currently no signs of recovery. The crisis of agricultural research has not been and is not a single fact. The sectoral crisis is manifested in all Romanian research, on the one hand, as a result of immobility of the institutional structures and, on the other, of underfinancing of the sector, which led to both the departure of researchers and the decrease of the number of young people opting for a qualification in the field and to decreasing the results.

In addition, agricultural research has also been the victim of the privatization of agriculture, through de-collectivization and de-privatization, and which, in the field of land relations, have embraced the ęreconstruction and establishment of the property rightę for the lands confiscated by the Communists and / or of the land ownership of state ownership. Because of these actions, a large part of the agricultural research area went into a commercial circuit (at the beginning of the 90s the institutes of the ASA had about 130 thousand ha of agricultural land for research, and in 2017 they had 74.6% less, respectively, about 33 thousand hectares).

In Romania, in the category of producers of information and scientific knowledge for agriculture and forestry there are also the big traditional university centers, such as Bucharest, Iasi, Cluj, Timisoara and Craiova. It is worth mentioning that the universities did not have a scientific production at the level registered by the Academy of Agricultural and Forestry Sciences, because their activities were more of a didactic, educational and editorial nature than research. We appreciate that if the university management were to capitalize with responsibility and efficiency and, at the same time, it would have acted in the direction of enhancing human resources (teachers, researchers, specialists, students), land (agricultural land of any kind) and all the other elements that make up the agricultural capital broadly, it would probably have been significant and useful for agriculture. Notorious, in these cases, were the alienations for the reconstitution of property rights of some lands. In this context, we mention the case of Băneasa Didactic Farm of the University of Agronomic Sciences and Veterinary Medi-

cine (USAMV) in Bucharest, a unit of over 200 hectares, although under public law, it was transferred privately, being returned to former owners. We do not judge the lawfulness of this action! However, from the point of view of social responsibility in the preparation of the young generation, the decision to renounce the Baneasa Didactic Farm of USAMV in Bucharest has an anti-native character, as it compromises the quality of agriculture specialist of many generations of future engineers, veterinarians or agrarian economists. Such examples can continue because USAMV in Bucharest was not the only institution affected by the laws of the restitution of former land.

6.2. The problems faced by agricultural research since 1990

It is widely accepted that investing in research and innovation is driving long-term growth and that the R&D rate of public funding is estimated to be high. Nevertheless, on the background of the adoption in the Romanian economy of capitalist relations, agricultural research has been confronted with:

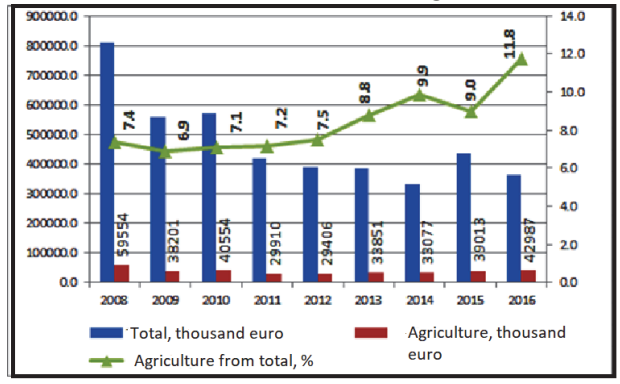
- Chronic under-financing of the sector;
- Shortcomings in relations with the market;
- Increasing aggressiveness of competition from foreign companies.

Underfunding of agricultural research

Undoubtedly, the post-communist Romanian society has drastically reduced the public funds granted to the research, because:

- it constantly faced deep economic and financial imbalances;
- a clear, consistent and predictable doctrinal and legislative line has not been identified, promoted and adopted.

Figure 1. Funds allocated for RDI – overall and for agriculture – in 2008-2016



Source: calculations based on (i) Tempo online (accessed on: 10 Nov.2017) and (ii) Annual average exchange rate (arithmetic mean of monthly average exchange rates), NBR website, (accessed on: 10 Nov.2011).

In 2014, the "National Strategy for Research, Development and Innovation 2014-2020" was launched. This document – legalized by the Government Decision No. 929 of 21 October 2014 – supports the professionalization of the technology transfer segment both from public research institutional structures and from other similar organizations. The National Strategy for Research, Development and Innovation 2014-2020 promotes the intensification of the transfer of technical knowledge, the improvement of intellectual property portfolios, the mobilization of private financial resources towards RDI activities and increased mobility of researchers from public and private organizations. Specifically, the main actions proposed in the document include: (i) financing the thematic projects through a set of instruments; (ii) the possibility of developing short and long-term research on phases of the research cycle (from idea to marketing) with a focus on priority areas; (iii) making research funding in the framework of partner actions between RDI institutes, universities and firms / companies.

Relations with the market

Agricultural research, from the time of its institutionalization, which took place in the last century, until the moment of the post-totalitarian reforms, has manifested on the market under the form of partnership relations, according to the model described below.

After the collapse of Communism, agriculture was given priority over other sectors of the economy, in an ample and profound process of reform, which had to suffer because of the lack of expertise of the decision-makers.

Also, over a period of about a decade, the network of large agricultural production units, consisting of about 3000 agricultural production cooperatives and nearly 420 state units, has disappeared, and instead small family-type entities have been activated, in the amount of over 4 million, i.e. it is the number registered in 2000.

The latest statistical data from the "Farm Structure Survey, 2016. General National Data" on the small farm household reveals the continued high degree of fragmentation of agricultural economic agents and their degree of participation in agricultural markets. Thus, 93.0% of the total agricultural holdings have up to 5 hectares, most of them have 2-5 ha (19.3% of the total), followed by households with 1-2 ha (18.6 %) and 0.5-1 ha (17.0%). To this reality of the small peasant farms is also added the low degree of participation in the market – 7.6% – which is represented by the number of direct selling households for more than 50% of the produced output. Only these summary data are likely to reflect the reduced capacity of these entities to gain access to knowledge.

Table 1. Agricultural holdings by destination of agricultural production, 2016

	Agricultural units (number)	Of which		Agricultural units (%)	Of which	
		For own consumption, over 50%	Direct sale, over 50%		For own consumption, over 50%	Direct sale, over 50%
Under 0.1 ha	421 008	409 342	11 666	12.8	13.85	3.58
0.1-0.3 ha	540 762	515 226	25 536	16.5	17.43	7.84
0.3-0.5 ha	287 917	272 081	15 836	8.8	9.20	4.86
0.5-1 ha	554 462	519 827	34 635	17.0	17.58	10.64
1-2 ha	611 567	560 145	51 422	18.6	18.95	15.80
2-5 ha	632 950	539 531	93 419	19.3	18.25	28.70
5-10 ha	177 178	123 460	53 718	5.4	4.18	16.50
10-20 ha	36 387	15 157	21 230	1.1	0.51	6.52
20-30 ha	7166	1154	6012	0.2	0.04	1.85
30-50 ha	4834	353	4481	0.1	0.01	1.38
60-100 ha	3378	101	3277	0.1	0.00	1.01
100 ha and over 100 ha	4286	6	4280	0.1	0.00	1.31
Total	**3 281 895**	**2 956 383**	**325 512**	**100**	**100**	**100**

* Data refer only to agricultural units without legal personality.

Source: processing after the "Structural Survey in Agriculture, 2016. General Data at National Level" [2017]. Andrei, T. (Coord.), [2017], National Institute of Statistics, Bucharest.

As regards the agricultural research units, even if they managed to go through the reforming process with small changes in their organizational structure, the collapse of the large production units in the agriculture sector meant the beginning of the decline and, later on, of the functional and economic disaster. Nowadays, all the institutes and research centers have been faced with new market relations, which in their essence were based on an unbalanced scheme, incapable of generating functional relationships.

From an economic point of view, such relationships were objectively non-functional because they put in front of over 60 institutes and agricultural and forestry research facilities, the opportunity to economically relate to and interact with almost 4 million small and very small family-type production entities.

Because the economy is frequently imitating or copying models from nature, we could say, without exaggerating and taking into account the physiocrats' opinion, that these relationships were like the cross between a pureblood horse and a donkey, with the mere observation that the product of the two is always sterile.

Foreign companies' competition

Romania's integration into the European structures, a process followed almost simultaneously by the liberalization of the markets, has made the results of national agricultural research less and less important to the demand of the domestic producers, when taking into consideration the factors that generate technical progress.

Table 2. Top 15 farmers who applied for APIA subsidies in the 2017 Campaign, selected according to the size of the area requested for payment and presented in ascending order*

No.	County	Agricultural units that have requsted APIA subsidies in the 2017 Campaign	Observations
1	Braila	S.C. AGRICOST S.A	It has the largest concession area at the State Land Agency (ADS) of 57 720 hectares. It belongs to businessman Constantin Duluţe, who took over in 2012 the contract for land exploitation of the Insula Mare a Brailei from Culita Tărâţă. This company is about to be bought by the Al Dahra group in the United Arab Emirates. The transaction will amount more than EUR 200 million** according to www.zf.ro data.
2	Ialomita	S.C. INTERCEREAL S.A.	18 362 ha ***
3	Vaslui	S.C. COMCEREAL S.A.	27 488 ha ***
4	Timis	S.C. Emiliana West Rom S.R.L.	It has in concession or lease an area of 629 hectares. The firm belongs to the Italian businessman Luciano Martini.
5	Timis	S.C. CAMPO D ORO S.R.L.	It operates around 12 000 hectares, being the largest grain grower in the county. It was set up by Italian Giovanni Roncato, who later moved into the Danes portfolio of Ingelby and Emiliana West Rom, controlled by the Italian citizen Luciano Martini.
6	Calarasi	S.C. MARIA TRADING S.R.L.	It operates around 50 000 hectares, of which 11 700 ha are concessions from ADS. It is owned by Lebanese businessmen Sarkis Sarkis (31.6% of shares), Laoun Youssef (31.6%), El Khalil Jihad (15%) and other minority shareholders of Lebanese origin.
7	Dolj	S.C. CERVINA S.A.	It operates 9883 hectares (in 2013)****. At Cervina S.A. the majority shareholder is Oltyre SRL
8	Tulcea	S.C. DELTA-ROM AGRICULTURE S.R.L.	It operates over 13 000 hectares of land in the Danube Delta concessioned from the Romanian state. It is owned by the Luxembourg Company Fri-El International Holding and SC Cross Wind SRL, a company of the Danish family farm group Ingleby, they do not have land in concession from the Romanian state.
9	Ialomita	S.C. ZIMBRUL S.A.	It operates over 25 200 hectares. It is held, according to data provided by the site termene.ro, by Nutre Farming SRL, part of the Portuguese Nutre Group. It entered Romania in 2005.

Table 2. cont.

No.	County	Agricultural units that have requsted APIA subsidies in the 2017 Campaign	Observations
10	Calarsi	S.C. AGROCHIRNOGI S.A.	It now operates approximately 24 000 hectares. It is owned, according to the site termene.ro, by Lebanese citizens El Khalil Raji and Jabre Nassif.
11	Ialomita	S.C. JD AGRO COCORA S.R.L.	It has 9800 ha. It belongs to Romania Farm Invest A/S, a company based in Denmark, owned by a group of private investors and companies, according to the site termene.ro.
12	Teleorman	S.C. AGRINATURA S.R.L.	9195 ha in operation; the estimated turnover for 2017 is about EUR 10 million; the main customers are Cargill, Bunge, Agricover, Titan or Vel Pitar.
13	Dolj	S.C. OLTYRE S.A.	It operates 9298 hectares. Serves the businessman Mihai Anghel****.
14	Tulcea	S.C. AGRODELTA SIREA-SA S.A.	In 2014, the Tulcea County Council granted 9417 hectares of land in the Sireasa area of the Danube Delta. It belongs to the family of Traian Rece*****.
15	Vaslui	S.C. AGROCOMPLEX BARLAD S.A	It is part of the Racova group, which in 2016 passed from the property of Adrian Porumboiu to that of Trans-OIL Agro-Industrial Group, the largest grain trader and producer of sunflower oil in the Republic of Moldova. He has debts to the State Property Agency amounting to about RON 427 200 (EUR 94 900). According to the site termene.ro, the company is now owned by Babylon Overseas, with address in United Arab Emirates; the lawyer Dimitriu Sorin Manuel; Duluţe Constantin; Sif II Moldova.

* The smallest required area (position 1) in ascending order at the highest surface (position 15).
Note: The above selection took into account the fact that the APIA top ranked according to the size of the area requested for payment in the 2017 agricultural campaign, but there may still be areas for which no subsidy was requested and these were not included in the the above ranking of APIA. ** http://www.flux24.ro/cea-mai-mare-firma-de-cereale-din-romania-dorita-de-un-seic/ (accessed on: March 12, 2018). *** The area for which APIA paid subsidies in 2014. **** http://www.gds.ro/Actualitate/2014-09-02/Cine+sunt+cei+ mai+mari+latifundiari+ai +Olteniei/ (accessed on: March 12, 2018). ***** http://www.economica.net/top-terenuri-agricole-latifundiari-2017-traian-rece-agrodelta-insula-mare-braila-dulute-comcereal_138186.html (accessed on: March 12, 2018).
Source: APIA quoted by ECONOMICA.net at: http://www.economica.net/opt-din-15-se-mai-exploatatii-agricole-apartin-unor-companies-foreign-un-fond-de- US investment-to-collect-the-princes-subventii_138231.html; http://www.economica.net/exclusiv-latifundiarul-care-ia-subventii-de-la-stat-dar-are-datorii-la-agentia-domeniilor-statului_98178.html; https://www.google.com/url?q=http://www.economica. net / irregularities-in-top-beneficiaries_101003.html & sa = U & ved = 0ahUKEwjHhsClu-HZAhUMxaYKHXqjAfU QFggUMAY & client = internal-uds-cse & cx = 017785504891785687534: 9ljoq1gmt4g & usg = AOvVaw2qYuz LYXMBMn821A4FCFlY.

However, there is an increase in the interest of foreign investors, which is because the Romanian agriculture registered good results every year. It is significant in 2017 when the best result for cereal production in the last decade was noted (Eurostat data shows for Romania, in 2016 as against 2008, an increase in cereal production by 29.3% while at the EU level a decrease by 5.6%). Thus, Romania has become the largest wheat exporter in the EU. Romanian farmers exported not only to the EU Member States but also to non-community customers – 1.2 million tons of wheat, only in July and August 2017. These results are mostly due to the existence of foreign companies, which with advanced technologies, resources and efficient management have contributed to these achievements. For example, the data from APIA in May 2017, for 15 companies that applied for the largest subsidies in the 2017 Campaign, 8 of them (53.3%) are owned by foreign shareholders.

In fact, the struggle in the market with foreign companies was uneven, losers being constantly domestic actors. Both the research infrastructure and, above all, the decision-makers, usually with indisputable scientific results, have hardly been able to cope with the foreign offensive. I dare to say, previously thought out and planned, based on the most cynical rules of competitive management and marketing, but also based on their long-term experiences.

6.3. Possible solutions for the recovery of Romanian agricultural research

The future of recovering the Romanian agricultural research is closely linked to its innovative power. The solution is an action-packed initiative for a Romania dedicated to innovation and research, in this case the field of agriculture and forestry. Thus, Romania will be able to fit into the core requirement of the Europe 2020 strategy, which aims to generate smart, sustainable and inclusive growth.

The key to returning to the functional parameters of Romanian research can result from:

- Connecting research with priority to the market and here we are referring to the knowledge market and, only secondarily, to intensify the efforts to increase budgetary allocations. The latter solution, given the current economic and social context, is not able to offer an optimistic perspective in short and medium term.
- Growing potential of agriculture's demand for progress factors, where research results occupy a central place amid the development of industrial farms at a steady pace.

  However, the performance demonstrated by yield increases per hectare or per head of animal requires, first and foremost, technical progress. From

this point of view, we can say that there is a real demand for the scientific product as a main factor of progress.

- Taking the example of large, foreign companies, which are providers of progress factors.
  While these companies intensify contacts with farmers in various forms, through symposiums, seminars, round tables, work visits and others, agricultural research institutes and entities in Romania are becoming more and more insulated. Because of this, the danger of gradual compression up to the disappearance of the national research is not a false alarm, a metaphor, but a reality.
- Studying, evaluating and intensifying the operationalization, on the knowledge market, of the vectors linking producers and consumers of information, namely research and farmers, because:
  a) The vectors in question, with special references to education, consultancy, the media and others, do not belong to the producer nor to the consumers of information, which is why they are outside the interests of the two actors.
  b) A large part of the mentioned vectors is still under the responsibility of the public authorities, because it has been assumed that the promotion of the novelty at the level of the sector must be in accordance with the national strategic interests and certainly not only in accordance with the particularities of the productive sector.
- Dynamic energies in the knowledge market must come from information producers, as research goes from top to bottom; that is, it goes down from those who generate it to those who need it. Therefore, the first step towards novelty belongs to the researcher, in what concerns both the production and dissemination of the results, and only after that comes the farmer, as an information consumer.
  It is a relation that needs support from both sides, but with initiative on the part of the offer. Without the effort of public research, the farmer is either turning to experience, which is much easier yet traditional and poorly productive, or resorting to the market of foreign inputs of technological progress, which are much more expensive than domestic ones and risky in terms of the imposed commercial conditions.
- Accepting the fact that in the knowledge market the highest costs are associated to the information consumers and not to the information producers, respectively, to research. The most often cited example here is the law of gravity. In the time passed since Isaac Newton's formulation of this law, numerous generations of students have so far tried to understand and know it. It is obvious that the efforts related to knowing the law are much

higher, immeasurably higher than those related to the formulation of the law. By extension, the previous example is also applied in agriculture, although in other fields. For example, much less is spent for the creation of a plant variety or a new animal breed, than for the efforts generated by their assimilation into production.

This phenomenon leads to the conclusion that efforts to support research must be conjugated to those intended to encourage consumption. When only one of the two segments of the market is sustained and encouraged to the detriment of the other, or both are neglected, then, naturally, their activity becomes isolated, according to the pattern of the present situation.

- Bringing research and production closer together by exploiting all the possibilities that can form an efficient bridge between the two components of the knowledge market. The solution promoted by some circles in the sphere of legislative power poles, which understand the reinvigoration of agricultural research through the institutionalization of management as an intermediate structure between research and agricultural producers, does nothing but alienate the producers from the domestic consumers of information. The finality of this proposal, if it becomes a law, can only lead to a double bankruptcy: first of all, the bankruptcy of the newly created structure and secondly, together with it, that of the entire institutional structure that supports current agricultural research.

  Obviously, agricultural producers too, especially those connected to high-performance inputs, will experience the shock of such a situation, yet not to an extent that would affect their functionality decisively.
- In the civilized world, the research market is configured into more elaborate schemes that have proven to be functional. Classical information producers, the same as in our case, delegate responsibility for the dissemination of knowledge to territorial centers of rural development. In their turn, agricultural producers are organized into cooperative or associative structures with responsibilities in taking over and disseminating information from territorial centers. This results in a market-based, public and private, functional partnership between medium-sized structures and flexible activities, in which the objectives are compatible.
- Knowledge, as a production factor, will surely and quite soon stop being only abstract and will acquire concrete features once it will be found as an expense element within the cost of all products. Under these circumstances, the center of gravity in research funding will move from the public budget to the private sector, and the responsibility of the research will go mainly to economic agents.

- Scientific knowledge as a direct product of research has a dual representation in the economy: firstly, it is an intangible asset and secondly, it is a production factor. As intangible asset, it has some essential characteristics, namely: it is the part of the patrimony with the highest dynamics; it has a high degree of volatility when it has the quality of a public good because it escapes the control of the national authority; it has a high speed of movement under the current technical-scientific conditions. The direct consequence of these characteristics is that, under the conditions of the globalization process, knowledge is migrating from countries with poor economies to the developed ones. In other words, scientific knowledge is naturally polarized by the rich world, which facilitates the drain of brains and ideas from countries of origin in terms that exceed the limits of morality or value equivalents.

6.4. Summary and conclusions

Retrospectively, and in summary, research, as an agricultural policy issue, has multiple facets that demonstrate the crisis that this sector is going through. It is a profound crisis that lasts for over a quarter of a century!

Contrary to those who wished its disappearance, as was the case of many agriculture-related capacities for producing progress factors such as Tractorul Brașov, the chemical plants, Semănătoarea București and others, the agricultural research miraculosly still exists and still does its duty, even if at odds with what it could normally give.

Here is the merit of all those who have continued their work in the research institutions, as many as they remained after the reform of the economic sector. The fact that these people continued to work in spite of their minimum income and conditions, the system's loss of credibility, the reduction of the public support, and similar things, may have different interpretations that can be motivated by various arguments. Nevertheless, such motivations are rather related to personal factors, than to causes of a general, social, political or even economic nature.

The stubbornness (of the researchers) to continue to work within the research institutions, although in many respects the results of their work bear critical interpretations, has a special value, though. Through them, the flame of the creative power of this nation has survived.

We are now in the period when agricultural research reached the point of maximum supportability from the forces that compressed its space of manifestation. In physics, such a phenomenon determines the implosion of the whole, while in our case, it determines the manifestation of a simple, Hamletian question: "how long it will be able to resist?"

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7. Price relationships of the production factors as exogenous determinants of production in agriculture

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Abstract

In this article, attention is focused on the prices of production factors (capital, labour and land) and their relationships. We indicate here their exogenous character based on the author's analytical approach. In addition, we derive the dependencies, while drawing from the theory of microeconomics and the producer choice theory. Empirical verification for the selected EU countries covered the pairs of levels of these prices in the agricultural sector. Finally, these relationships determine the production techniques and their changes, that is, the relationships of the involved production factors necessary to obtain a certain production level[8].

Keywords: production factors, Total Factor Productivity (TFP), microeconomic behaviour

JEL codes: D33, D24, D01

7.1. Introduction and analytical basis

In order to identify the exogenous factors which are of our interest from the point of view of the set objective and which influence the production techniques, we are starting with the definition of the production efficiency (PE), which is exceptionally given here in current prices. In an analytical way, it can be noted as a quotient between income and the cost of using production factors (capital, labour and land for the given level of the agricultural production on a producer or agriculture scale at current prices [Bezat-Jarzębowska and Rembisz, 2013]:

$$EP = \frac{p_i y_i}{K_i c_K + L_i c_L + Z_i c_Z}$$

[8] This article is a continuation of the studies carried out by the Team under the Multi-Annual Programme 2015--2019 at the IAFE-NRI. The issue of the exogenous factors was discussed in more detail in the monograph by Rembisz W., Waszkowski A., *Egzogenne uwarunkowania produkcji w rolnictwie - ceny czynników produkcji i wybrane wskaźniki makroekonomiczne,* Program Wieloletni 2015-2019, nr 69, IERiGŻ-PiB, Warszawa. The article presents a synthetic approach to the above-mentioned monograph, presented at the Conference organised by the IAFE-NRI and entitled "The Common Agricultural Policy of the European Union – the present and the future" which was held on 5-7.12.2017.

where:

i – means the agricultural producer,
p – prices of agricultural products,
c_K – price of the capital factor,
c_L – price of the labour factor,
c_Z – price of the land factor.

In analytical terms, the time subscript *t* is omitted.

Assuming the zero profit conditions and the homogeneity of the function at the given time, the above equality, in the conditions of competitive equilibrium in the product market, may be noted as:

$$p_i y_i = K_i c_K + L_i c_L + Z_i c_Z$$

When both sides of the statement are converted to a logarithm, this enables an approximate notation[9] of the production efficiency in value terms as a sum:

$$lnp_i + lny_i \approx lnK_i + lnc_K + lnL_i + lnc_L + lnZ_i + lnc_Z$$

Determining the ∂ partial derivatives and omitting the time indices allows to make the following notation:

$$\frac{\partial y}{y} - \left\{\frac{\partial K}{K} + \frac{\partial L}{L} + \frac{\partial Z}{Z}\right\} = \left\{\frac{\partial c_K}{c_K} + \frac{\partial c_L}{c_L} + \frac{\partial c_Z}{c_Z}\right\} - \frac{\partial p}{p}$$

In analysing the above identity, we can divide it [Bezat-Jarzębowska and Rembisz, 2016]. The left side of the equation is responsible for the endogenous, conventional factors dependent on agricultural producers in the sense of choices they made to maximise their own objective function. These factors are related to the production efficiency and its changes in the sense of TFP. The factors listed on the right side of the equation are the exogenous factors. These are the relationships between product prices (prices which are either paid or received) and prices of the production factors (in fact, their services from the given factor involvement) identified in the market of production factors as we showed above (this is equivalent to the idea of price scissors).

The obtained exogenous dependencies are the indices of the most important economic parameters, important from the point of view of the agricultural producer. As a sector, agricultural producers are price-takers. The price scis-

[9] This is a sort of approximation, assuming that we deal with the sum of two-factor production functions expressed as $p_1 y_1 = K_i c_K$, $p_2 y_2 = L_i c_L$ and $p_3 y_3 = Z_i c_Z$, while $p_i y_i = \sum_{i=1,\ldots,3} p_i y_i$, i.e. the identity is an approximation of two-sided conversion into a logarithm assuming the sum of one-factor production functions.

sors arrangements indicated in the above inequality are determined by market mechanisms, self-regulatory processes on the demand and supply sides, and are susceptible to the impact of the pursued economic policy or intervention measures. In this context, and in line with the Jovens' interpretation, producers adapt to prices. This relationship is not transitive – the prices of products do not adapt to the costs of production in the free competitive market. It happens where intervention measures are applied, for example, in agricultural markets.

The adaptations are related to an improvement in the efficiency, especially to an improvement in the productivity of individual (endogenous) factors. As we have shown, the relationships of prices of the production factors and their changes are not, in fact, dependent on the agricultural producer and in each market model they are exogenous for the agricultural producer. The above-mentioned improvement in the efficiency of the production process may take place as a result of substitution, for example, of involving the labour factor with increasing the involvement of the capital factor [Rembisz, 2005] and by making progress understood as an increase in innovation, knowledge, managerial and organisational skills.

7.2. Relationships of prices of the capital, labour and land factors – hypothetical approach

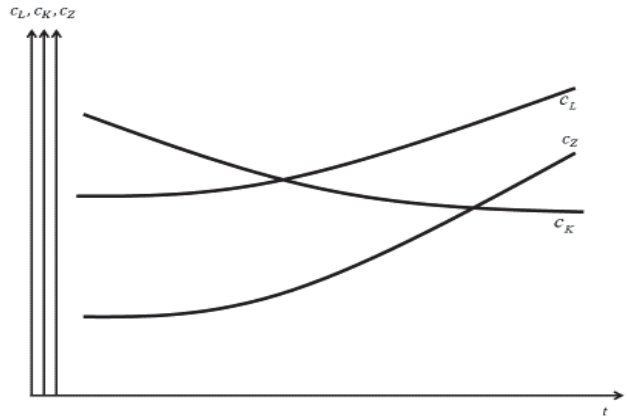
As a result of the assumptions showing the price evolution for the labour, capital and land factors, hypothetical Figure 1 was adopted. It shows the relationship of prices of the production factors: the price of the labour factor whose remuneration increases, the capital factor which becomes relatively cheaper and the price of the land factor. The final relationships should be referred to prices of services of these factors in the production process.

The adopted hypothetical assumptions related to prices of the production factors are also justified by the theories and observations of the economic growth and development. They also stem from the relationship of their scarcity as a fundamental economic right.

As a result of the non-agricultural demand for the land factor, i.e. urbanisation processes, residential housing, environmental, tourism and recreation issues, etc., it is becoming increasingly scarce also in absolute terms as far as the agricultural use is concerned. Similar dependencies are observed in the non-agricultural demand for the labour factor. On the other hand, the increase is characteristic of the supply of the (real) capital factor which makes it relatively and also absolutely cheaper and cheaper. This results in an increase in its use in agriculture. Together, this leads to changes in production techniques, generally towards those which are more and more capital inten-

sive while labour- and land-saving. We do not analyse this here. We refer only to price-related (production factor prices), exogenous determinants of these production techniques changes.

Figure 1. Hypothetical assumption as to the price evolution for the labour, capital and land factors



Source: own study.

7.3. Relationships of prices of the capital, labour and land factors – empirical approach

As shown in Figure 1, the hypothetical relationships of prices of the capital and labour factors and of the land and capital factors have been verified empirically. The following time series were used for this purpose:

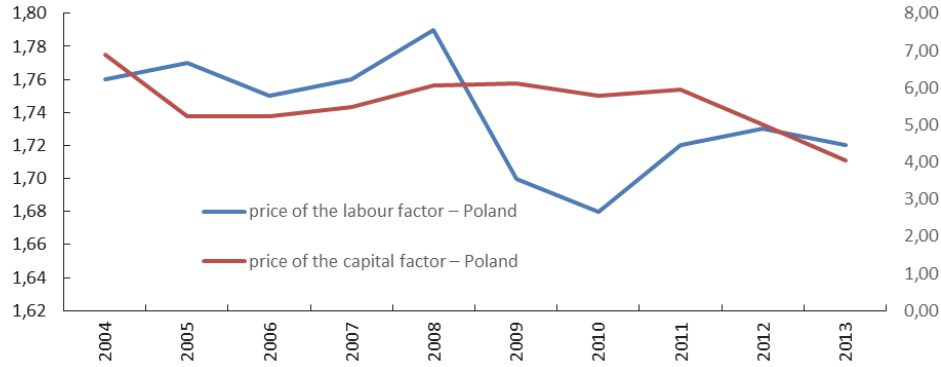
- Price of the capital factor c_K – defined on a proxy basis as the baseline interest rate on the alternative involvement basis (in terms of lost profits [Kleinhanss, 2014]); based on the Eurostat database;
- Price of the labour factor c_L – defined as the average hourly remuneration expressed in EUR; based on the Eurostat database;
- Price of the land factor c_Z – for 2005, 2007, 2010 and 2013; taken from the Eurostat database.

Final verification covered the years between 2004 and 2013, which results straight from the data availability.

The following empirical figures show the price of the capital factor and the price of the labour factor for the selected EU countries[10].

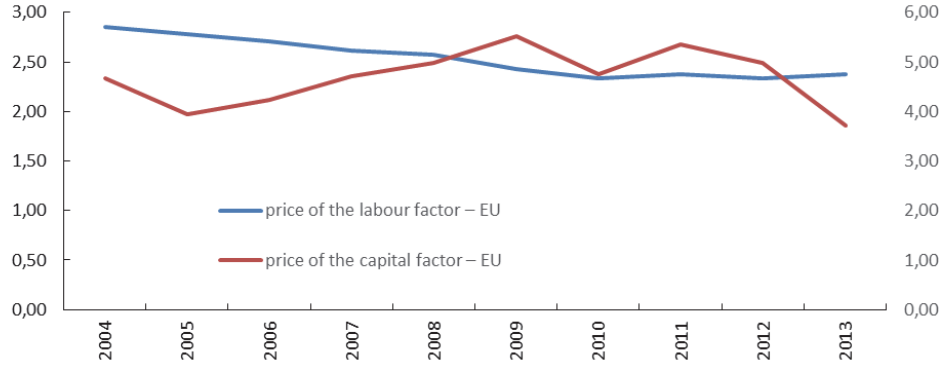
[10] Empirical studies on this issue were presented in more detail in the monograph by Rembisz W., Waszkowski A., *Egzogenne uwarunkowania produkcji w rolnictwie - ceny czynników produkcji i wybrane wskaźniki makroekonomiczne,* Program Wieloletni 2015-2019, nr 69, IERiGŻ-PiB, Warszawa.

Figure 2. Labour factor price and capital factor price in agriculture in Poland



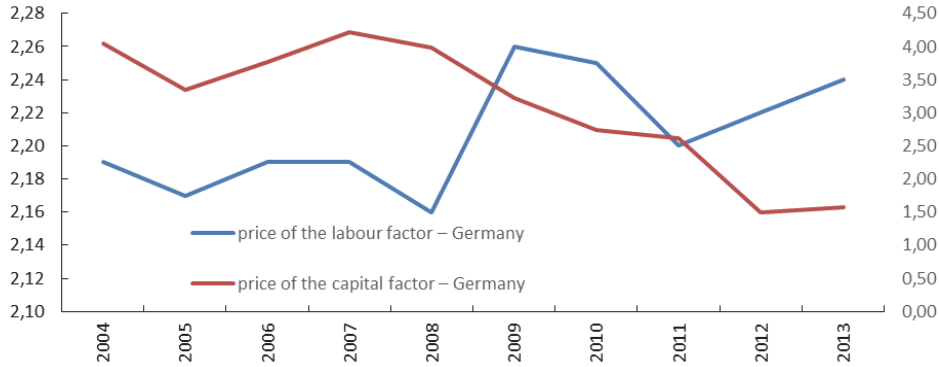
Source: own study based on the Eurostat data.

Figure 3. Labour factor price and capital factor price in agriculture in the EU



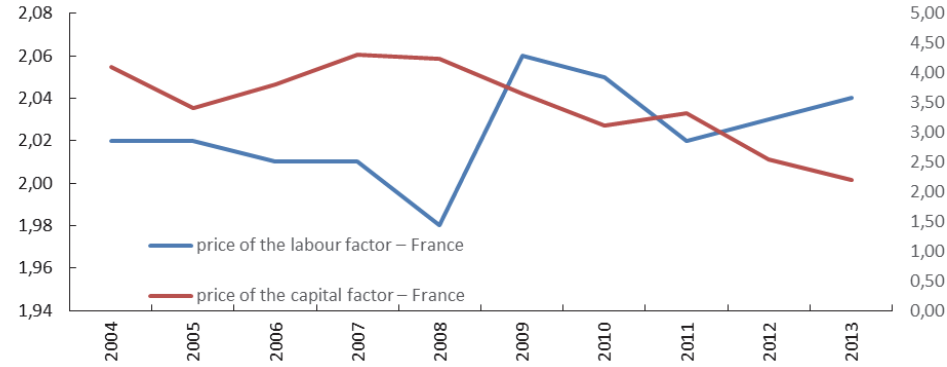
Source: own study based on the Eurostat data.

Figure 4. Labour factor price and capital factor price in agriculture in Germany



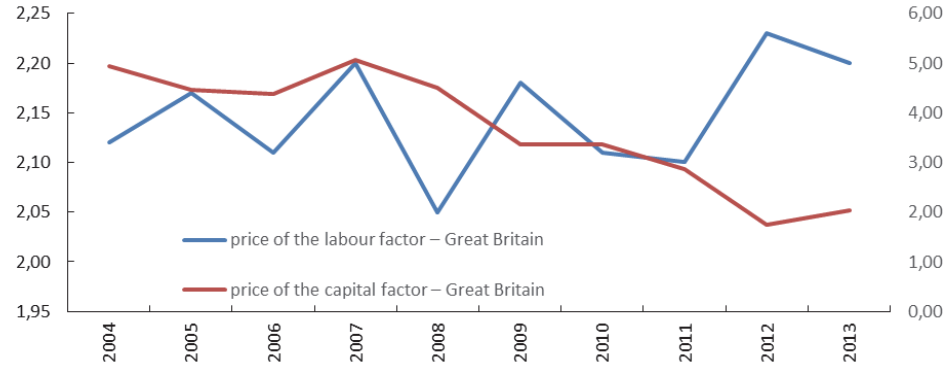
Source: own study based on the Eurostat data.

Figure 5. Labour factor price and capital factor price in agriculture in France



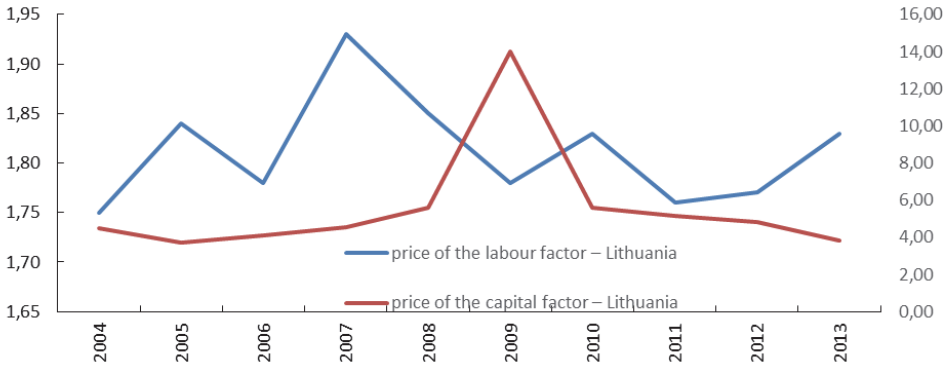
Source: own study based on the Eurostat data.

Figure 6. Labour factor price and capital factor price in agriculture in Great Britain



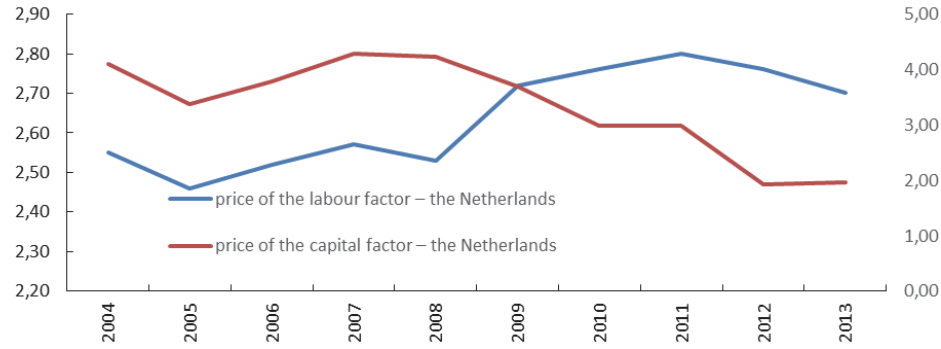
Source: own study based on the Eurostat data.

Figure 7. Labour factor price and capital factor price in agriculture in Lithuania



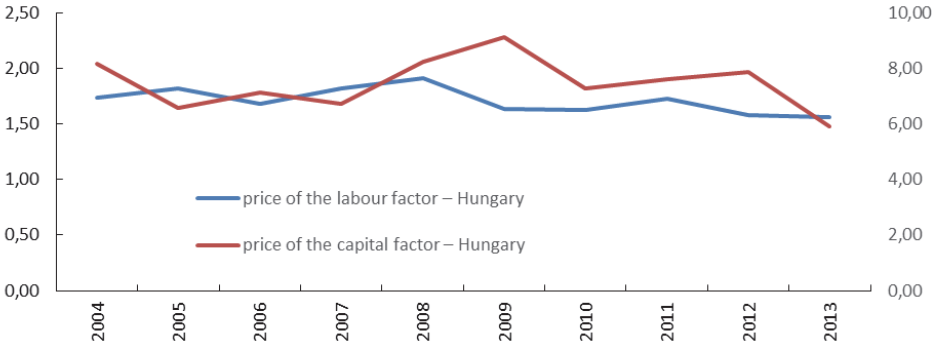
Source: own study based on the Eurostat data.

Figure 8. Labour factor price and capital factor price in agriculture in the Netherlands



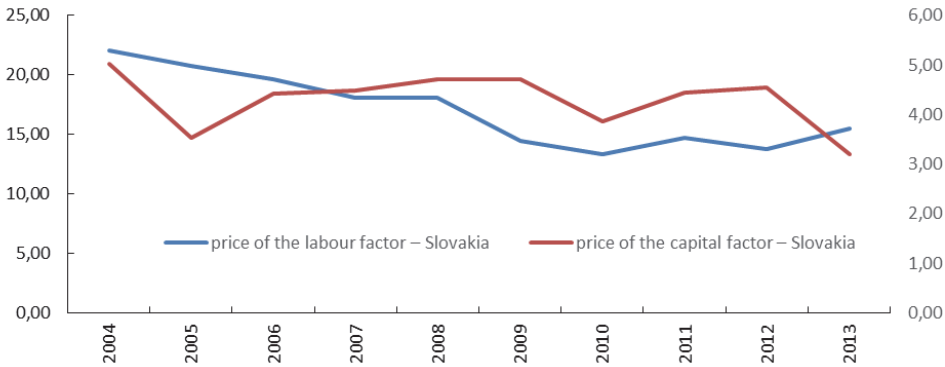
Source: own study based on the Eurostat data.

Figure 9. Labour factor price and capital factor price in agriculture in Hungary



Source: own study based on the Eurostat data.

Figure 10. Labour factor price and capital factor price in agriculture in Slovakia



Source: own study based on the Eurostat data.

The above-mentioned visualisations confirm the adopted hypothetical assumptions that were derived from the theoretical and analytical approaches. As we have shown, we verify the indicated dependencies as regards the trends. In Figures 2-10, it can be observed that the price of the labour factor in relation to the price of the capital factor is higher and higher. The opposite directions are clearly visible since 2008. This may indicate the occurrence of substitution processes in the economy in the context of production techniques. This is, naturally, consistent with the assumptions adopted. This is also confirmed by the growth models in agriculture [Rembisz and Floriańczyk, 2014]:

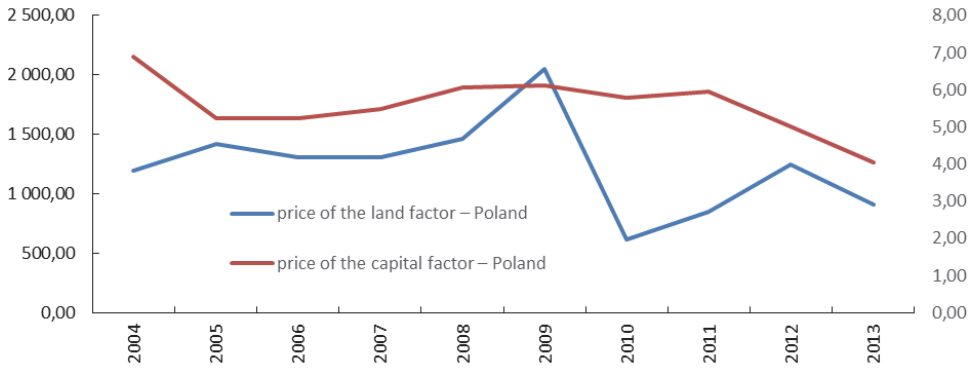
- models based on the intensification theory [Woś and Tomczak, 1983],
- Hayami-Ruttan models,
- Kuznetz models in broader terms.

In this context, we conclude that the amount of the capital factor is increasing. This is due to the economic and industrial development. Therefore, in accordance with the principle of the level of scarcity, the capital factor is becoming cheaper and cheaper in absolute terms and in terms of the price of the labour factor. This is due to the fact that it becomes more expensive as a result of the general development. This determines the decrease in its availability for the agricultural sector due to the competitive employment outside that area.

These price relationship changes are also determined by an improvement in the productivity of both production factors. By assumption, the increase in the productivity is, in fact, due to the rise in the price of the given factor(s) provided that the assumption stating that the endogenous relationships are induced by the exogenous relations is fulfilled.

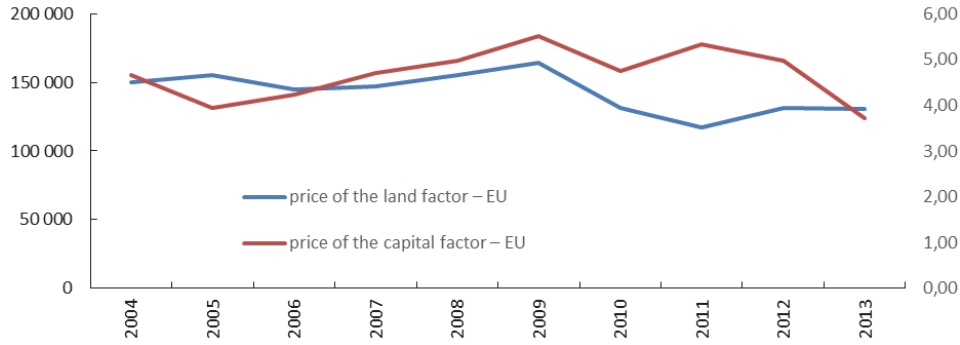
The price relationships of the capital and land factors are presented in the following Figures 11-18.

Figure 11. Land factor price and capital factor price in agriculture in Poland



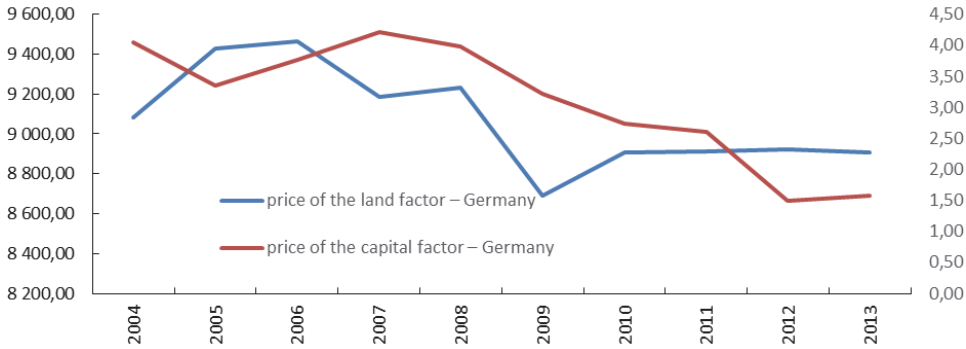
Source: own study based on the Eurostat data.

Figure 12. Land factor price and capital factor price in agriculture in the EU



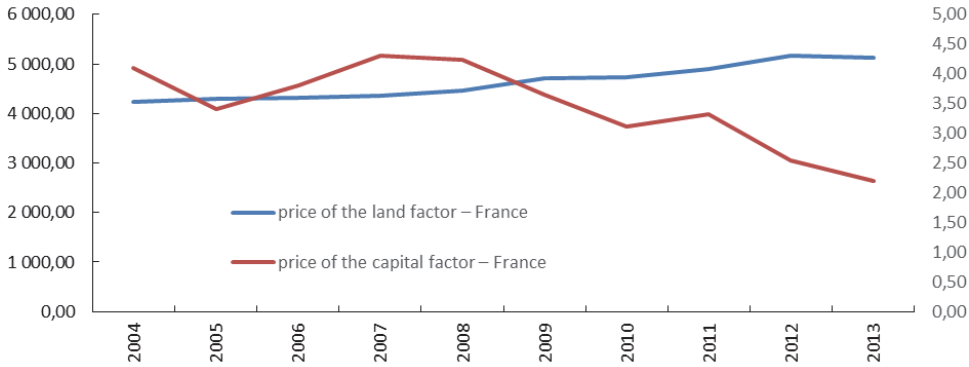
Source: own study based on the Eurostat data.

Figure 13. Land factor price and capital factor price in agriculture in Germany



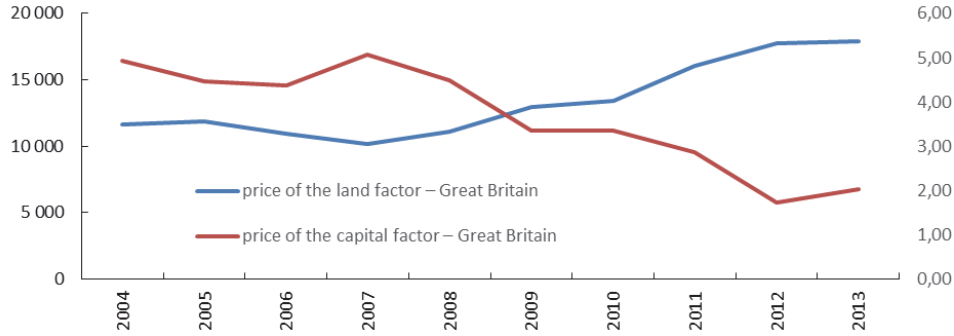
Source: own study based on the Eurostat data.

Figure 14. Land factor price and capital factor price in agriculture in France



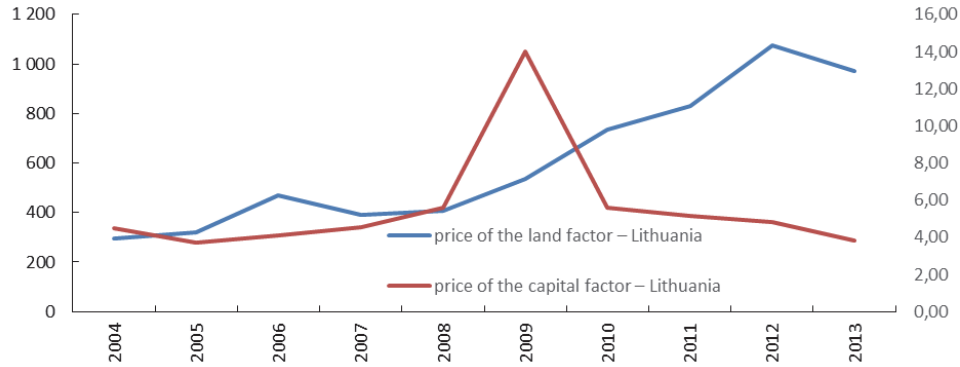
Source: own study based on the Eurostat data.

Figure 15. Land factor price and capital factor price in agriculture in Great Britain



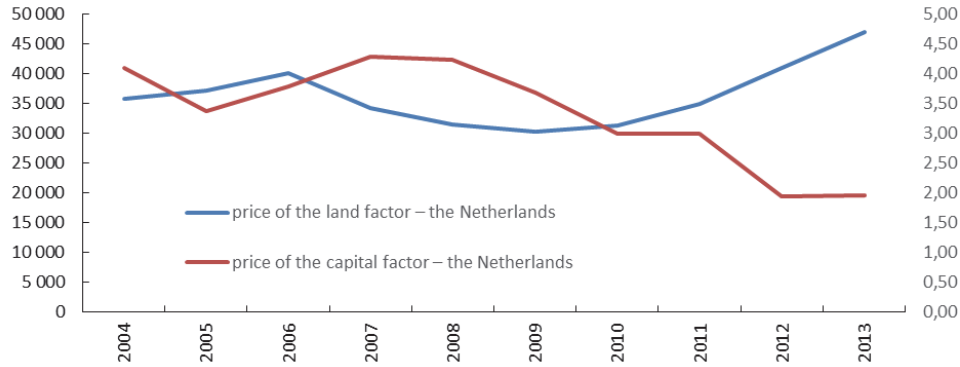
Source: own study based on the Eurostat data.

Figure 16. Land factor price and capital factor price in agriculture in Lithuania



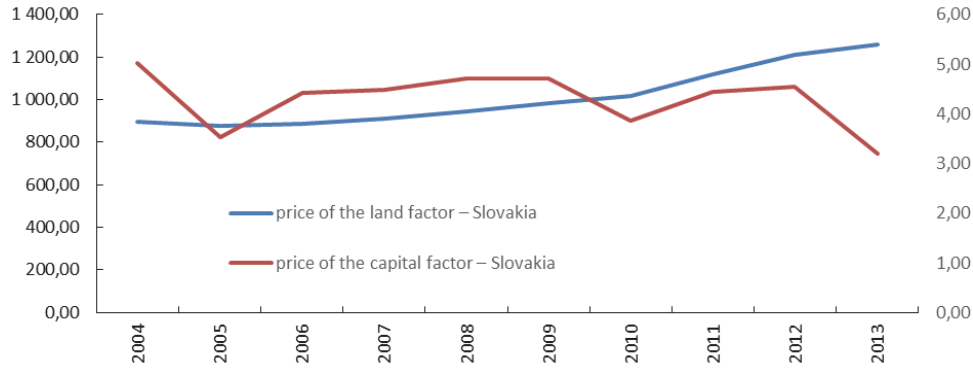
Source: own study based on the Eurostat data.

Figure 17. Land factor price and capital factor price in agriculture in the Netherlands



Source: own study based on the Eurostat data.

Figure 18. Land factor price and capital factor price in agriculture in Slovakia



Source: own study based on the Eurostat data.

Also, in the case of the price relationships of the land and capital factors, the empirical charts obtained are in line with the analytical assumptions and hypotheses derived. As a general rule, the trends in the price changes of both factors are opposite – the time series charts intersect. The reasons should be seen in the same areas and theories as for the price relationships of the capital and land factors.

7.4. Summary and conclusions

In the article, the main focus is on the analytical identification of the exogenous factors, based directly on the theory of microeconomics and production function. It was indicated that the price relationships of the capital, labour and land factors determine the production techniques. Based on the author's model approach, the assumptions were adopted as to the price relationships of these factors and were subsequently empirically verified for the selected EU countries.

Empirical analyses were carried out for the average values of the EU countries and for Poland, Germany, France, Great Britain, Lithuania, the Netherlands and Slovakia. In the case of the first pair of price relationships, we expected the falling price of the capital factor in relation to the price of the labour factor. As to the trends, these assumptions are best illustrated by the time series for the Netherlands, France and Great Britain, and thus the developing countries with a dominant share of the service sector in production. In the case of Hungary and Slovakia, these changes start evolving according to the expectations derived from the theoretical approach only after 2013. Poland is not an exception – the expected trends as to the falling price of the capital factor have been observed since 2009, while the price of the labour factor has been rising since 2008. For the second pair of price relationships: the capital factor and the land factor, we also did not observe any deviations from the derived hypotheses. For each ana-

lysed country, these price scissors “are opening” to the outside of the coordinate system. This is clearly an exogenous determinant of changes in the production techniques implicitly consistent with the views contained in the literature. It must also be added that the the second endogenous determinant of changes in the production techniques are changes in the productivity of the production factors. These are issues to be discussed on a different occasion.

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8. Effects of direct payments on agricultural development in Bulgaria

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Abstract

The CAP policy in Bulgaria during these 10 years reveals difficulties in handling the current national problems in agriculture in terms of market, production and structure. A strongly adaptive behaviour is observed among producers in making their management and production decisions stuck and oriented to the policy and the financial support. During the last years the gross agricultural production in Bulgaria amounts to threefold lower compared to the average level in the EU-27. These low values reveal the big issue in Bulgarian agriculture and raise the question about the efficiency of the policy and the benefits for the society. The goal of the paper is to analyse some of direct payments effects on agricultural output, value added, production costs, land structure and rent. It turns out that the CAP is the policy adjusted better to the old Member States, which can be explained by the historical development approach. The direct payments, based on area, distort the allocation of resources and do not generate adequate growth entailing higher productivity, bigger employment and labour remuneration, better market stability and competitiveness.

Keywords: CAP, agriculture, direct payments, gross agricultural output, farm incomes

JEL codes: Q18, C01, E23

8.1. Introduction

Agriculture, as part of the country's economy, contributes to the general economic development and benefits from the latter. Until the beginning of the new millennium it formed more than 10% of Gross Value Added and GDP of the country. GDP has grown in real terms, amounting to BGN 88 billion (about EUR 45 billion) in 2015 and exceeding 3% in 2016. The growth of GDP after 2009 fluctuates within 2% and the reasons for that lie in both the domestic economic environment and the slowly recovering European economy. Agriculture has started to gradually lose its positions in the total value added after 2000. The share of the agricultural sector after 2007 has dropped down to 5%. According to Bachev et al. [2017], the minor increase in the GVA of the Bulgarian agriculture

and the small rate of investment growth affects its long-term economic sustainability negatively. This drop is not due to the absolute decrease in production and value added of the sector, but due to more rapid economic growth in the economy, mostly in the tertiary sector – services, which forms 65% of GAV of the country.

The state of the gross output and GAV in agriculture is a direct function of the production structure, which during the observed period has changed considerably with the share of crop production growing substantially at the expense of livestock breeding. In 2016 crop production accounts for 70% of GAV in agriculture, and livestock breeding for 25%, the remaining 5% being formed by agricultural services. For the sake of comparison, at the beginning of the century, livestock breeding was responsible for 50%, and crop production for ca. 45% of GAV. The situation is rapidly changing and a major role is played by the implementation of the Common Agricultural Policy, whereby the financial support is based on area. Thus, the increase in the size of the area with field crops – cereals, oilseeds – is affected the most by the subsidies received [Sokolova et al., 2015]. The most significant decrease in GAV of the agricultural sector is observed for vegetables the share of which has dropped from 12% in 2007 to 4% in 2016, and this production has suffered the greatest losses as a result of changes in the policy. Regardless of the fact that vegetable production uses land as an immediate production factor due to production specifics, market uncertainty, organizational problems and last, but not least, the high demand for land for the development of consolidated grain production, this sector shrinks constantly. According to Sokolova et al. [2015], reduction in the areas occupied by intensive type of production (vegetables and permanent crops) are influenced less by the subsidies and although they have some sustaining affect, the role of market and price fluctuations is stronger.

Table 1. Distribution of direct payments

DP Topic/Schemes	**2007-2013**	**2014-2020**
Total 1st pillar envelop (EUR billion)	EUR 2.5	EUR 5.3
SAPS / BP	97%	45%
Top-ups support / National transitional support (EUR billion)	EUR 0.6	EUR 0.3
Greening	No	30%
VCS	3%	15% (13% + 2%)
YFS	No	0.5%
SFS	No	Yes (EUR 500 per ha)
Redistributive payment	No	7,9% (EUR76/ha)

Source: Payment Agency.

The direct payments in Bulgaria have been implemented since 2007, as due to the accession provisions, Bulgaria similar to other New Member States started as of 25% out of the national financial package set up for 2016 by a progressive rate of annual increase. At the EU level, the direct payments constitute 72% of the CAP budget, while in Bulgaria during the first programing period (2007-2013), their share accounted for about 50%. Direct payments are granted to farmers in the form of a basic income support based on the number of hectares farmed. In Bulgaria as the other NMS, the direct payments are allocated as Single Area Payment Scheme (SAPS), which is different from the old Member States, where the Single Payment Scheme (SPS) is implemented. Because of the lack of historical data, the payments per area in Bulgaria are equal regardless of the type of production, whereas in the old Member States, the entitlements have different payments based on historical support received by beneficiaries. It makes the differences between the SAPS and SPS, which in Bulgarian conditions leads to a unfavourable structural distortion giving advantages to low-cost productions contrarily to high-cost but higher added value sectors.

According to Ivanov et al. [2017], it turns out that the direct payments improve the situation for grain producers, with subsidies covering 20-30% of production expenses, and minimize the possible losses in case of adverse events – low average yields (production risk), low prices (price risk), marketing difficulties (market risk). At the same time, the SAPS offers merely 3-5% of the production costs incurred in the intensive vegetable and fruit sectors, which inevitably sends signals and engenders advantages to those productions, where the level of subsidies in the costs is higher compared with all others. The increase in area with field crops is strongly affected by the subsidies, and the producers have more incentives to engage in such a production compared to stimulus found in the intensive agricultural cropping [Ivanov et al., 2017].

Along with the effects of direct payments on the agricultural production pattern, the direct payments have an impact on the development of the farm structure. The farm structure is also important, affecting the economic accounts in agriculture. From an economic point of view, the successful run of the grain and oilseed farming demands relatively huge land sizes to achieve economy of scale, which brings about consolidation and concentration of land in large agricultural farms.

Thus, the decoupled payments create advantages for the field crops mainly grain and oilseeds which leads to concentration of land in large holdings driven by economic reasons eventuating in disproportion in subsidy allocation. The disparities in the distribution of these financial resources proved to be a serious issue during the past ten years – a great number of farms receive direct payments of small total value. It is identified that 83% of the beneficiaries receive 12% of

the direct payments per area. This group usually includes farms of small size or such engaged in the intensive sectors of agriculture – vegetable production and animal breeding. The number of farms receiving more than EUR 100 000, is small – 0.2% in 2008, and 1.3% – in 2015. The beneficiaries belonging to this group received 16.8% of the payments per area in 2008, and in 2015 this percentage increased considerably up to 44.2% of all decoupled payments.

Since the direct payments are based on areas owned by agricultural holders it can be argued that a great part of the farms falling into the category of agricultural holdings receiving up to EUR 5000 EUR are exactly small size farms. The payments thought to support the incomes of farmers, i.e. to support predominantly those farmers who need funding to stand in agriculture get actually less and the major part of subsidies are granted to farms, which have the capacity to maintain their activities and to generate incomes without so generous public aid.

In the new programimg period 2014-2020 an attempt was made to address the disparity problems by introducing mechanisms directed to a fairer distribution of direct payments, such as the Redistributive Payment Scheme (RPS) and capping of payments above EUR 300 000 per beneficiary. These measures yield certain results. Regardless of that the effect of RPS is smaller than expected and it cannot eliminate the differentiation in the support, which is due to the decoupled payment support and the equal payment per area.

8.2. Methodology

The goal of the paper is to analyse direct payment effects on agricultural output, value added, production costs, agricultural industry patterns and to make comparative scenarios. Every time, we are at the stage of a new programing period, the analysts, experts, researchers consider what will be the effects on production, farmers' incomes and prices if the subsidies are stopped. There is a lot of criticism on the agricultural subsidizing, particularly outside the EU, from the developed countries and other transnational organizations, such as: FAO, OECD, World Bank, etc. [Milner and Morgan, 2004; Matthews, 2015]. At the beginning of the current CAP, the European Commission [2011] rolled out an assessment scenario report, where in compared 4 scenarios of future policy, one which was called refocus scenario representing a variant where the direct payments are abolished and thoroughly transferred to the 2nd pillar, demonstrated that farmers' incomes, labour remuneration, net value added would be the most affected.

In this study, two scenarios were explored and run – status quo scenario, where the elaborated model was simulated, the main goal of this procedure was to adjust the model to the least error exposure and to elicit the adjustments. The active scenario is a scenario without direct payments, which means all SAPS payments,

top-up payments are not allocated to Bulgarian agriculture after the accession to the EU. The scenario without direct payments is projected as in the model without direct payments, those payments are excluded from the gross return but other circumstances are envisaged as the status quo scenario. It means that the EU membership is a fact, the EU has and implements direct payments, the 2nd pillar exists, the investments and fixed capital formation is not changed due to direct payments.

The model projects the productivity in the crop and livestock farming, and the area and herd size, as those variables are driven by the economic results and profitability, assuming equal state of disposable fixed assets in either scenarios. The major industries in crop and livestock are modelled separately along with the major cost groups. The results from the analysis are bound to calculate the Gross Agricultural Output (GAO), Gross Value Added (GVA) and Intermediate Costs (IC), as the items consisting in these macro-economic indicators are modelled by the gross return. The model is formed based on the historical data for 1998-2016, as the goal is to reveal changes in the scenario without direct payments in the period covering the EU membership 2007-2016.

As regards the study objectives and the data available, the model works with the reference average to 2000-2006. On the other hand, the elasticity is derived endogenously through iterations, as those elasticity coefficients are selected, where the model residuals fit the least error. There are various ways to calculate the elasticity, as because of the goal to compare the results from both scenarios and the importance to minimize the error, the elasticity coefficients are tuned to the lowest residuals occurred in the status quo scenario. Along with the elasticity, the adjustment factors are another crucial element of the model setup. The adjustments in the non-direct payment scenario are transplanted from the status quo scenario. It is considered relevant because this scenario is the control one and when the same adjustments are arrayed in the active scenario it makes sure the bias of the results is precluded.

The model is set up by a system of 2 groups of equations. The first group is the production output equations, where in both scenarios the main agricultural industries in Bulgaria are modelled: in crop farming (5 sectors), and in livestock (6 sectors). The basic equation that is used is:

$$El_{PO} = f(Trend; \frac{TR}{IC}) \quad (1)$$

where El_{PO} are the elements of the production output – production area, livestock herds and the yields. The production output itself is an estimation of:

$$PO = Area(Herds) * Yield \quad (2)$$

where the previously modelled elements of production output make up the latter. The TR represents the total revenues from the particular industry, which is composed of the production output and the direct payment received. Thus, the direct payments added to the TR make the difference between status quo and non-DP scenario in the study. In the different models, which estimate the development of agriculture under various scenarios the direct payments are assumed as an underlying factor for production decision-making, where the marginal principles are the primary criteria for equilibrium. According to Binfield et al. [2004], in the model where the Single Farm Payments (SFPs), which are counterpart of the SAPS, are assumed to be partially decoupled – one EUR of SFP is assumed to have the same impact on production as EUR 0.3 of coupled payments. It shows the different approach in judging the impact from decoupled payments, while in this paper, all direct payments are tallied up by their real amount.

The second group of equations is founded to model the intermediate costs. Those costs represent the variable (production) costs, which are incurred directly in the production process. The assumption in modelling the production costs is that direct payments entail their increase. It is substantiated by the theory that the direct payments foster up the demand for production input causing an increase in the costs. Thus, the difference between both scenarios is that intermediate costs in the non-direct payment scenario would be less than the status quo one. The calculation of the considered less production costs in the non direct payment scenario are determined using the dispersion method [Solnik et al., 1996], which is modified and adjusted by CAPA [Ivanov et al., 2017].

$$CD = \sum_{i=1}^{n} \left[\frac{SU_I / SU_{AV}}{IN_I / IN_{AV}} \right] / N \tag{3}$$

The above equation is designated to calculate the coefficient of determination (CD) among the two variables – subsidies and inputs. The estimation calculatesthe dispersion between internal dispersion of the annual direct payments per hectare (SUI) to the average payments within the period (SUAV) and internal dispersion of the annual input indexes to the average input index over the covered period (INAV). The sum of the coefficients of determination (CD) is divided to all years in the sample (N). The *CD* is braced in the range of 0-1, as high, it is so the changes in the dispersion of both variables are connected and synchronized.

$$CD_{AD} = \frac{CD}{1 + \frac{\sum_{k=1}^{n} k*(N_k - 1)}{N_k}} \tag{4}$$

where the CD_{AD} is the adjusted coefficient of determination, which is deemed to cope with the multicollinearity and overfitting of the results. In the dispersion

analysis the dependency of the input price indexes by the direct payments and the commodity price indexes are used and both of these variables influence the changes in the input price indexes. The *k* represents the inter-dispersion coefficients (CD) among all variables comprised in the analysis, as in this research the above-mentioned 2 variables are selected.

$$El_{IC} = RV_{IC}^{EL} - \Delta RV_{IC}^{EL} * PI_{IN} * CD_{AD} \quad (5)$$

The above equation is used to estimate the amount of intermediate costs' elements (ElIC) increased by the effect of direct payment introduction, which are subtracted from the non-direct payment scenario. In the equation (5) the input price indexes (PIIN) and the CD_{AD} are taken into account , as the amount of the intermediate costs may increase over time but only increment ascribed to the input price enhancement is considered.

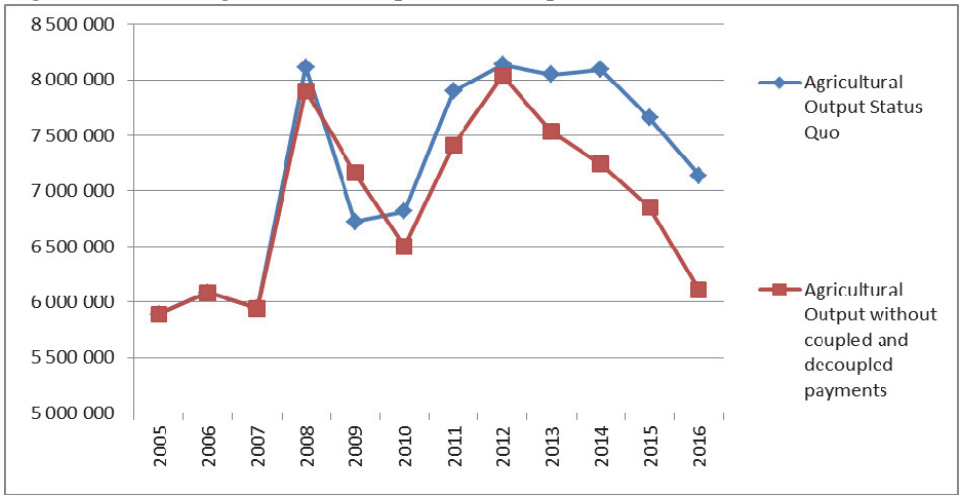
8.3. Results

The analysis of the effects from both scenarios starts with the comparisons of the Gross Agricultural Outputs. Until 2012, the comparison of the evolution of the GAO in both scenarios does not show distinctive differences, as both lines in Figure 1 move in the same direction and stick closely. The direct payments are allocated to farmers as of 2007, but during the first 5-6 years, the contribution of the subsidies is not significant. Moreover, in the years when the GAO drops down in 2009, this indicator in non-DP scenario stands higher than in the status quo one. It is explicated by the restructuring the Bulgarian agriculture, which in the last 20 years loses its production diversification, acquires prevalently a monoculture production pattern, resulting in a declining added value chain.

Besides, regarding the Accession Treaty, the SAPS in Bulgaria is determined to phase in from the level of 25% out of the average financial package and gradually increase to 2016 when it shall attain the average payment per hectare. Thus, the level of support in agriculture in the first few years was relatively low and brought about a limited impact on the dynamic of the agricultural output. It is also deemed that the changes in the policy do not have immediate effect on the production pattern due to the lag effect in the farmers' reaction.

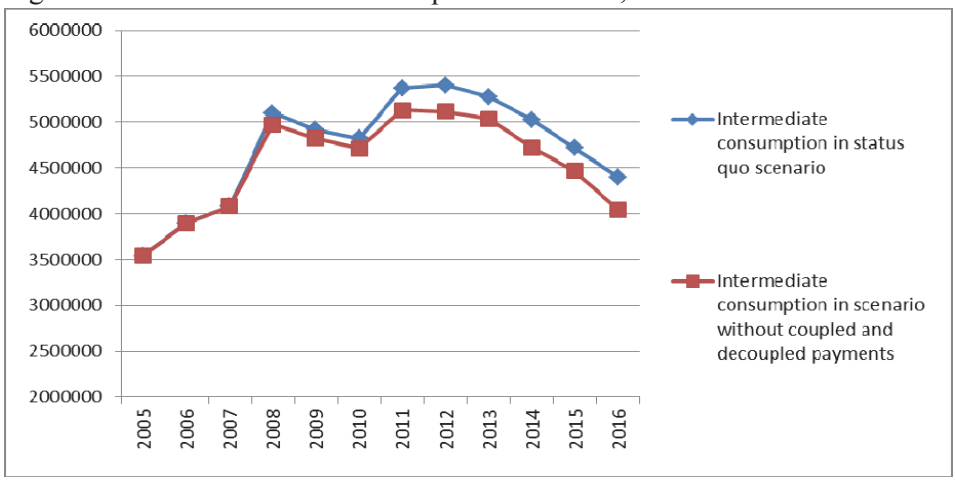
As regards the production costs, it is found that after 2006, those costs soars up significantly, which is attributed to the increased incomes of farmers boosted by direct payment aids. The analysis of the input price index in the agriculture shows that in 2000-2006, the costs index rose up by 31%, while in 2007-2013, it climbed up by 38%.

Figure 1. Gross Agricultural Output – status quo and non-DP, BGN thousad



Source: CAPA, NSI data.

Figure 2. Production costs – status quo and non-DP, 000 BGN



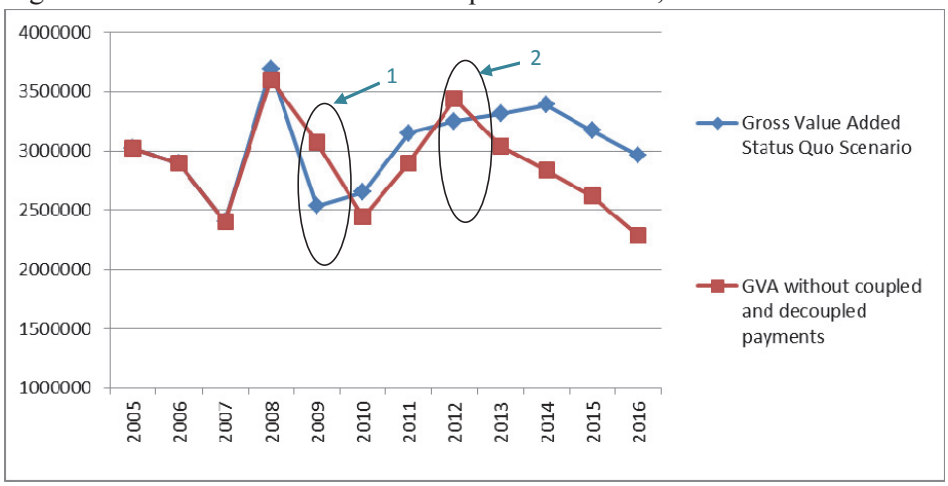
Source: CAPA, NSI data.

In addition, the national GDP during the first period was in average about 7.5%, while in the second one merely 2%. It is well-known fact that high GDP growth projects high cost index, because the growth in the economy is linked with a stronger demand and gears up the prices. The scenario analysis shows that intermediate costs at the non-direct payment variant exceeds the level of the same costs in the status quo one by an average of 4% in the period from 2007 to 2016. There is a clear difference between both scenarios concerning intermediate costs which gradually increase from the beginning of the period and reach their peak

value in 2016. The gap between the scenarios slowly diverges after 2011, which coincides with the notable reduction in the production costs in the last 5 years of the period. The intermediate costs in both scenarios decline, which is attributed to the shrug of the GAO propelled by the agricultural commodity slump after 2013.

The widening divergence of the intermediate costs in the last couple of years in both scenarios goes together with the sharp fall in the agricultural output in the non-DP scenario. Thus, the substantial cut of the input price index in those years, which is due to the oil price drop rolling down the prices of connected inputs contributes to the cost slump in the status quo scenario, whereas the cost differences are explained mostly by the physical reduction in the production rather than the input prices driven up by subsidy effect.

Figure 3. Gross Value Added – status quo and non-DP, BGN thousand

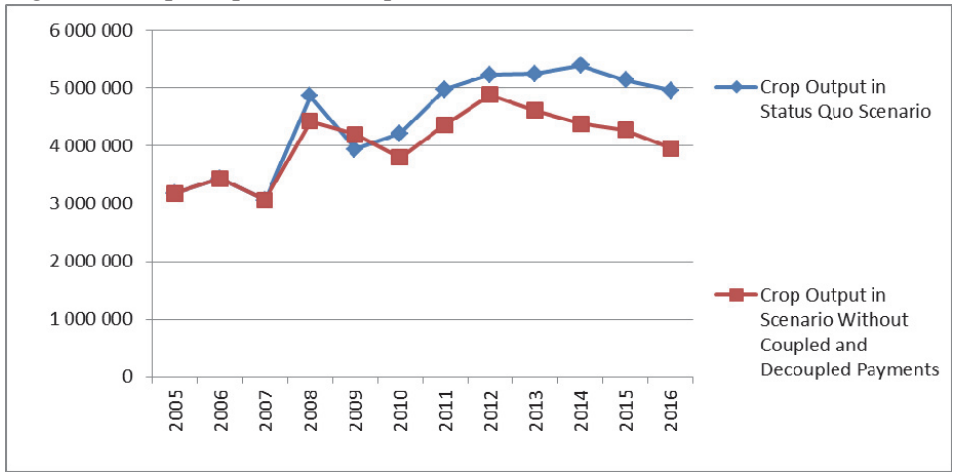


Source: CAPA, NSI data.

The results concerning the GVA in both scenarios manifest a similar movement in 2007-2012, when the differences caused by the DP effects are not identified. Moreover, in 2009 and 2012, the GVA in the non-direct payment scenario outmatches the results from the status quo scenario. In 2009, the gross output from agriculture in non-DP scenario is higher than that in the status quo one, which is explained by low market prices, especially in the crop production, which significantly benefited from the direct payments in the development prospective. In 2012, the prevalence of the non-DP scenario over the status quo one is ascribed to the strengthened prices in the livestock industries (milk and meat), which reinforces the results in the alternative scenario. The relative parity of the GVA at the beginning of the period between the observed scenarios testifies to the subtle effects of subsidies on the added value, productivity and the agricultural growth.

The performance of crop and livestock industries under both scenarios is rather divergent. The crop agriculture benefits from the direct payment and SAPS, and through the whole 10 years' period the status quo scenario demonstrates a higher output value compared to the non-DP scenario. The crop output under non-DP scenario scores a tangible downward after 2012, as the likely reason for it is the abstinence from physical expansion of the crop area, which is seen in the real scenario. The crop production in the status quo scenario develops up, which is driven by the enhanced interest of farmers in this production, where the public support amounts up to 25-30% of the area production costs.

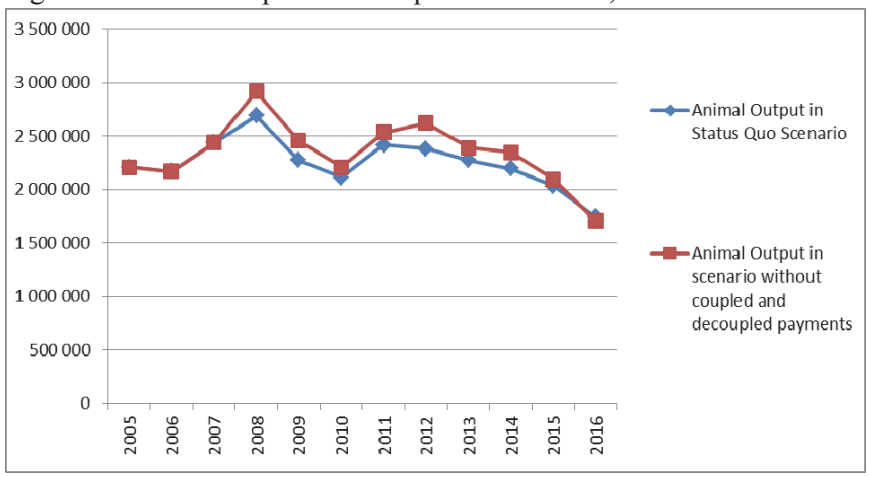
Figure 4. Crop Output – status quo and Non-DP, BGN thousand



Source: CAPA, NSI data.

Regarding the animal output, in contrast to the crop production, it turns out to be affected by the SAPS model of agricultural support. In the previous programing period of 2007-2013, the coupled payments, which are assumed as the main instrument to support the vulnerable sectors, as the dairy and livestock meat sector, was allowed up to 3.5%. The meat sectors, which predominantly run the business without possessing agricultural land, did not have an opportunity to obtain direct payments. In comparison to both scenarios, the animal output in the non-DP maintains constantly higher level of output than the real scenario, which is explicated by the impact of direct payments, which drives up the input price index in the agriculture as well as draws the production interest into sectors where the guaranteed public support is bigger in the cost structure.

Figure 5. Animal Output – status quo and Non-DP, BGN thousand



Source: CAPA, NSI data.

The livestock sector is affected by the established system of decouple support, which rewards farmers based on their acreage not on the value added and risk taken. The livestock sector is subject to increased production costs caused by direct payments and subsides, as the dispersion analysis reveals that about 27% of the price enhancement in the feeding in 2007-2015 period is driven by direct payments. It is said to explain the higher livestock output in the non-DP scenario compared to the status quo one, which at the end of the surveyed period – almost equalized. Of course, the direct payments have an incentive effect on the agricultural development, boosting the demand and interest in the industry and just placing the producers in an environment where others receive subsidies, while a minor part does not get them which will lead in the future to an irreversible reaction. Generally, the animal output in both scenarios converges in the last 2 years of the period, as they converge in a decreasing trend of the output, which again confirms the direct payments and the decoupled form of the aid do not create enough positioning for growth and value chain development.

8.4. Summary and conclusions

The CAP is the dominant policy adjusted better to the old Member States which can be explained by the historical development approach. The CAP policy in Bulgaria during these 10 years reveals difficulties in handling the current national problems in agriculture in terms of market, production and structure. The support under 1st pillar is fruitful for producers, but the effectiveness of the achieved results needs to be enhanced and the negative effects related to the in-

terference with the management and production decisions made by the farmers. The comparative analysis of the elaborated scenarios shows the non-DP and status quo scenarios have similar evolution but different magnitude on the agricultural macro indicators. In the non-DP scenario – the GAO and GAV would have higher levels in the first years but afterwards, they would dropped.

The crop sectors show higher outcomes from the DP implementation compared to livestock. It is substantiated that SAPS gives advantages to land--based farms because regardless of the production costs per hectare on different sectros, the direct payments go to all farmers doing land-generated farming based on a flat-rate. Contrarily to it, the livestock farming – pig and poultry sectors are posed to rising input prices, which is accompanied by no direct support due to decoupled payments based on area and those industries have a shrinking trend. The livestock industries are part of the value chain and play important economic role in utilizing the commodities produced in crop sectors and the unsatisfied situation in the livestock one causes lingering level of added value and the output of crop production, especially in grain and oilseed sectors cannot remain in the domestic economy and must be exported.

The problem of low agricultural added value stemmed at the low value added per unit of agricultural and arable land. In recent years, Gross Agricultural Output in Bulgaria is estimated at around 3 times lower than the EU-27 average. Those numbers and findings reveal the crucial challenge in Bulgarian agriculture and explain why the low levels of added value are due to weaknesses of the sector, rather than the faster and more surpassing development of secondary and tertiary industries of the economy. The direct payments are income stability instrument but demonstrate little effect on creating added value, which is considered as a significant disadvantage. The added value is thought as an ultimate goal needed to achieve in Bulgarian agriculture, because it is the most robust instrument to create jobs, lift up incomes, generate revenues, improve competitiveness and provide resilience of the agriculture.

However, it is noticed that there is an adaptive behaviour of producers to support policy rather than the market signals. It is illustrated by the depressed development in the livestock sector and the moderate level of the GAV, as due to equal payment per hectare, producers are bound to crop production where the subsides account for higher share in the intermediate costs. It is also found that the introduction of higher coupled support after 2014 as a result of policy changes backs up intensive sectors and fits even better from added value point of view. In the status quo scenario, the GAO and GAV in the last 3 years decline due to market price drop but this slump is less compared to alternative non-DP scenario. It can be concluded that decoupled support is not efficient enough apart from income contribu-

tion. It cannot create the growth and the productivity, which is crucial for the competitiveness of Bulgarian agriculture. Therefore for the future, it is thought that decoupled payment system and SAPS should be re-considered in the CAP post-2020 to adjust to the need and to overhaul the weaknesses of the current policy. The last communication of the European Commission [2017] "The Future of Food and Farming" envisages a new delivery system and simpler CAP, where the Member States will set up strategic plans, which will bring more flexibility of the policy framework, hence facilitating the national interest and needs in the agriculture.

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9. Re-adjusting risk management within the CAP: evidences on the implementation of the Income Stabilisation Tool in Italy

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Abstract

In order to contribute to the literature on the Income Stabilisation Tool (IST), this study investigates which is the better geographical dimension of a sector--specific instrument. In particular, the study focuses on Italian farms specialised in viticulture over the period of 2011-2014, estimating their income losses, the level of indemnification and the average fee due to farmers. We also compare the hypothesis of both a national IST and five different macro-regional funds, considering the threshold for indemnification at 30% and 20%. Results suggest a strategy to establish a double mechanism where macro-regional funds can guarantee more tailored fees for farmers (specific for different geographical areas and level of riskiness), whereas a national IST, being able to reduce the systemic risk and the variability of income losses more than smaller funds, can provide resources for the compensation of farm losses, in case of insolvency.

Keywords: income risk assessment, Income Stabilisation Tool (IST), Common Agricultural Policy, farm economic sustainability, viticulture, Italy

JEL codes: G32, Q12, Q18

9.1. Introduction

Income risk has been increasingly attaining academic relevance in the last years. Indeed, due especially to both the joint volatility of input costs, output price and crop yields at farm level [Chavas, 2011; Tangermann, 2011] and climate change, nowadays Italian agriculture results are extensively exposed to income risks [Anton et al., 2012; Severini et al., 2016], and the viticulture sector also. In addition, literature suggests the role of agricultural policy in influencing the higher exposure to production and market risks that contribute to threaten farmer's viability and sustainability. To this purpose, on the one hand, cross-compliance and agri--environmental schemes in the majority of cases have resulted in augmenting production risks, while promoting less intensive production processes [El Benni et al., 2016]. On the other, it is good to mention the progressive reduction of direct payments over the last years, that represented a sort of guarantee for farmers.

In order to find new solutions to efficiently tackle farm economic risks, the Common Agricultural Policy for 2014-2020 of the European Union provides a new measure called Income Stabilisation Tool (IST) within the rural development policy, that aims at coping with income risks [JEU, 2013a]. In addition to this, the wine sector continues to be included into the Common Market Organization [JEU, 2013b] and also the management of crisis. As opposite to insurances and mutual funds against yield losses, the new IST offers an overall risk coverage for farmers [Pigeon et al., 2012; Finger and El Benni, 2014] in the form of a compensation against income losses beyond 30% over the previous three years. More precisely, the new IST recognizes the establishment of mutual funds by farmers who decide to self-financing their losses in the case of a severe income drop. In particular, these funds represent private initiatives owned by farmers who share common risks and territorial membership. When the loss experienced by the farmer is greater than 30%, compared to the average of the previous three years or the previous five years (excluding the highest and the lowest), such mutual fund provides compensations to farmers for a maximum of 70% of the loss. Subsequently, a contribution up to 65% (of the amount previously paid to farmers) is granted to the fund from the EU compensation. A number of changes to the previous risk management toolkit arose with the so-called "Omnibus Regulation" [JEU, 2017] that, within its agricultural rules package, aims at improving the implementation of the current tools since January 2018. As regards the IST, the main changes are the following: introduction of a new sector-specific IST; reduction of the threshold level for indemnification from 30% to 20%; increase of public support from 65% to 70%; the possibility to cover both the initial assets of the fund and the annual contribution paid by the farmer with public support; finally, implementation of Index-based IST to simplify income losses' calculation. With regard to the implementation of such innovative tool, in 2013 the EU asked Member States to specify the rules to establish and manage the tool. To this purpose, as well as Hungary and Spain (Castilla Y Leon region), Italy applied the IST measure by allocating a total amount of EUR 97 million and providing for a specific national plan. Going beyond the EU borders, it is interesting to note that the IST instrument also attracted the interest of Switzerland, as suggested by El Benni et al. [2016]. Up to now, this instrument is still not available in Italy; in the current scenario, the limited availability of information on real farm income is found to be the most relevant reason preventing the IST to be operational [MIPAAF, 2015]. Although it does not exist yet, the potential beneficiaries represent a prominent number in Italy. To this end, Trestini et al. [2017a] found a positive relationship between the variability of value added loss of wine growers and many characteristic features of Italian

traditional viticulture areas as big farm size (UAA) and high altimetry (mountain and hill). In 2016 a Ministerial Decree[11] in Italy has ratified some main operative features[12] of the IST, representing a first step toward its implementation. To sum up, contrary to the already established voluntary basis for farmers' participation and the sector-specific nature of the IST, any precise decision in relation to the IST geographical dimension exists [Finco et al., 2013; Capitanio et al., 2016], at the best of our knowledge; thus, this current knowledge-related gap existing in Italy leaves room for this research.

Comparing a hypothetical national and five different macro-regional dimensions of the IST, this study examines the differences between these funds and their riskiness, in order to check which kind of territorial dimension could guarantee better performances, based on farm information observed during the period from 2008 to 2014. To this purpose, both the level of income loss and the indemnification of wine growers in Italy have been analysed, comparing the establishment of a national and five different (related to five macro-regions) IST mechanisms, considering the threshold fixed at both 30% and 20%. Although its better performance compared to other farm types [Trestini et al., 2017b], as many other sectors also the viticulture sector faced income risks and losses in Italy in the last years; hence, this justifies the choice to study a specific IST for wine growers in this work.

9.2. Data and methodology

A FADN dataset related to Italian farms specialised in viticulture provided data for the analysis. This study represents an assessment of income losses at both territorial and corporate level, referring to a constant sample of 325 farms within the observed time interval that is 2008-2014. In accordance with Regulation of the EU No. 1305/2013 on Rural Development, the value added (VA) based on individual farm data was used as an indicator of income loss, being calculated as the sum of farm total revenues and public payments (i.e. direct payments) minus costs for external factors. In order to calculate the reference parameters to estimate farmer compensation from the IST, we calculated the average VA per hectare of the previous three years for each year and each farm.

[11] G.U. n. 141/2016, art. 10

[12] In particular, it provides clear information about: voluntary nature of participation; nature of the initial capital of the fund (voluntary payments by farmers); duration of the fund (minimum five years) and fund membership (minimum of three years); indemnification rules; minimum requirements for fund establishment (minimum 150 farmers or 50 farmers with a total turnover of more than EUR 10 million); nature of the subjects responsible for establishing and managing the mutual fund (agricultural cooperatives and consortia, producers' organizations and associations, etc.); duration of the income protection (one year for income protection funds and less than one year for funds related to climate and environmental risks).

From this it follows that we obtained a four-year observable period (2011-2014) to estimate the indemnification that Italian farms would have received through IST. Afterwards, we compared this reference VA to the actual VA for each year from 2011 to 2014, in order to estimate the loss and to verify the existence of a severe income drop (i.e. greater than 30% and 20%) to justify the indemnification from the fund. Based on a total of 1300 usable observations, we estimated the average indemnification on annual basis in each sample, i.e. the 70% of farm loss, and the average membership fee. The fee was calculated both as a percentage on the reference VA and in EUR/ha for each farm. Moreover, we considered and operational national IST (ITALY) and the following five different funds, related to five Italian macro-regions (MRs): North-East (NE); North-West (NW); Central Italy (CEN); South (SOU); Islands (ISL).

Table 1. Descriptive statistics of different IST-related samples, 2014

		ITALY	NW	NE	CEN	SOU	ISL
No. farms		325	133	103	17	52	15
Gender (% of farms)	female	20	20	12	47	18	60
	male	80	80	88	53	83	40
Altimetry (% of farms)	hill	69	94	27	100	68	87
	mountain	15	5	42	-	2	-
	lowland	16	1	31	-	30	13
UAA (ha)		11.9	10.8	9.5	12.8	13.1	33.1
Average farm revenues per hectare (EUR/ha)		11 284	11 614	14 247	5342	8861	10 737
Average EU payment per hectare (EUR/ha)		132	78	182	151	162	134
Average costs for external factors per hectare		3513	3715	5210	1871	2419	1947
Average value added (VA) per hectare (EUR/ha)		7903	7977	9219	3621	6604	8924

MACRO-REGIONAL SAMPLES (MRs)	**REGIONS**
North-West (NW)	Piemonte, Lombardia, Valle D'Aosta, Liguria
North-East (NE)	Veneto, Friuli Venezia Giulia, Trentino, Alto Adige, Emilia-Romagna
Central Italy (CEN)	Umbria, Toscana, Marche
South of Italy (SOU)	Abruzzo, Campania, Basilicata, Puglia, Molise
Islands (ISL)	Sardegna, Sicilia

Source: own elaboration, 2017.

Table 1 reports some main descriptive statistics related to each IST sample. The lack of data related to two Italian regions, i.e. Lazio and Calabria, prevented to consider regionally tailored ISTs in Italy. To test whether the variability of farm VA was significantly different or not among the above mentioned five MRs, a t-test for equality of means at 5% significance level was used, considering the standard deviation as indicator of variability[13]. Furthermore, we considered losses referring to both the 30% and the 20% threshold: as before mentioned, the latter is currently provided for sector-specific ISTs, according to Regulation EU No. 2393/2017. Finally, we tested differences in terms of income variability among all the considered samples and years.

[13] This was standardized dividing it by the 7 year average, representing a coefficient of variation.

9.3. Results

Evidences from Table 2 support the choice to consider different macro-regional samples as, for instance, the variability of farm VA between macro-regions significantly differs over the considered seven years, with the exception of the pair-wise comparison between NW and CEN. This reveals that both the level of farm riskiness and the relative compensation from the fund differ and, based on this, also the fee that farmers from different geographical areas have to pay in order to become IST members.

Table 2. t-test for equality of mean values linked to the coefficient of variation (C.I. 0.95) of value added (VA) and comparison among couples of macro--regional samples

	NW	NE	CEN	SOU	No. farms	Mean	Std. Dev.
NW					133	.530	.413
NE	0.167***				103	.363	.221
CEN	0.074	-0.093			17	.456	.273
SOU	0.169***	0.002	0.095		57	.361	.134
ISL	0.179**	0.012	0.105	0.01	15	.351	.163

Note: * p < 0.1; ** p < 0.05; *** p < 0.01.
Source: own elaboration, 2017.

Table 3. Farms (number and %) with income loss greater than 30% and average indemnification, 2011-14

IST dimension (sample)	Variable	Threshold 30%				
		2011	2012	2013	2014	'11-'14
ITALY (N = 325)	No. of farms with income loss greater than 30%	62	61	46	74	
	% Farms with income loss greater than threshold	19%	19%	14%	23%	
	Average indemnification per farm (EUR/ha)	4822	3035	5026	2677	3851
NW (N = 133)	No. of farms with income loss greater than 30%	37	30	26	27	
	% Farms with income loss greater than threshold	28%	23%	20%	20%	
	Average indemnification per farm (EUR/ha)	7241	4406	8188	3694	6094
NE (N = 103)	No. of farms with income loss greater than 30%	16	20	10	30	
	% Farms with income loss greater than threshold	16%	19%	10%	29%	
	Average indemnification per farm (EUR/ha)	2228	2285	5233	2615	3050
CEN (N = 17)	No. of farms with income loss greater than 30%	5	4	4	5	
	% Farms with income loss greater than threshold	29%	24%	24%	29%	
	Average indemnification per farm (EUR/ha)	4813	3186	2679	4663	3746
SOU (N = 57)	No. of farms with income loss greater than 30%	3	4	2	9	
	% Farms with income loss greater than threshold	5%	7%	4%	16%	
	Average indemnification per farm (EUR/ha)	2845	1868	526	1087	1882
ISL (N = 15)	No. of farms with income loss greater than 30%	2	3	4	3	
	% Farms with income loss greater than threshold	13%	20%	27%	20%	
	Average indemnification per farm (EUR/ha)	1579	1613	384	1138	1139

Source: own elaboration, 2017.

Table 3 and Table 4 show that the percentage of farms of the national sample who experienced losses higher than the threshold (both 30% and 20%) has registered a general increase in 2014, as for MRs samples but with the ex-

ception of NW. Generally speaking, when comparing the two levels of threshold, we find the same trend related to the number of farms with income drop, although the percentage is greater when dealing with the lower threshold (20%), as considered by the Omnibus Regulation.

Table 4. Farms (number and %) with income loss greater than 20% and average indemnification, 2011-14

IST dimension (sample)	Variable	Threshold 20%				
		2011	2012	2013	2014	'11-'14
ITALY (N = 325)	No. of farms with income loss greater than 20%	98	85	69	99	
	% Farms with income loss greater than threshold	30%	26%	21%	30%	
	Average indemnification per farm (EUR/ha)	3632	2672	4077	2479	3186
NW (N = 133)	No. of farms with income loss greater than 20%	49	40	34	34	
	% Farms with income loss greater than threshold	37%	30%	26%	26%	
	Average indemnification per farm (EUR/ha)	5963	3780	7237	3163	5154
NE (N = 103)	No. of farms with income loss greater than 20%	31	30	20	37	
	% Farms with income loss greater than threshold	30%	29%	19%	36%	
	Average indemnification per farm (EUR/ha)	1993	1614	3278	2506	2425
CEN (N = 17)	No. of farms with income loss greater than 20%	6	4	4	8	
	% Farms with income loss greater than threshold	35%	24%	24%	47%	
	Average indemnification per farm (EUR/ha)	3839	3186	2679	3263	3016
SOU (N = 57)	No. of farms with income loss greater than 20%	7	7	6	15	
	% Farms with income loss greater than threshold	12%	12%	11%	26%	
	Average indemnification per farm (EUR/ha)	2136	2529	986	2054	2173
ISL (N = 15)	No. of farms with income loss greater than 20%	6	4	5	5	
	% Farms with income loss greater than threshold	40%	27%	33%	33%	
	Average indemnification per farm (EUR/ha)	987	1596	384	1037	989

Source: own elaboration, 2017.

Compared to other MRs (i.e. NE, CEN, SOU and ISL), the average indemnity payment per hectare is found to be greater for farms in NW within the observed period 2011-2014, both when we consider the threshold of 30% (EUR 6094 per ha) and 20% (EUR 5154 per ha). This is due to the fact that, while reducing the threshold, the indemnification becomes higher whereas the number of hectares remains constant into the same sample. In addition, the average compensation per hectare in NW is also significantly greater than what found for the national IST (EUR 3851 per ha and EUR 3186 per ha, for the 30% and 20%, respectively), suggesting that the variability of farm VA is reduced when considering a unique national fund in Italy, instead of many macro-regional ISTs. Indeed, compared to a smaller fund, a national IST could contribute to face systemic risk[14] [Ramsey and Santeramo, 2017] by including geographical heterogeneity, albeit requiring high transaction costs due mainly to information asymmetry problems (e.g. moral hazard).

[14] Systemic risk represents a large financial risk due to highly correlated losses and exists when many farmers are exposed to the same risk in the same moment; notoriously, it can make the fund being insolvent when it has to compensate farmers with severe income drops.

Table 5. Average fee for farmers with income drop above 30% threshold, 2011-14

IST dimension (sample)	Variable	Threshold 30%					C.V. (%)	Max. Dev. from mean level (%)
		2011	2012	2013	2014	'11-'14		
ITALY (N=325)	Average fee on reference VA (%)	12.0	8.1	12.8	7.8	10.2	25.5	25.6
	Average fee per hectare (EUR/ha)	1006	618	1048	647	822	27.6	27.2
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	352	216	367	227	288		
NW (N=133)	Average fee on reference VA (%)	19.4	11.7	22.9	8.1	15.8	43.9	45.7
	Average fee per hectare (EUR/ha)	1894	1033	2001	655	1400	47.1	43.1
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	663	361	700	229	490		
NE (N=103)	Average fee on reference VA (%)	4.0	3.3	9.3	10.1	7.1	52.7	44.9
	Average fee per hectare (EUR/ha)	290	239	814	961	600	63.4	62.7
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	101	84	285	336	210		
CEN (N=17)	Average fee on reference VA (%)	27.7	20.8	22.4	32.4	25.6	20.5	26.3
	Average fee per hectare (EUR/ha)	1600	1067	1027	1234	1234	21.2	29.7
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	560	373	360	432	432		
SOU (N=57)	Average fee on reference VA (%)	4.6	3.1	0.1	1.8	2.4	79.7	91.7
	Average fee per hectare (EUR/ha)	379	222	7	147	178	82.1	106.5
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	133	78	3	51	62		
ISL (N=15)	Average fee on reference VA (%)	4.90	9.60	2.10	4.10	5.00	61.4	88.9
	Average fee per hectare (EUR/ha)	418	632	140	312	371	54.8	69.5
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	146	221	49	109	130		

Source: own elaboration, 2017.

As shown in Table 5 and 6, the fee that is up to farmers in order to participate to IST is different according to the geographical sample we consider (i.e. national or macro-regional ISTs), and the fee reflects a different level of compensation and risk between different areas in Italy. Along the four-year period from 2011 to 2014 and among the different MRs, the average fee (calculated on the reference VA for each farm) is higher for farms belonging to CEN, followed by NW, both when considering the threshold at 30% (25.6% for CEN and 15.8% for NW, respectively) and 20% (26.2% and 16.7%, respectively). In addition, when comparing the two northern macro-regions (NE and NW), which are also the largest in terms of number of sample farms, it is possible to see that the average fee is always lower in NE (7.1% and 8.2%) than in NW (15.8% and 16.7%). Analyzing the average fee per hectare along the four years, on average we note that, compared to the other MRs, this is higher in NW (EUR 1400 per ha with threshold at 30% and EUR 1480 per ha with threshold at 20%), followed by CEN (EUR 1234 per ha and EUR 1236 per ha, respectively).

Table 6. Average fee for farmers with income drop above 20% threshold, 2011-14

IST dimension (sample)	Variable	Threshold 20%					C.V (%)	Max. Dev. from mean level (%)
		2011	2012	2013	2014	'11-'14		
ITALY (N=325)	Average fee on reference VA (%)	12.9	10.1	13.5	9.6	11.6	17.0	16.5
	Average fee per hectare (EUR/ha)	1090	772	1048	8.09	932	17.8	16.3
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	381	270	367	283	326		
NW (N=133)	Average fee on reference VA (%)	20.4	12.4	23.6	9.3	16.7	40.7	42.0
	Average fee per hectare (EUR/ha)	1993	1033	2088	737	1480	46.4	41.6
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	698	361	731	258	518		
NE (N=103)	Average fee on reference VA (%)	5.5	5.1	10.4	10.5	8.2	37.8	29.2
	Average fee per hectare (EUR/ha)	434	399	904	961	696	44.4	39.3
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	152	140	317	336	244		
CEN (N=17)	Average fee on reference VA (%)	28.1	20.8	22.4	36	26.2	25.6	36.5
	Average fee per hectare (EUR/ha)	1600	1067	1027	1388	1236	21.5	28.7
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	560	373	360	486	433		
SOU (N=57)	Average fee on reference VA (%)	4.8	9.8	0.7	8.4	5.9	68.7	65.8
	Average fee per hectare (EUR/ha)	379	741	73	587	440	64.9	67.6
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	133	259	25	205	154		
ISL (N=15)	Average fee on reference VA (%)	5.8	9.6	2.5	4.2	5.3	54.9	77.8
	Average fee per hectare (EUR/ha)	501	569	140	312	398	50.9	44.9
	Average fee per hectare (EUR/ha) with the EU contribution (65%)	176	199	49	109	139		

Source: own elaboration, 2017.

When considering the threshold at 30%, the average fee per hectare among the MRs ranges from a minimum of EUR 178 per ha (SOU) to a maximum value of EUR 1400 per ha (NW), whereas it amounts to EUR 822 per ha in the Italian sample (i.e., the national IST). Conversely, when considering the 20% threshold, the average fee per hectare ranges from EUR 398 per ha (ISL) to EUR 1480 per ha (NW) and EUR 932 per ha for ITALY. Therefore, in line with Regulation no. 1305/2013, such values are reduced by 65% in the case of public contribution to the fund provided by the EU. With the exception of CEN only when considering the threshold at 30%, the coefficient of variation that has been calculated along the period both for the average fee (%) and the average fee per hectare (calculated by dividing the standard deviation in each year by the average of fees along the four-years) is always lower in the Italian sample (25.5% and 27.6%, respectively, with 30% threshold; 17% and 17.8% with 20% threshold), compared to MRs samples. This shows that the hypothesis of a national IST in Italy would significantly reduce the variability of risk intensity, rather than smaller funds as the macro-regional ISTs analysed in this study.

9.4. Summary and conclusions

The purpose of this research is to explore the more suitable geographical dimension of the IST in Italy, according to both the current rules provided by CAP Regulation on Rural Development and the new rules introduced by the Omnibus Regulation, in the context of the adaptation of the agricultural sector to production and market risks. Because of the absence of IST experiences and the lack of a wide empirical literature on this specific topic, we can only summarize some comments from our findings related to the viticulture sector in Italy. Even if this could increase management costs (mainly against moral hazard risk), the unification of different geographical areas (the five Italian macro-regions in this study) into a single national IST fund could potentially reduce the systemic risk that is notoriously linked to mutual funds; indeed, this could make the level of risk homogeneous among farms that participate in the fund and reduce the variability of income (VA) losses. Our findings justify the establishment of a double national and macro-regional (or regional) IST, in line with the idea that risk diversification can reduce the risk of insolvency. In line with this, a good solution would be to set different fees for farmers belonging to different MRs, so that these reflect area-specific level of risks. In addition, it would be desirable to create also a national fund as this could provide resources in case of local insolvency of MR funds. In this way, the national fund would be more stable against the risk of insolvency, representing a potential buffer for MRs' funds, and could also reduce reinsurance costs. Our results contribute to the current policy debate on the implementation of new publicly funded Income Stabilisation Tools that, in line with the new CAP mid-term review (i.e. Omnibus Regulation), can be also sector-specific. In particular, this research provides useful information to support the design of the more suitable geographical dimension for such new tool. However, the limited number of farms in many MRs (CEN, SOU and ISL) and the short period of time that we observed prevents to consider the investigated sample as representative of the entire population of Italian farms.

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10. Comparison of risk management tools under the CAP of the EU, the US Farm Bill and in the Czech agriculture[15]

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Abstract

It is due to its strong dependence on the market and natural factors, such as weather conditions and extreme weather events or livestock diseases, agriculture is characterized by high exposure to risks. It is the reason for the important role of mitigation of their impacts in the framework of agricultural politics of many countries of the world. The presentation analyses the various systems of risk management tools in the agricultural policy of the EU, the US and the Czech Republic. In the US the support of risk management tools such as the crop and income insurance is the most important part of the policy. In the CAP of the EU, the support for agricultural insurance plays only a minor role and this support is usually applied on the national level. It is also the case of the Czech agriculture, which is characterized by the prevalence of large corporate farms. This structure creates the important barrier for reasonable application of the risk management tools under the RDP for the period bewee 2013 and 2020.

Keywords: risk management, comparative analysis, risk management tools, Common Agriculture Policy of the Eu, US Farm Bill

JEL codes: Q18, Q14, H12, H84

10.1. Introduction

This paper attempts to compare risk management policies applied in the United States' Agricultural Act (Farm Bill), the European Union's Common Agricultural Policy (CAP), and in the Czech Republic on the national level [Vilhelm et al., 2015]. The findings presented in the literature review should contribute to the formulation of requirements for future risk management policy and its effective application in the conditions of the Czech agriculture in the context of the EU's CAP.

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The work draws mainly from the studies by Mathijs [2017] and Cordier [2015], which describe the current agricultural risk management under the EU's CAP for 2014-2020 and the US Farm Bill of 2014. Furthermore, it also makes recommendations for the future formulation of the CAP risk management policy drawing from the above-mentioned studies.

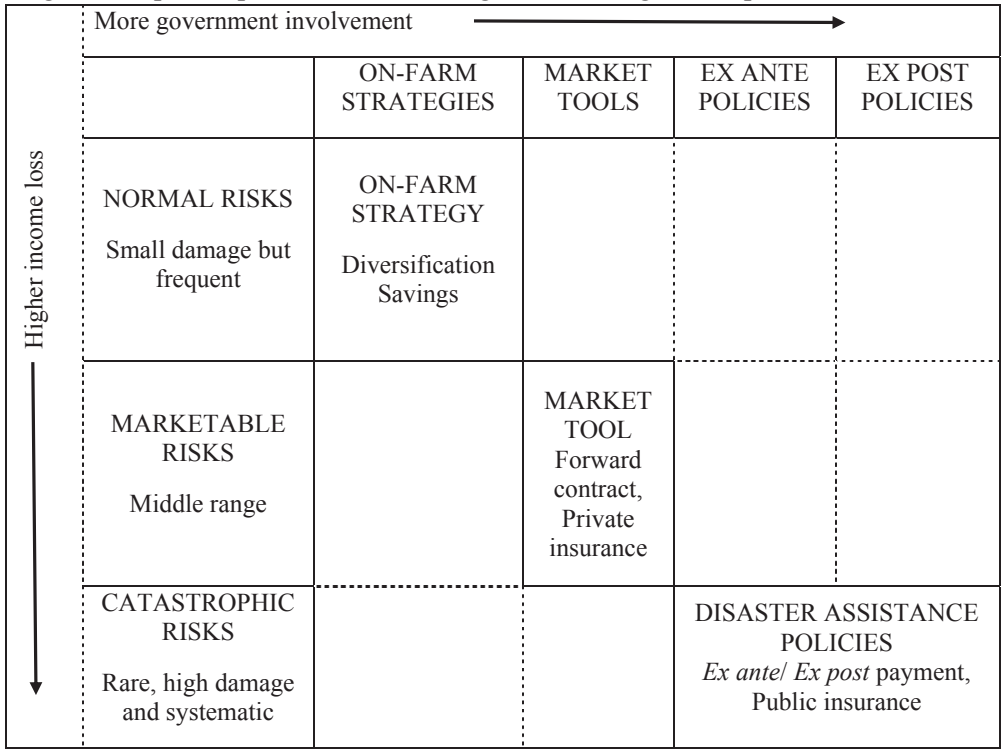
The Common Agricultural Policy (CAP) of the European Union (EU) has historically been undergoing a series of reforms that have contributed to its current form. The current CAP reform after 2020 is likely to bear a gradual reduction in the income support with the intention, e.g. to shift financial resources to risk management systems [Cordier, 2015]. The general market orientation of the European agriculture since the mid-1990s and recent liberalization in the milk (dairy) and sugar sector has put European farmers at increased risk, thus increasing the CAP's demand for more effective price volatility and other risks. The current task is to review and improve the position of farmers in supply chains and to make recommendations such as: to increase market transparency, to make risk management tools more attractive by simplifying loss calculations and the possibility to reimburse and relocate resources from unplanned direct payments to rescue networks for farmers who can use them at a time of market imbalance [Agricultural Markets Task Force, 2016]. The transfer of resources should focus on introducing an integrated risk management strategy at the EU level complementing existing Member States' strategies, not only as a freely defined set of strategies but also as a structured and coherent framework complementing both private and public risk management measures. Such a framework should provide a reasonable response to the various threats posed by producers.

In the US, agricultural policy has seen a shift from direct payments used as a basic supporting tool for agricultural income-generating programmes, both natural and price character. This approach is, therefore, fundamentally different from the approach of agricultural support implemented in the EU's CAP.

10.2. Risks in agriculture

The Organization for Economic Co-operation and Development analyses three layers of risks: high frequency/ low damage normal risks, low frequency/ high damage catastrophic risks, and marketable risks with immediate levels of frequency and damage [OECD, 2011]. Normal risks are managed by farmers as a part of the normal business strategy – small accidents, minor management failures, normal weather volatility. Marketable risks are handled through market tools (insurance, future markets, cooperative arrangements among farmers – with or without support from public sources). Catastrophic risks are handled through market tools with public support or directly by the state through government interventions.

Figure 1. Optimal pattern of risk management strategies and policies



Source: OECD (2011), own processing.

10.3. Risk management policy in the United States Farm Bill 2014

The US agricultural policy is established by the Agriculture Acts. The long-term objectives and priorities were and are ensuring and maintaining food security in the US, ensuring stable income and income for farmers, stabilizing agrarian markets, deepening the relationship to the environment. This law was introduced as the Farm Bill, which sets the US agricultural policy for a five-year period. The Farm Bill is approved by the Congress and the Senate of Representatives. Both producers, consumers, and taxpayers share their views with views of the aforementioned authorities. The first Farm Bill was introduced in 1949 and did not bring any major changes. The programme for food consumption, environmental protection and the recently approved programme on bioenergy has been developed over the last decade [Bureau, 2012].

Programmes focused on selected commodities were shifted from direct payments to two main instruments: Agriculture Risk Coverage (ARC) revenue programme and Price Loss Coverage (PLC) programme. The ARC can be based on coverage of individual or district earnings. Payment is paid out if yields fall below 86% of the benchmark yields. The PLC is a form of a counter-cyclical programme that pays to farmers when market prices fall below a set reference price [Cordier,

2015]. Farmers with the so-called "basic acres" had to choose to register in the ARC or the PLC in 2014. These programmes pay only for basic acres and farmers must respect certain conservation objectives. All in all,75% of base hectares were included in ARC and 22% in PLC [Johansson, 2016]. For dairy farmers, there is a Dairy Margin Protection Plan (DMPP) based on milk prices and feed prices.

Crop insurance programmes include premiums paid by farmers. Each year, farmers can choose the acres to be covered by crops, whether net income (AYP) or gross income (ARP) and coverage. The reference net and gross revenues are set at the district level. These programmes require farmers to comply with the conservation criteria. Most farmers enrolled in the protection of gross income (70.3%) than demand protection of net income (21.0%) [Johansson, 2016].

10.4. Risk management policy of the European Union's CAP

Since 1993, the Common Agricultural Policy has significantly changed its approach to supporting agricultural markets. Strict price and supply controls were replaced by market orientation principles and direct payments. Market measures were maintained, but for most commodities, they are long-term inactive and can be applied in exceptional circumstances. A crisis reserve was set up. Support was provided to insurance and mutual funds. However, these instruments are unevenly used by the Member States [Špička and Vilhelm, 2012]. Despite the new risk management tools mentioned above, the development of recent years was shaken by the crisis period, the agricultural sector so much that doubts arose as to whether the new EU's CAP is capable of coping with market disruption [Cordier, 2015].

Risk management systems in the EU have not yet been established, particularly in terms of income stabilization. Instruments covering natural hazards could, due to their frequent local character, be classified in the second pillar in Regulation (EU) No. 1305/2013 of the European Parliament and of the Council of 17 December 2013 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD). Regulation (EU) No. 1305/2013 of the European Parliament and of the Council in Articles from 36 to 39 presents the measures related to farm risk management. Article 36, equivalent to Article 68 in Council Regulation (EC) No. 73/2009 of 19 January 2009 establishing common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers, deals with risk management in general. The three following articles deal respectively with subsidies for agricultural insurance (Article 37: Crop, animal, and plant insurance) and mutual funds (Article 38: Mutual funds for adverse climatic events, animal and plant diseases, pest infestations and environmental incidents), and with Income stabilization tool (Article 39). However, the management and regulation of price risks are too closely linked to market measures and cannot, therefore, be created, financed and controlled within the framework of subsidiarity.

The main tools are particularly participation in income stabilization programmes, preventive savings or risk reduction due to diversification. The possibilities for intervention for agricultural products are limited, except for products such as fruit and vegetables for which the volatility is extremely high due to natural external causes. The EU's for CAP 2014-2020 has clearly positioned risk management measures in rural development, i.e. in Regulation No. 1305/2013, and no longer on farm income support as was previously the case. The shift is clear, risk management instruments moved from the first to the second pillar. Consequently, they remain as facultative instruments for the MSs. This optional implementation by the MSs will inevitably lead to the discordant development and, probably, economic distortions of this new toolkit. Furthermore, risk management policy is marginal within the text of Regulation No. 1305/2013. Qualitatively, risk management issues do not seem to be a priority for rural development either. In practice, Rural Development Programme (RDP) measures have been implemented in only 13 of more than 100 rural development programmes within the EU.

10.5. Risk management in the Czech Republic

Articles 36-39 of Regulation No. 1305/2013 of the European Parliament and of the Council are not implemented in the Czech Rural Development Programme. It is caused by a criterion for the compensation which requires at least a 30% loss compared to the production average of the last 3 years (or an average of 3 years from the last 5 years with the exclusion of the minimum and maximum), and given the size of the Czech farms (hectare-weighted median[16] of 1100 hectares).

In 2016, agricultural insurance was offered by seven commercial insurance companies in the Czech Republic according to the Report on Agriculture of the Czech Republic in 2016 [Zpráva o stavu zemědělství, 2016]. Agricultural insurance companies offer commercial insurance products such as crop and livestock insurance that relate to selected natural hazards, disease risks, and possibly other risks connected to crop and livestock production. Some risks remain uninsurable in the Czech Republic, in addition to price risks. Those are for example the risks of drought and rain during the harvest period. The interface between insurable and uninsurable risks lies above all in the current supply and purchase demand for products to cover a certain risk and may change over time. As part of the subsidized insurance programme, PGRLF [Subsidiary and Guarantee Agricultural and Forestry Fund) offers support for crop and livestock insurance since 2004. The level of support was maximally 50% of the premium paid for crops or livestock insurance. The aid is granted to agricultural business entities

[16] The hectare-weighted median is calculated by ordering farms from the smallest to the largest and choosing the farm size at the middle hectare. Thus, half of all agricultural land is on farms smaller than the median and the other half is operated by farms greater than the hectare-weighted median.

fulfilling the parameters of a small or medium-sized enterprise. In 2016, nearly 60% of the crop area and about 80% of animals were insured.

The damages caused by uninsurable risks, mainly draught, are usually compensated by *ad hoc* state aid. Consideration is being given to the establishment of the Fund for uninsurable risks, which has already been authorized by the European Commission and the notification is valid until 2022. However, the legislative issues and prerequisites for its functioning have not been satisfactorily resolved.

10.6. Comparative analysis of risk management policies

Agriculture income in the US is historically supported by compensatory payments that tend to stabilize incomes and leave the market to its natural variability. Farmers are responsible for individual price risk management by using time trades as well as engaging in rescue networks. Farm Bill 2014 focuses on *ex ante* risk management tools structured by safety net measures. Fixed direct payments are not implemented.

Table 1. Risk management comparison (the US, the EU, the CZ)

	Area	**EU**	**US**	**CZ**
Weight of policy instruments (%)	Insurance	1%	60%	1.25%
	Safety nets	30%	40%	Approx. 30%
	Income support/ direct payments	60%	0%	Approx. 60%
	Policy	Static-segmented	Dynamic-integrated	Static-segmented
	Budget	Fixed	Flexible	Mostly fixed
	Risk management support	Agricultural income support	Agricultural income risk management	Agricultural income support
Estimated budget weights of programmes within agricultural policies (%)	Risk management support	1%	47%	1%
	Safety nets	5%	23%	2%
	Income support/ direct payments	72%	0%	72%

Source: [Cordier, 2015], own processing.

The EU's CAP 2014-2020 concentrates most of its resources on fixed direct payments – reduces their compensatory role in lowering prices and supporting farm incomes, greening – encourages sustainable agriculture that produces improved public goods (food quality, environment, and measures against climate change).

Safety nets are included, but to a limited extent and with limited financial capacities. The European Union's safety nets and risk management tools are now being defined, implemented and managed separately under the two pillars of the CAP. Table 1 shows the differences between the risk management policies in the EU's CAP, the US Farm Bill, and the Czech Republic.

10.7. Recommendations

Table 2. Recommendations

ISSUES	CRITICAL POINTS	RECOMMENDATIONS / PROPOSALS
The EU public and private partnership	Absence of coordination between public safety nets and private risk management tools	Build on common parameters for defining layers of risk. Improvement of risk valuation and premium pricing
Risk coverage in between "normal" and "catastrophic" risks	Discontinuity between financial and insurance markets	Support of hybrid OTC contracts and insurance policies dealing with price and quantity risks as a "Revenue and/or Income Stabilization Tool"
"Normal" risk coverage	The CAP and MS responsibilities	Support the creation of savings accounts based on DPs in recognizing some taxes as "national co-financing"
Openness to move from constrained principles to applied projects	The administrative process for monitoring innovation. Self-censorship for experimentation	Support field tests as real options on the future of the EU farm risk management. Experience monitoring
Low experience of risk management toolkit	Lack of know-how, lack of adequate database, and lack of organization	Create an experience curve in supporting a structured portfolio of field tests with adequate evaluation
The additive umbrella principle of the EU/MS/region	Restrictive interpretation of international, EU and MS regulations	Remove all current constraints on field tests that could be adjusted later. Flexible interpretation of constraints
Research, development, and training	Investment is required for designing and implementing instruments, creating common parameters, assessing and pricing risks, training and education	Create long-term collaborative networks of European Universities with research and transfer expertise. Develop educational programmes
Financial flexibility	Fixed EU budget and limits of co-financing	Create macro- and micro-flexible funds (EU nested reserve funds and saving accounts) with adequate participative rates of DPs
Regulatory framework	Dichotomy between two pillars, Lack of coordination	Create an EU Risk Agency with adequate goals, capacities, and means
Capacity of implementation	From long-term to short-term objectives of the Agency	Establish strategic goals. Design the potential experience curve

Source: [Cordier 2014].

Recommendations voiced by Mathijs [2017] consider building adaptive capacities which make farms more resilient in undistorted markets. Furthermore, restriction of public support on market measures should be offered only as a temporary support to the costs of producer organizations under the Common Market Organization. Moreover, the authors propose that the EU Risk Management Policy (RMP) should be built on three axes: risk prevention, risk mitigation, and risk coping. The RMP should undergo transformation towards a policy in which most private and public assembled resources are spent on risk prevention and the least on coping with risk. Nevertheless, the share of government spending should be the smallest in prevention and the highest in risk coping. Mitigation should coincide with manageable risks, while risk coping corresponds with catastrophic risks.

Recommendations published in the EP study Comparative analysis of risk management tools supported by the US Farm Bill 2014 and the CAP 2014-2020 by Cordier (2014) consider 10 recommendations – see Table 2.

10.8. Summary and conclusions

Great differences between the US and the EU were evident in the importance of direct payments in the EU and the US policies. These differences evolve from the different farming cultures, approaches and historical development, and economic philosophy. Furthermore, the range of institutional instruments in risk management is more developed in the US than in the EU. The US has been designing and implementing agricultural risk management policies longer than the EU.

In the US, agricultural policy has seen a full shift from direct payments to programmes which secure farm incomes in the event of risks of natural and price cause. This approach is reflected in the design of titles/programmes to support agricultural insurance and income support which is offered to the US farmers. The funds devoted to this policy represent a major part of public spending in the context of the US agriculture. On the contrary, direct payments in the EU's CAP represent vital support for farmers and a certain source of income, regardless of the actual result of their work. Risk management tools in the current period as defined in the Regulation 1305/2013 of the European Parliament and the Council on rural development support offer to the MS limited scope to deploy. Only thirteen RDPs from over one hundred programmes are implemented within the EU Member States. Above all, the European Union's CAP 2020+ should form agricultural risk management strategy with uniform guidelines which take into consideration the individual aspects and specifics of Member States.

The diversity of approaches to risk management in agriculture in the world and the countries of the European Union reflects various risks that farmers face in different countries [Bardaji et al., 2015].

The Czech experience shows that the EU's CAP risk management is little acceptable for the big agricultural corporations. The perception of risks is differ-

ent for big corporations and for family farms [Soliwoda et al., 2017], to which the CAP is primarily targeted.

Risk management policy should address the variability of agricultural income rather than its level. The current risk management setting is too fragmented because it attaches little attention to building long-term resilience while paying too much attention to addressing short-term volatility. Creating resilience involves reducing farmers' exposure to risks. It is necessary to formulate measures compatible with incentives and measures promoting good agricultural technology and soil care. An important principle is a possibility for farmers to decide individually which tools they want to implement.

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11. Factors determining the crop insurance level in Poland taking into account the level of farm subsidising

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Abstract

Despite efforts and pressures on the part of the State, the relatively small percentage of Polish farmers insure their crops. The paper analysed the determinants of taking out crop insurance, using logistic regression and FADN data (2004-2013). The models were estimated for the analysed population and by groups with a different subsidy rate. A novelty is the use of the Horvitz-Thompson estimator which allows us to generalise the results of the models on a national scale.

It was found that crop insurance was mainly determined by received compensation and significant losses in the past yields, as well as by: value of the agricultural production, crop production intensity and soil quality. The results obtained in this part are consistent with the expected utility hypothesis.

The impact of the level of subsidies received by farmers on insurance crop decisions was not confirmed, however, the models assessed for farms with a different subsidy rate point to the importance of subsidies as an income stabilising factor.

Keywords: crop insurance, agriculture subsidisation, income stabilisation, risk management

JEL codes: G22, Q14, G32, G18, Q11

11.1. Introduction

Since 2008, crop insurance in Poland was obligatory for farmers receiving direct payments. Farmers must insure at least 50% of their farmland. The relatively small percentage of insured crops raises the question of what factors determine farmers' decisions on crop insurance.

This problem was noticed by the European Commission [2001, 2006, 2011], as a result of which a possibility of subsidising crop insurance under the Rural Development Programme was introduced, in an amount of up to 65% of the contributions [European Commission, 2013], which was to encourage farm-

ers to join the insurance system and thereby to ensure a sufficiently high participation rate necessary to guarantee the high efficiency of the system.

In Poland, the government did not make use of the opportunities created by the European Commission under the RDP, but also attempted to increase the insurance coverage for the crop production through a nationally-financed subsidy system. In addition, since 2008, crop insurance was obligatory for farmers receiving the EU payments. Almost all Polish farmers are required to insure at least 50% of their farmland. In 2013, however, only 10.8% of the total number of farmers insured their crops in the area accounting for 23.88% of arable land. This happens despite the fact that, according to the Polish law, farmers who do not take out any insurance are required to pay a penalty of EUR 2 per ha. The penalty is relatively small when compared to the lowest subsidised contribution of EUR 10 per ha (winter wheat 7 t/ha, insurance against hail). Many farmers decide not to insure their crops, taking into account the fact that local authorities responsible for the collection of penalties are reluctant to enforce this obligation.

Despite limiting factors such as the adverse selection [Goodwin, 1993; Sherrick et al., 2004; Smith and Baquet, 1996; Velandia et al., 2009], moral hazard [Mishra et al., 2005; Smith and Goodwin, 1996], which together may lead to an increase in information asymmetry [Esuola et al., 2007] or fraud [Roth and McCord, 2008], the agricultural insurance offer continues to develop thanks to state subsidy programmes [Bielza Diaz-Caneja et al., 2009]. This note also applies to Poland, where the first subsidised insurance scheme was introduced in 2005.

The Ministry of Agriculture and Rural Development signed an agreement with 5 major insurance companies active in the agricultural insurance market, which were designated to introduce subsidised agricultural insurance pursuant to the Act on crops and livestock since 7 July 2005. The maximum level of the contribution for each insurance eligible for co-financing w set at 6% of the insurance amount.

In addition to crop insurance, farmers in Poland are required to take out civil liability insurance due to managing a farm and insurance for farm buildings against fire and natural disasters. Pursuant to the data published by the Central Statistical Office [GUS, 2015; GUS, 2016], it can be concluded that the number of civil liability insurance contracts in agriculture in 2013 was 1465 thousand and was higher than the total number of farms (1429 thousand). In the case of farm buildings, the number of insurance contracts was even higher (1931 thousand of insurance policies). This means that almost all farmers have at least one contract with an insurance company during the year. Given the fact that the major insurance companies signed the aforementioned agreement with the Ministry of Agriculture, it can be assumed that most Polish farmers have access to crop insurance at least for the

most serious risks. Thus, the problem of the low uptake of crop insurance in Poland does not result from the lack of access to offered insurance. As the level of the uptake of insurance policies in Poland is still very low, the authors set for themselves an objective to analyse the determinants influencing the decisions of Polish farmers on crop insurance, based on the production data at the farm level and the accounting data available in the FADN (Farm Accountancy Data Network), with particular consideration to the farm subsidy rate as a factor potentially differentiating the decisions of farmers on taking out crop insurance. The paper uses logit regression to define the factors determining taking out any crop insurance by the farmer.

The typical determinants of the demand for any good in the market can be defined as: "own price of the good, price of substitutes, income level, consumer expectations about future prices or incomes and tastes and preferences or complementary goods" [Parkin et al., 2002].

As regards taking out insurance, classic analysis of the demand for crop insurance may be carried out taking into account the following components:

Risk level:

- Crop variability,
- Weather conditions,
- Income variability,
- Farm debt level,
- Expected level of compensation.

Available substitutes:

- Production techniques e.g. irrigation,
- Participation in mutual funds,
- Subsidy rate of operating activities.

Farmer's preferences:

- Experience in managing a farm,
- Level of education,
- Experience with insurers,
- Level of risk perception,
- Level of risk aversion.

Income level:

- Farm income level.

Price level

- Amount of the insurance contribution.

The price of the good, in the case of insurance, is the amount of a contribution paid by the farmer. Theoretically, the higher is the price, the lower should be the demand for the good. However, there are many studies showing that the demand for crop insurance is inflexible [O'Donoghue, 2014; Coble and Barnett, 2013; Shaik et al., 2008; Goodwin et al., 2004; Serra et al., 2003; Coble et al. 1996; Goodwin, 1993]. As regards the subject of analysis, it should be concluded that the contribution paid for specific insurance depends on many factors, e.g. on the characteristics of the region, and even on the characteristics of the farm, type and number of crops covered by insurance and, finally, on the value of the production insured. In reality, the real insurance price is a difference between expected compensation (in the case of losses) and paid contribution – the expected return on crop insurance. This value can only be provided based on the historical data regarding specific crop insurance, but this price cannot be determined when considering taking out any crop insurance.

The availability of cheap substitutes reduces the demand for the given good because customers are more likely to purchase a substitute. In the case of crop insurance, it is more difficult to identify substitutes than in the case of tangible goods. Assuming, however, that the main purpose of insurance is to stabilise income from the agricultural production and to secure the current level of consumption of the family, irrespective of a possibility of losses in crop yields, many activities with similar effects may be considered a substitute. Consequently, the cost of using other risk management methods can be treated as a price of substitute. The diversification of production [Smith and Glauber, 2012; Tsikirayi et al., 2013] results in the lower risk at the expense of lower economies of scale within a single farm. Participation in investment funds [Meuwissen et al., 2013; Sulewski et al., 2014] leads to risk sharing at the expense of supporting other farmers who suffer serious losses. Traditionally, a substitute for any insurance is the accumulation of savings [Farrin et al., 2016], which also means incurring some alternative costs. The use of appropriate farming practices can significantly reduce the production risk. A spectacular example is irrigation [Heerman et al., 2016, p. 29], which significantly reduces the risk of drought in the crop production, but requires investment and operational inputs. The potential availability of public-funded *ad hoc* compensation for losses in crops [Liesivaara and Myyrä, 2017] can be considered as a substitute for efforts made to stabilise income and, consequently, reduce the level of crop insurance. Moreover, in particular in relation to the EU countries, subsidies to operating activities, in particular direct payments, are often mentioned as an income stabilisation instrument. Income of farmers receiving payments is less dependent on the production performance and market factors. This is particularly important in farms with a high subsidy rate for income [Kulawik and Płanka, 2013; Majewski and Wąs, 2009].

As regards the price risk, the literature points to futures contracts as an instrument for securing the level of crop income [Sherrick and Schnitkey, 2016]. Also, contracts with the buyer, e.g. "Marketing contracts" and "Production contracts" [Vavra, 2009] can be considered as an income stabilisation tool. However, bearing in mind the objective of this paper, i.e. analysis of taking out crop insurance, income stabilisation instruments were not analysed, while focusing more on insurance of crops against the production-related risk.

The income level is one of the important factors when analysing the demand for any goods. It is mentioned in the literature as one of the factors determining the uptake of insurance. However, income as a determinant of crop insurance may be examined in two aspects. The income level determines the farmer's wealth. From this point of view, the low income level, especially when farmers have to pay loans, can reduce the level of taking out crop insurance [Tsikirayi et al., 2013, p. 7]. On the contrary, the high income level gives more opportunities to increase wealth and maintain capital reserves helping to survive a poor year, even without payment of compensation. It can be concluded that "crop insurance is something that low-wealth farmers cannot afford and high--wealth farmers do not want" [Farrin et al., 2016, p. 5[.

On the other hand, in addition to the absolute income level, its variability and expectations as to future income may be a significant factor affecting the use of crop insurance. This aspect can be clarified based on the expected utility hypothesis by von Neumann–Morgenstern. Insurance is more attractive to farmers with high risk aversion and in situations where the risk justifies payment of contributions significantly higher than the expected loss without insurance [Hardaker et al., 1997; Mohammed and Ortmann, 2005]). This is particularly important in the case of high-value losses that could undermine the financial stability of a farm [Farrin et al., 2016]. Similarly, the amount of expected compensation and the probability of receiving it [Tsikirayi et al., 2013] are factors which increase the utility of taking out insurance. The higher expected profitability level corresponding to the expected production value [Tsikirayi et al., 2013] tends to increase the expected loss value due to adverse conditions and, therefore, it is also a factor which should increase the uptake of insurance. Similarly, the expected adverse weather conditions [Turvey and Kong, 2010; Liu et al., 2010; Kong et al., 2011] tend to increase the perception of farmers as to the expected loss value and thereby increase the uptake of crop insurance. The farm debt level may also determine decisions on taking out insurance. The necessity of debt servicing increases uncertainty as to the future financial situation of the farm and, therefore, the utility of potential compensation is higher in farms with the higher assets debt level.

While it is difficult to measure "tastes and preferences" regarding crop insurance, the literature lists a number of variables that affect these preferences: age of the farmer, experience and level of education of the farmer, as well as the size of farmland, risk aversion or satisfaction with previous insurance policies [Tsikirayi et al., 2013]. These are factors determining the farmers' assessment as to future expectations. With regard to the age of the farmer, there is no conclusive evidence of its impact on the decision on taking out insurance. Masara and Dube [2017] prove a positive effect of the age of farmers on taking out crop insurance based on their observation in Zimbabwe, while Sadati et al. [2010], as well as Mahammed and Ortmann [2005] and Akinola [2014] claim that older, and thus more experienced, farmers can handle the risk without insuring crops.

The scale of activity also has a positive impact on the uptake of insurance [Afroz et al., 2017]. This is consistent with the results of many studies [Goodwin, 1993; Barry et al., 2001; Goodwin and Mishra, 2006], according to which the farm size was positively correlated with the decision on taking out crop insurance. It should be stressed that the choice and signing of an insurance contract is a complex decision which, if is to be reasonably made, requires farmers to carry out complex and multifaceted analysis. The effort is even greater if the farmer needs to submit an application for compensation. This effort has the nature of a permanent cost. Owners of small farms where the total value of expected losses is relatively low, are less likely to make these efforts.

It is also worth stressing that the use of agricultural insurance may be associated with the risk perception and risk aversion of farmers. The risk assessment for farmers is a prerequisite for the choice of a risk management strategy because the farmer who is not aware of the risks is not able to manage them effectively [Sulewski and Kłoczko-Gajewska, 2014a]. The risk perception by farmers, which may result from losses suffered in the past, potentially increases the uptake of insurance [Adtiya et al., 2016]. Even farmers who are aware of all potential risks may behave differently because of their attitude towards risk. Sulewski and Kłoczko-Gajewska [2014b] and Heerman et al. [2016] stated that farmers who insured their crops were characterised by greater risk aversion.

In classical analysis of demand, the factor determining the decision on taking out insurance is the situation in the market of complementary goods, the demand for which is connected with the demand for the given main good. In this context, it is possible to analyse the situation where crop insurance required by a financing institution as loan collateral can be used as an example. The existence of such conditions in the market may lead to an increase in the demand for agricultural insurance [Tsikirayi et al., 2013].

Strong resistance of Polish farmers to taking out crop insurance gives rise to a question about the determinants affecting the decisions of farmers in this regard. In the previous studies on the conditions of taking out crop insurance in Poland [Stempel, 2013; Wicka et al., 2013], the authors concluded that the key factors determining the decisions on taking out crop insurance are: farm size, level of education and experience of the farmer, share of the crop production in the value of agricultural sales and the income level. However, due to the fact that this analysis does not include the information about the number of farms represented by each farm in the sample used for studies, their results cannot be considered representative of the entire population of Polish farms.

11.2. Methodology and data

In order to analyse the determinants of the decisions on crop insurance, the authors constructed a logistic regression model based on the FADN sample. The accounting data of famrs belonging to the FADN network has been collected in Poland from the moment of accession to the European Union in 2004. It is well-known that in the case of applying quantitative methods, the quality of results depends on the size of the analysed sample. In this case, the FADN sample, especially if a period of 10 years is analysed, is one of the best possible data sources for this analysis. The sample of farms is composed of about 11-12 thousand farms in each accounting year. In accordance with the data collection rules in the FADN system, the farm sample represents at least 90% of the agricultural production in each EU country. In Poland, the FADN sample represents about 731 thousand farms, which accounts for about 50% of all farms and nearly 80% of the utilised agricultural area. Depending on the structure and overall value of the standard output (SO), farms are divided according to the production type and economic size. For the purposes of this analysis, the typology of farms from 2008 [European Commission, 2008] was used.

The primary source of data for the study was the sample of FADN farms of 2013. However, the data on losses in yields, received compensation and the rate of risk aversion of farmers were determined using the data of farms which were present in the FADN sample for at least 4 years in the period from 2004 to 2012. The following types of farms were identified: cereal (TF15), mixed cropping (TF16), cattle (TF45-48), mixed livestock (TF73-74) and mixed (TF 83--84). Poultry and pig farms were not analysed, because the crop production could have been seen as the marginal activity on these farms. Similarly, specialised fruit and vegetable farms were not taken into account because of the variety of crops and the particularly high risk associated with the horticultural production.

As far as the economic size of farms is concerned, the smallest farms with the economic size of less than EUR 8000 of standard output (SO) were excluded from the sample. It was considered that these farms are mainly a place of residence and an additional source of income for farmers, and not any commercial activities. In total, 5202 farms of the total number of 12 117 of individual farms included in the FADN sample were taken into account in 2013. The reduction in the number of farms resulted from the selection of specific production types, economic size classes and exclusion of farms which were present in the FADN sample for less than 4 years in 2004-2012. The reason for applying the criterion of presence in the sample for at least 4 years was a need to estimate the occurrence of yield losses and risk aversion in farmers. The number of farms in the FADN sample of 2013 in each identified class, taking into account the location in the FADN regions, is shown in Table 1.

Table 1. Number of analysed farms in the FADN sample in Poland in 2013

	Cereal (TF15)	Mixed cropping (TF16)	Cattle (TF 45-48)	Mixed livestock (TF 73-74)	Mixed (TF83-84)
Pomorze and Mazury (785)	300	116	209	57	242
Wielkopolska and Śląsk (790)	586	337	270	180	769
Mazowsze and Podlasie (795)	178	227	521	114	569
Małopolska and Pogórze (800)	100	102	89	35	201
Total	1164	782	1089	386	1781

Source: Own study based on the FADN data.

As for geographical criteria, in Poland four FADN regions are identified and each is made of four NUTS 2 regions (Fig. 1).

The number of farms in each FADN region was as follows: "Pomorze and Mazury" – 924 farms of the total number of 1823 farms in the FADN sample; "Wielkopolska and Śląsk" – 2142 analysed farms of the total number of 4367; "Mazowsze and Podlasie" – 1609 analysed farms of the total number of 4498; "Małopolska and Pogórze" – 527 analysed farms of the total number of 1429.

Figure 1. FADN regions in Poland

Source: European Commission Regulation 1291/2009.

A dependent binary variable described the use of at least one type of crop insurance (1 – use of crop insurance, 0 – no crop insurance). In the analysed group, 29.18% (19.47% in the population) of farmers had crop insurance. Given that the Polish FADN sample is representative of about 50% of all farms (the second half is made up of small, often partly self-subsistence, farms which largely do not bring any yields), this number seems to be in line with the official reports. The logistic regression model was used for analysis:

$$\ln\left(\frac{P(Y_i=1)}{1-P(Y_i=1)}\right)=\alpha+\beta_1 x_{1i}+\mathrm{L}\ +\beta_k x_{ki} \tag{1}$$

where:

Y_i – dichotomous variable describing the fact of taking out crop insurance: 0 – not taken out, 1 – taken out,

α – absolute term,

$x_{1i},\mathrm{K}\ ,x_{ki}$ – values of independent variables for the i^{th} farm,

$\beta_1,\mathrm{K}\ ,\beta_k$ – values of coefficients for individual independent variables.

The regression models were estimated for the entire analysed population and broken down into quartile groups identified based on the subsidy rate, measured as a ratio of the value of subsidies to operating activities to the production value (respectively, <14.9%;14.9%-22.8%;22.6%-34.5%;>34.5%).

Due to stratified sampling in the FADN, which was intended to ensure representativeness of the sample given the production type, economic size of the farm and FADN region, for assessing the model the Horvitz– Thompson estimator was used, thanks to which during the estimation of the models the estimate information on the number of farms represented by each farm in the sample was taken into account. In the event of exogenous sampling probabilities, weighing may be unnecessary for conformity and adverse to precision [Wooldridge, 1999]. However, the Neyman optimal allocation method used in the FADN makes the sampling probabilities strongly dependent on exogenous variables. For example, the correlation coefficient for the probability of sampling and production value is 0.63. In such cases, the use of information about the number of actual farms represented by each farm in the sample is necessary for the compliance of the regression parameter estimators [Solon et al., 2015].

Table 2. Set of independent variables in relation of the concept of the analysis

Factors potentially determining the crop insurance level		Variables used in the model
Risk level	Crop variability	Experiencing a significant (>40%) yield decrease in2004-2012 Soil quality index [0.05-1.95]
	Weather conditions	Location in one of the FADN regions
	Income variability	Crop production intensity [value of inputs PLN thousand /ha]
	Farm debt income	Debt ratio (total liabilities/total assets)
	Expected level of compensation	Receiving compensation at least once in 2004-2012
	Farm size	Farm output value
Available substitutes	Level of subsidisation of operating activity	Subsidy rate equal to the quotient of subsidies to operating activity and production value
	Production techniques – irrigation	Not included in the model Not applicable to Polish farms
	Participation in mutual funds	Not included in the model Not applicable to Polish farms
Income level	Farm level income	Farm income [PLN thousand /year]
Farmer's preferences	Experience in managing a farm	Age of the farmer [years]
	Level of education	Level of education of the farmer [1 = at least secondary]
	Experiences with insurers	Receiving compensation in 2004-2012
	Level of risk perception	Experiencing a significant (>40%) yield decrease in 2004-2012
	Level of risk aversion	Arrow–Pratt absolute risk aversion coefficient
Price level	Amount of the insurance contribution	Not included in the model.

Source: own study.

Based on the factors which may be determined according to the FADN sample and affecting the uptake of crop insurance, the following variables have been selected for empirical verification (Table 2).

Some variables included in the model require an additional description. In particular, the method used to calculate the Arrow–Pratt absolute risk aversion coefficient. The values of this coefficient were calculated based on production decisions of farmers registered with the FADN 2004-2012 database. The method used consists of several stages, the first of which is to develop a model explaining income according to the levels of inputs (e.g. costs of fertilisers, seeds, pesticides, labour input) and then to estimate two other models: one explaining the effect of the analysed variables on the square and cube residuals from the income model. The next step was to calculate the marginal effect of each input factor on the first 3 conditional profit moments and to estimate the FOC (first order conditions) system of equations using the calculated marginal effects for all analysed factors. A seemingly unrelated regression (SUR) model was used for this purpose. The estimation of the FOC system of equations has been carried out separately for each farmer. A detailed description and derivation of the procedure can be found in the original paper by Antle [1987] and in the specific application for assessing the Polish farmer's attitude regarding risk [Kobus and Wąs, 2017].

Other differentiated variables were defined in accordance with the methodology adopted in the FADN [European Commission, 2008]. In particular, farm income was calculated as a difference between the value of the agricultural production in a given year and the value of all means of production used, with the exception of unpaid labour costs and interest on net worth. The value of the agricultural production was used as an indicator of the economic size of the farm. The performance losses recorded in the last 9 years (2004-12) were defined as at least the 40% reduction in the yields below the on-farm average for at least one of main crops. Approximately 25.97% of farmers in the population represented by the data set have experienced at least one such loss over the analysed period. The 40% loss level was determined by the sensitivity analysis of the variable's predictive power.

A number of determinants mentioned in conceptual analysis have not been applied in the model. As already mentioned, the information about insurance prices or returns on contributions was not available at the farm level. Contributions to insurance policies in Poland depend primarily on insured crops and the type of risk covered. In 2015, the price of crop insurance against hail for spring cereals ranged from 0.39% to 2% of the insured amount, while for maize it was between 0.35% and 5%. The costs of insurance against spring damage in the case of maize, sugar beet and potatoes ranged from 1% to 3%, whereas in

the case of cereals from 0.5% to even 6.6%. The winter damage package is available from 1.8% for cereals and 3.6% for oilseeds. The most expensive was drought insurance, since the contribution was between 2% and 17% of the insured value in the case of maize. It can be assumed that this is the reason why insurance against this risk is practically not applicable in Poland.

Production practices such as irrigation, which are mentioned in the literature as an important factor determining taking out insurance policies, have not been included in the model as irrelevant in the Polish conditions where less than 0.05% of agricultural land is irrigated, mainly in horticultural farms that were excluded from the analysis. Similarly, participation in mutual funds was not taken into account since it is not used by Polish farmers at all. As mentioned earlier, price-stabilising measures were not analysed because they are neither a direct substitute for crop insurance, nor they are widely available in Poland.

The model has been estimated for farms from all over the country. The estimation was carried out in the R [R Core Team, 2015] environment, using the "survey" package [Lumley, 2014].

11.3. Results

The basic characteristics of farms in the analysed areas of the data set were calculated and shown in Table 3. Due to the FADN sampling method, each farm in the sample represents a different number of farms in the said population. The values shown in Table 3 shall be calculated as weighted averages, using the information about the number of farms in the population represented by each farm in the sample.

The characteristics presented in the Table indicate the differences in the characteristics of farms divided into quartile groups by subsidy rate. The main factor determining the amount of subsidies received is the farm size. The average farm size in all identified groups of farms is similar. On this basis, it can be assumed that the differentiation in terms of the subsidy rate will depend mainly on the production value per farms. This is confirmed by the results – the production value in the fourth quartile group is more than twice lower when compared to the first group. The lower production value on farms with the higher subsidy rate results from the poor soil quality and lower production intensity. When comparing the data for the 3rd and 4th quartile group with other farms, it can be observed that farming on poorer soils is subject to greater production risk. In the groups with the higher level of support, the percentage of farmers who at least once experienced a significant decrease in yields is also increasing. However, the share of farms which managed to receive compensation is significantly low-

er than in the others, although in all the groups the share of insured farms is similar. The analysed groups of farms also differ in terms of the structure of production types. As the subsidy rate rises, the share of cereal farms increases, and in the fourth quartile group the share of mixed farms is strongly increased, at the expense of farms where the livestock production is dominant (TF 73-74).

Table 3. Characteristics of the population represented by farms in the sample in the FADN regions

Specification		Quartile groups by subsidy rate				Analysed population in total
		<14.9%	14.9- -22.8%	22.6- -34.5%	>34.5%	
UAA [ha]		21.35	23.07	21.47	22.10	21.99
Percentage of farms with insured crops [% of farms]		20.83	19.81	20.67	17.23	19.53
Farmers' level of education [% of farmers with secondary or tertiary education]		50.27	54.93	54.12	47.35	48.43
Age of a farmer [average]		45.99	45.72	45.74	46.79	46.09
Arrow–Pratt absolute risk aversion coefficient		1.41	1.47	1.51	1.56	1.49
Soil quality index [average]		0.94	0.91	0.84	0.74	0.85
Production intensity [average value of inputs, PLN thousand/ha]		2.01	1.82	1.57	1.32	1.65
Share of farms which received compensation [%]		4.5	4.0	2.9	3.6	3.7
Share of farms which experience a significant (>40%) yield decrease in 2004-2012 [%]		15.9	17.3	20.2	23.0	19.4
Assets debt ratio*		0.039	0.036	0.029	0.030	0.033
Value of agricultural production [average, PLN thousand]		193.00	157.44	113.42	82.33	131.69
Farm income [average, PLN thousand]		67.98	59.25	43.43	42.52	52.05
Structure of types of farms in the population [percentage of farms in the group]	Cereal [TF15]	2.1	3.1	4.5	6.9	4.4
	Cropping [TF16]	11.0	7.3	6.9	9.7	8.6
	Cattle [TF45-48]	15.5	18.0	16.3	17.4	16.8
	Mixed livestock [TF73-74]	31.8	27.3	31.5	17.7	26.7
	Mixed [TF 83-84]	39.6	44.2	40.8	48.4	43.5

Data for the population represented by the FADN sample calculated using the Horvitz--Thompson estimator; *value of liabilities/value of assets in total.

Source: own study.

To show the impact of each analysed factor on the probability of taking out crop insurance, the authors calculated the average marginal effect of independent variables [discussion on calculating the marginal effect, cf. Greene 1997, p. 730]. The value of the average marginal impact on the quantitative variables can be interpreted as an average change in the probability of taking out crop insurance due to the growth of the individual variable by one unit.

In the case of the variable pointing to the location in the region, one level was selected as the reference point: "Pomorze and Mazury" region and the estimates presented show the result of the change in the farm region in relation to the level selected as a reference.

Analysis of the model's results was to clarify the factors determining taking out crop insurance. The estimates of the models for all analysed variables (relevant and irrelevant) for the whole country are shown in Table 4. The McFadden R2 for the estimated model was only 14.8%, but the weighted percentage of proper forecasts was almost 82%. The relatively high percentage of proper forecasts, the relatively small value of the McFadden R2 results from the very high share of uninsured farms in the analysed population.

Table 4. Estimation of the model of all Polish farms

Variables	**Estimation**	**SE**	**p-value**	**Average marginal effect p.p.**
Absolute term	-2.7055	0.3667	0.000	0.00
Wielkopolska and Śląsk	0.5924	0.1178	0.000	10.52
Mazowsze and Podlasie	-0.9186	0.1486	0.000	-10.94
Małopolska and Pogórze	-0.5317	0.185	0.004	-7.09
Experiencing a significant (>40%) loss – [0/1]	0.5702	0.0984	0.000	8.23
Soil quality index [0.05-1.95]	0.6788	0.1493	0.000	10.37
Production intensity [PLN thousand/ha]	0.2198	0.0747	0.003	3.05
Farm income [PLN thousand]	-0.0017	0.0007	0.020	-0.02
Age of a farmer [year]	-0.0077	0.0045	0.087	-0.10
Assets debt ratio	1.1035	0.5121	0.031	18.12
Receiving compensation in 2004-2012 [0/1]	1.1853	0.1999	0.000	19.71
Arrow–Pratt absolute risk aversion coefficient	0.1455	0.1266	0.250	1.99
Value of agricultural production [average, PLN thousand]	0.0021	0.0004	0.000	0.03
Subsidy rate (operating subsidies/ production value)	0.3897	0.2256	0.084	5.62

Source: own study.

The results of the model show that there are significant differences between the regions in using crop insurance. The location of the farm in the Wielkopolska Voivodeship (790) has a strong positive effect on the probability of crop insurance and farmers in the southern, mountainous regions (800) of the country insure their crops less frequently. The difference between the probabilities of the average farm in these two regions with crop insurance is about 20 percentage points.

The experience of serious crop losses (>40% of the average in the last 9 years) increases the probability of taking out crop insurance by more than 8 percentage points. The even more important factor positively affecting taking out crop insurance is the receipt of compensation in the past, which increases the probability of taking out insurance by 20 percentage points.

The results of the model also indicate that the soil quality and production intensity, and thus the expected production value, have a positive impact on the crop insurance decision. It can be concluded that the higher is the expected crop production value, the more farmers will actively manage the production risk through the use of crop insurance. Also, the farm debt level in relation to the asset value positively affects the probability of taking out crop insurance. Although the results of the model indicate the direction of changes in the probability of taking out a policy when changing individual factors, assuming that the remaining factors remain unchanged, it can be argued that farmers with the intensive production, who either perform or completed modernisation processes in their farm, will be more willing to take out a policy.

On the other hand, the income level negatively affects the probability of taking out crop insurance. It can, therefore, be concluded that farmers gaining the low and average income level are more likely to insure. Although, the average marginal effect shows that, on average, gaining income higher by PLN 100 thousand would lower the probability of concluding an insurance contract by only 2 percentage points. Bearing in mind the average income level for the analysed farms (Table 3), income cannot be indicated as a key factor.

In the model drawn up for the entire Poland, the factors such as the age of the farmer, Arrow–Pratt risk aversion coefficient and subsidy rate were not significant at the level of 0.05.

In order to analyse more thoroughly the impact of subsidies on insurance decisions of farmers, further models were built for subgroups of farms identified according to the subsidy rate for farms (Table 5). Farms were grouped into four quartile groups as a division criterion using the value of the subsidy rate for farms.

Table 5. Estimation of the model for farms divided into quartile groups by subsidy rate

Quartile groups (subsidy rate) / Analysed variables	1st group <14.9%	2nd group 14.9-22.8%	3rd group 22.6-34.5%	4th group >34.5%
Wielkopolska and Śląsk	-	-	10.20**	14.53**
Mazowsze and Podlasie	-15.62**	-18.25**	-12.59**	-
Małopolska and Pogórze	-	-13.90**	-11.49**	-
Experiencing yield losses [0/1]	13.87**	8.54**	4.66*	4.94**
Soil quality index [0.05-1.95]	-	15.54**	8.30*	11.51**
Production intensity [PLN thousand/ha]	-	3.65*	4.62*	7.34**
Farm income [PLN thousand]	-0.07**	-	-	-
Age of the farmer [years]	-	-	-	-
Wskaźnik zadłużenia aktywów	-	-	34.14*	-
Receiving compensation in 2004-2012 [0/1]	15.59**	12.49**	-	39.18**
Arrow-Pratt absolute risk aversion coefficient	-	-	-	-
Value of agricultural production [thousand PLN]	0.05**	0.03**	0.03*	0.03**

** p-value <0.05; * p-value <0.1; ”-” p-value > 0.1

Source: own study.

The results of the individual models assessed for groups of farms divided by level of support partially confirm the dependencies observed during model analysis for the entire Poland. The location of a farm in the Wielkopolska and Śląsk region significantly increases the probability of taking out a policy. At the other extreme, we can place farms from the Mazowsze and Podlasie and Małopolska and Pogórze regions, which are much less willing to take out insurance. Nevertheless, on a basis of the estimates obtained for the variables defining the FADN region, it is not possible to indicate clearly the relationship between the subsidy rate and the tendency to insure crops.

Just like in the case of the country-wide model, the increase in the value of agricultural production increases the farmers' tendency to take out insurance, but also in this case the strength and direction of this relationship is very similar in all four models.

But then, we can observe a decreasing impact of experience of significant yield losses on the probability of taking out insurance as the subsidy rate increases. Experience of a significant yield loss on farms with the lowest substitution rate increases the chances of concluding a crop insurance contract. This confirms the results of previous studies [Majewski and Wąs, 2009] indicating the importance of subsidies in reducing the income risk.

The statistically significant negative impact of the income level on the probability of taking out insurance was observed only in the group of farms with the lowest level of support. This may indicate that the statistically significant relationship between taking out insurance and income is observable only in the event of a low impact of subsidies on income.

We may also observe the growing, along with the level of support, impact of the production intensity on the decision on crop insurance. For less-supported farms (2nd group of farms), it is more than twice lower than in the group with the highest subsidy rate. It can be assumed that more supported farms are characterised by a significantly faster growth and development, which is conducive to increasing the production intensity, but also, due to the higher expected yields, increases the risk of failure in the crop cultivation.

11.4. Summary and conclusions

The article analysed the factors determining the demand for crop insurance in Poland using a large set of data on farms in 2004-2013. The main factors determining the conclusion of crop insurance contracts are associated with the farmers' experiences such as: suffering significant yield losses in the past, receiving compensation. Additionally, an important factor determining taking out insurance is the location of a farm. Most other analysed determinants are slightly less important, however, the observed relationships are largely consistent with the results of previous studies. The factors such as the value of agricultural production, cultivation intensity, quality of soils which, according to the literature, increase the expected loss value have a positive impact on the uptake of insurance, particularly when they are correlated with lower income. In this case, the observed economic conditions are consistent with the expected utility hypothesis.

Contrary to the expectations, the characteristics of the farmer, such as the level of education, age and even risk aversion have not been verified as statistically significant at a significance level of 5%. It is not possible to prove that farmers with tertiary education or with the Arrow–Pratt absolut risk aversion took out insurance more frequently than others. Also, at the national level, the impact of the subsidy rate on the willingness to take out insurance cannot be confirmed.

However, analysis of the results of the models on farms with various levels of support shows that the experience of a significant decrease in the past yields affects the decisions of farmers much more on farms with a relatively low level of support. This is confirmed by observations known from previous studies stipulating that direct payments and similar instruments stabilise farm income and thus reduce a need to insure crops.

However, bearing in mind that among all the factors analysed, the receipt of compensation is the main determinant of using crop insurance, although there is no clear evidence it could be argued that the crop insurance subsidy scheme in Poland should be particularly focused on encouraging farmers who have not previously used insurance to join the scheme. This would give an opportunity to gain experience and would create a chance to be positively strengthened by receiving compensation in the event of a significant yield loss.

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12. Farms and agricultural enterprises for development of sustainable and smart cooperatives: a multifactor approach using digital farm management

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Abstract

This paper presents a multi-criteria mathematical model which is capable to facilitate the formation of smart cooperatives and to collect behavioural data about small farmers. The model for smart cooperation is based on Gross Margin calculation and a multifactor approach known as the Analytic Network Process. The ANP, based on the farmer estimations, allows us to determine his behavioural risk for managing the farm. The model can also be useful for banks and insurance companies as they can be interested in estimating the risk for the farmers.

Keywords: smart cooperatives, risk profile, farm management model

JEL codes: Q12, D24, D81, Q13

12.1. Introduction

Smart cooperatives refer to the economic aspects of enforcing cooperation based on some common activities or objectives. The Third Green Revolution marks the path of digitization in otherwise traditional farming and the introduction of smart agriculture (smart farming technologies, SFTs). According to the European Innovation Partnership "Agricultural Productivity and Sustainability", 80% of the US farmers use some of these technologies in their production. The STFs are the key to precision farming, i.e. effective resource management in agriculture. Smart technologies are already incredibly diverse – from sensors to monitor the chemical composition of the soil to the use of drones to detect plant diseases, automated irrigation equipment, navigation systems for machinery, etc.

This paper presents a multi-criteria mathematical model, which is capable of facilitating the formation of smart cooperatives and collecting behavioural

data about small farmers. The value of this behavioral, qualitative data is unique and can be valued in a large range of domains[17].

Two of these domains regard the banks and insurance companies. The model can be useful for them by distinguishing the risk profile of the individual farmers. One of the major problems faced by funding organizations is to assess the behavioural risk of farmers. Using the multifactor model makes it possible to assess behavioural risk of farmers and to estimate the expected outcome of their activities.

Additionally, the agricultural and food sector need to change systemically. The data that is collected can make connections between farm modernization and rural development. We see the possibilities for, and drivers and limitations of sector change in four thematic areas: the resilience of farms and rural areas; prosperity and well-being; knowledge and innovation; and, the governance of agriculture and rural areas.

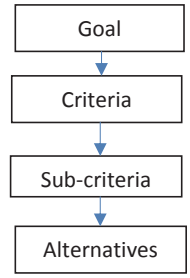
12.2. Multi-criteria approach

The Analytic Hierarchy Process and the Analytic Network Process are a part of multi-criteria approach as a decision making models constructed for synthesis of information. Their main benefits are when one have to solve problems that do not have clear quantitative measure, especially when the problem is related to social elements, subjective opinions, etc. Both the Analytic Hierarchy Process (AHP) and the Analytic Network Process (ANP) were introduced and their theoretical framwork was developed by T. Saaty [2001]. Historically and logically the AHP is the first model that appeared [Saaty, 1980]. The AHP can help with weighing of various alternatives according to a set of criteria, when the influences between alternatives and criteria are hieratical. At the top of the there hierarchy is the decision-making goal (Fig. 1).

The Analytic Network Process is a model that allows for considerably greater complexity. It recreates a system that allows dependences not only in the direction from a higher to a lower hierarchy toward the alternatives. When using the Analytic Network Process, it is possible that dependences are in both directions – from components to alternatives or from alternatives to the components. Additional dependences between components are possible. That creates a system that is much more complex and capable of describing in much more details the economic systems and dependences between different players on the market, etc. (Fig. 2)

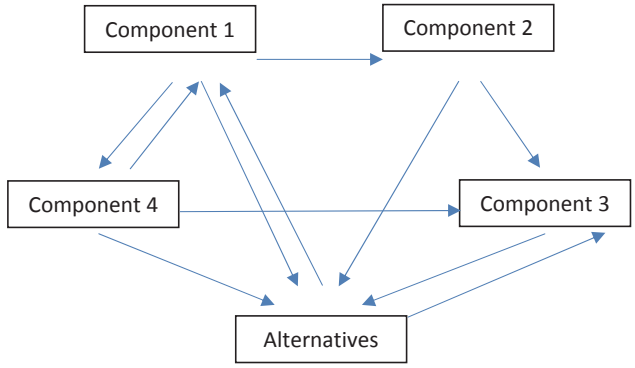
[17] For processing the information a software named GoMo (www.GoMo.bg) was created. GoMo bases on several principles ofoperation: (1) it gathers the experience and support of Bulgarian farmers; (2) it uses knowledge in the field of economy; (3) it follows the achievements of the information society for the processing of information; (4) it creates a potential for new competitive business models based on shared data.

Figure 1. Analytic Hierarchy Process



Source: own study.

Figure 2. Analytic Network Process



Source: own study.

In addition, the components may be constituted by elements. When evaluating the influence of components and elements on the alternatives, it is necessary to make pairwise comparisons between the individual elements. These comparisons are made on a scale from 1/9 to 9, where 1 means that both elements have equal influence on the alternatives, 9 means that the factor in the row has very strong influence and the factor in the column has no influence, 1/9 means that the factor in the column has very strong influence and the factor on the row has no influence. Table 1 summarizes possible scores and their explanation for the estimation of the elements.

Possible applications of the ANP can be very wide. It can be successfully used for solving decision problems in private corporations, public issues, military and conflict decisions, forecasting, market share estimation [Saaty and Vargas, 2006].

Table 1. The scale for estimation

Numerical	*Intensity of importance*	*Definition explanation*
1	Equal importance	Two activities contribute equally to the objective
2	Weak or slight	
3	Moderate importance	Experience and judgement slightly favour one activity over another
4	Moderate plus	
5	Strong importance	Experience and judgement strongly favour one activity over another
6	Strong plus	
7	Very strong or demonstrated importance	An activity is favoured very strongly over another; its dominance demonstrated in practice
8	Very, very strong	
9	Extreme importance	The evidence favouring one activity over another is of the highest possible order of affirmation

Source: Saaty and Vargas [2006].

12.3. Construction of Farm Management Model

The design of targeted, well-tailored policies in the agriculture, articulated with the CAP, is flawed by the particularities of small farms, their main concern being the amount of the allocated subsidies. Inability to form associative structures like, for example, agricultural cooperatives, based on common activities is usually blamed on the historical past when such solutions were enforced against the will of the proprietors. Nowadays, general discussions about the optimal functioning of the cooperatives in agriculture are carried out, with the scope to improve efficiency and achieve economies of scale.

Scopes and reasoning of the small farmers differ from behavioural perspective from those of large farms. In the process of production, substitutability between factors of production depends on many issues. We can stress the following behavioural patterns:

– The vulnerability to the weather conditions and farmers reaction to it;

– The simple ignorance about specific solutions;
– The ignorance of the official recommendations about specific conditions.

Risks and expectations mutually reinforce in the attempt to improve the farm operational management. In predicting and planning production, price and income for agricultural farms, both *a priori* and *a posteriori* Gross Margin's (GM) computation operates as proxy for the profit's dynamics. The correct estimation of the gross margin can act as a proxy for the dynamics of future profits.

This is why, the existence of a reliable, real data base concerning behavioural data presenting the process of formation of expectations regarding the current and future gross margin, stay at the base of the success of any action on the small farms. The model proposed is built on an innovatory mathematical model, following a multi-criteria approach.

The model constructed using this technique is entirely original and it was tailored to the specific needs of the Bulgarian agriculture. Several focus groups helped to construct, confirm and estimate this prototype and specific derivations, like the estimation of the cash flow, break-even point or the risk profile of the users.

The software allows farmers to be more and more conscious about:
– the structure of the variable costs,
– the errors in the estimation of gross margin,
– better adjusting their expectations and also the options they have about costs,
– the degree of substitution between factors of production.

Perhaps one of the most important other achievements is the possibility to aggregate these behavioural data on reports to be used as meaningful references of performance comparisons and to assist in the design of optimal agricultural policies.

The model is build using the Analytic Network Process (ANP) theory to incorporate behavioural decisions at the level of small farms regarding the substitution in between factors of production with the aim of determining the expected gross margin (GM).

– It is anchored on a standard calculation of the GM;
– The calculation of the GM follows the next theoretical idea:
– Consider there is a farmer's production function:

(1) Y=Y(Labour, Nutrition, Chemicals, Canopy , Machinery, Irrigation…),

where:

Y is the yield and Labour, Nutrition, Chemicals, Canopy, Machinery, Irrigation are all factors of production.

Gross Margin (GM) can be regarded as a proxy for the dynamics of the profits, being calculated as:

(2) GM=Y* Average Gross price-Variable Costs,

where:

(3) Variable Costs=wL*Labour*+wN*Nutrition*+…..WI*Irrigation* +….

Where Labour*, Nutrition*, Irrigation* and so on represent the optimal demand functions for the correspondent input factors of production after minimizing the cost of producing an arbitrary level of output Y.

It is customary to place the issue of determining the gross margin under the theoretical assumption of separability of the factors of production, yet this hypothesis is mostly contradicted for small farms.

This fact leads to significant discrepancies between the theoretical-standard estimations of the GM and the actual ones, these discrepancies being further interpreted as departures from some efficiency and optimal and standard values. These departures impede further derivations like a correct determination of future cash flows, break-even point and future profits and through that, conduce to an improper estimation of the farmers risk profile and management efficiency and, thus, to an inadequate financing of the specific agricultural activities.

To sum up, the main two theoretical assumptions in the neo-clasicall theory of production function are:

- the separability of the factors of production; and
- the dependence between the output and the selling price in the context of market characterization are addressed by this model and replaced by the next two assumptions.

The interdependence (substitutability) of the factors of production in case of small farms, is inversely proportional with the size of the farm.

The construction of the cluster matrix assessing the comparative importance of all the variables participating in the formation of the GM address exactly the two theoretical drawbacks previously mentioned.

12.4. Digital smart cooperation in agriculture

The core of the model for smart cooperation is the Gross Margin. It can be used as a proxy for profits, break-even analysis, cash flow, trends in development and investment. Many influence factors and dependences can be built around the Gross Margin, including input factors in agriculture, trading platform for nutrients, chemicals, machinery, financing instruments, consumers, reports, databases created from various dates (Table 2).

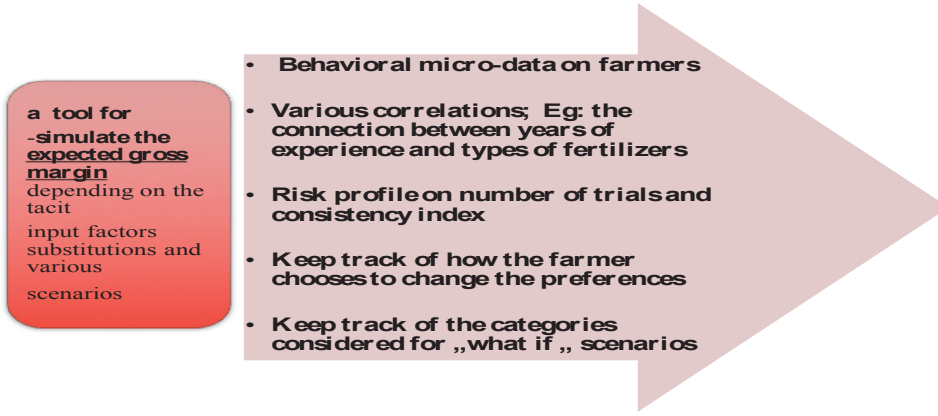
Table 2. Digital Smart Cooperation in Agriculture: Gross Margin and area of dependences.

External users	Digital solution	Internal benefits
Input factors in agriculture	**A platform for comercialization of various nutrients, chemicals, machinery**	**Behavioural database**
Producers of fertilizers, chemicals, nutrients, seeds, machinery	To be used as a the starting point in the future diversification and refinment in the production process	About expectation formation in the production and distribution for small and medium farm producers
Financing instruments	**Gross Margin for smalll and medium farms**	**A bold database**
Banks, insurance companies, credit cooperatives	As a proxy for profits, break-even point, cash flow, trends in development and investment	About assets, input factors demand and nominal production – leading to a more accurate assesment of financial reliabaility of individual farmers
Consumers	**A platform for traiding of production inputs and outputs**	**Reports on agregated performances**
Individuals, processing and/or storage	To be used as a starting point in the future for smart cooperation and other trding busineses	For a correct distinction in between categories of farmers, crops, regions etc.

Source: own study.

Once the data is digitalized it can be used in many different ways. One of the most valuable application can be simulating different scenarios based on assumptions and alternatives. These simulations can be loaded with different behavioural data for farmers. The software can show various correlations on individual level or at the level of the market as a whole. It will be possible to create risk profile on a number of trials and consistency index. “What if” scenarios will be easily accessible for the farmers and they will be able to study different options (Figure 3).

Figure 3. Smart cooperation in agriculture – possible outcome and benefits



Source: own study.

12.5. Application of the ANP Farm Management Model

The ANP can be used as a management tool on farms. To demonstrate how it can be useful we are going to use a honeybee farm as an example. The first that is important is the farmer to decide what are the alternatives. Our proposal is that alternatives can be:

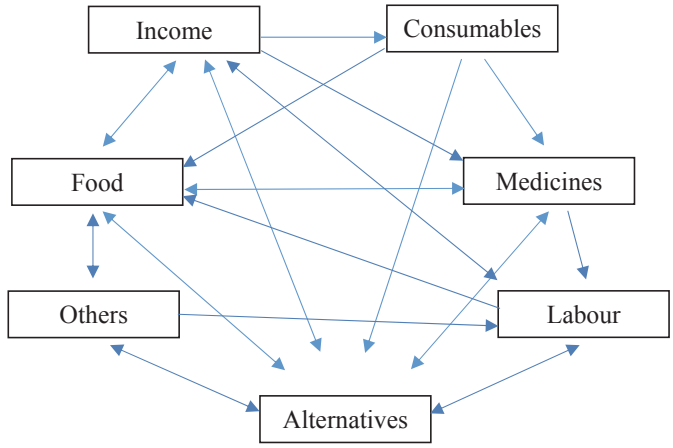
- Nominal Gross Margin – that is the GM calculated form the farmer based on his real results;
- Pessimistic Gross Margin – that is the GM calculated from nominal GM – certain % of the GM (the % is defined by the farmer);
- Optimistic GM – that is the GM calculated from nominal GM + certain % of the GM.

The second step is to arrange the components (sometimes called clusters) of dependencies and the elements of the components. After a consultation with honeybee farmers we have defined the following components: income, food, consumables, medicines, work, others. The clusters and their dependences are shown in Figure 4. As it is shown, the alternatives depends on all clusters but also the clusters depend on the alternatives. One can observe that from the arrows. If the arrow points in both directions that means that cluster influences the alternatives and the alternative influences the cluster too. In our particular case if we take for example the food cluster. It is obvious that the quality and quantity of food can influence the alternatives (i.e. Gross Margin). From other point of view, if the farmer requires higher Gross Margin he should be aware of the

quantity and quality of food needed and he should distribute enough food to the bees. That is how the influence can go from clusters to the alternatives and back.

Moreover, the observations clearly showedthat there are not only dependences between alternatives and clusters but also between clusters too. In Figure 4, they are shown as arrows between clusters. The direction of the arrows shows the direction of dependence. If it is in one direction the dependence goes form one cluster to the other. If the arrow is in both directions then the dependence goes form one cluster to the other but the other influences the first too.

Figure 4. Clusters and dependences of a honeybee farm



Source: own study.

The next step is to define the elements of clusters. They are summarized in Table 3.

Table 3. Elements of the components (clusters)

Income	**Food**	**Consumables**	**Medicines**	**Labour**	**Others**
Direct sales	Sugar	Wax bases	Regular	Farmer	Transport
Retailers	Honey	Frames	Not regular	Family	Certification
Subsidies	Prepared food			Seasonal work	

Source: own study.

Every element in any cluster can influence any other element in all clusters. The influence of the elements over the other elements of the network can be represented by a matrix, which is known as a supermatrix. The supermatrix of a honeybee farm is represented in Table 4. Not all cells of the supermatrix have

to be filled in with estimations. We have to create only the matrixes of dependences between clusters and elements that we find an influence. These are the same influences that we have outlined in Figure 4.

There is a problem of a practical nature here. Each arrow, which is seen in Figure 4, must be evaluated with a series of matrixes. If the arrow is in both directions – the number of matrices is doubled. The number of matrixes depends on the number of elements in the clusters. Additionally each matrix consists of multiple estimations. For example if we evaluate the matrix of the dependences between income and food clusters we will have 6 different matrixes to evaluate. Each matrix consist of 3 independent estimations. As you can imagine the number of evaluations grows exponentially with the numbers of clusters and dependences between them. In our case this means that 55 matrixes should be created, every matrix with a number of estimations (Table 4). Our opinion is that in practice the farmers will not make so much estimations or will make estimation automatically which can make the estimation invalid.

Table 4. Visualization of cluster matrix

	Clusters	1			2			3		4		5			6		7		
Clusters	Elements	1A	1B	1C	2A	2B	2C	3A	3B	4A	4B	5A	5B	5C	6A	6B	7A	7B	7C
1	1A																		
	1B																		
	1C																		
2	2A																		
	2B																		
	2C																		
3	3A																		
	3B																		
4	4A																		
	4B																		
5	5A																		
	5B																		
	5C																		
6	6A																		
	6B																		
7	7A																		
	7B																		
	7C																		

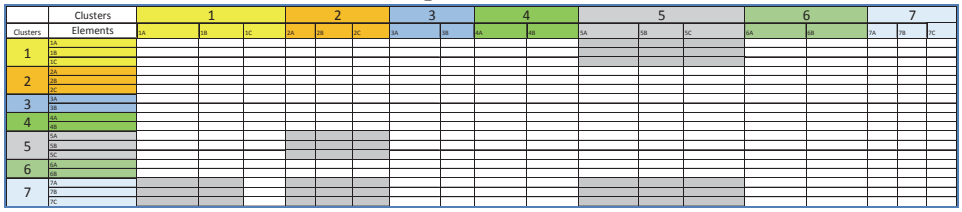
* The colored leading rows and columns represent different clusters and elements. The gray area inside are the matrixes that have to be estimated.

Source: own study.

Cluster numbers are: 1 – Income; 2 – Food; 3 – Consumables; 4 – Medicines; 5 – Work; 6 – Others; 7 – Alternatives. Element numbers are: 1A - Direct sales; 1B – Retailers; 1C – Subsidies; 2A – Sugar; 2B – Honey; 2C – Prepared food; 3A – Wax bases; 3B – Frames; 4A – Regular; 4B – Not regular; 5A – Farmer; 5B – Family; 5C – Seasonal work; 6A – Transport; 6B – Certification; 7A – GM -10%; 7B – GM; 7C – GM +10%.

In order to solve this problem, we decided to further assess the dependencies between clusters and classify them as strong and weak dependencies. Subsequently, we removed the weak dependencies from the supermatrix and thus reduced the number of matrices to 15 (Table 5).

Table 5. The reduced number of dependences between clusters and elements.



Source: own study.

If the supermatrix is solved in this way, that means all clusters have an equal weight. It is logical to assume that clusters have a different weight in the final evaluation of alternatives. Therefore, a cluster matrix is created that assesses the degree of impact of individual clusters. The cluster matrix is assessed by experts and is not set by the farmers. The cluster matrix for honeybee farm is shown on table 6.

Table 6. Cluster matrix of a honeybee farm.

	Income	Food	Consumables	Medicines	Work	Others	Alternatives
Income	25%	23%	22%	18%	30%	23%	33%
Food	16%	21%	28%	28%	16%	12%	27%
Consumables	3%	4%	8%	7%	4%	7%	5%
Medicines	7%	9%	4%	10%	5%	9%	5%
Work	22%	7%	12%	5%	23%	16%	19%
Others	2%	4%	4%	6%	3%	7%	3%
Alternatives	24%	31%	22%	26%	19%	26%	8%

Source: own study.

After calculating the cluster matrix, the initial supermatrix is weighted with the farmer's estimates and the final weights of the alternatives are calculated.

12.6. Summary and conclusions

The result of the analysis shows comparatively equalized probabilities for each of the alternatives ranging around 30% (have in mind that the result is from the answers of our experts, which is why we find it as expected). A slightly higher probability is for the pessimistic option – 39%.

Table 7. Weights of the alternatives according the ANP

Pessimistic GM -10%	39%
Nominal GM	27%
Optimistic GM +10%	34%

Source: own study.

As a summary of the results it can be said that if moderate results are shown, as in the example shown, this indicates that the behavioural risk of the farmer is minimal. It can be assumed that he follows a coherent technology tailored to the specifics of production. Large percentages for one of the variants would be indicative of a specific behavioural risk and could alert the interested party. The application of the ANP to a large group of farmers can achieve even better results by comparing them on a regional basis or over different periods of time.

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13. Brexit – potential implications for the Polish food sector

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Abstract

The chapter discusses the possible consequences of Brexit for the Polish food sector. The focus was on two areas – the budget of the CAP and the agri-food trade of Poland and the United Kingdom. It was found that the Polish food sector may be particularly affected by the implications of Brexit. On the one hand, the growing pressure to limit spending on the CAP and, on the other, a very likely deterioration in terms of mutual trade in agri-food products will be a problem. In the moderate scenario, which provides relatively small reductions in the CAP expenditure, transfers to Polish agriculture could decrease by almost EUR 290 million on average per year. In the radical scenario, reductions could amount to nearly EUR 1 billion on average per year. In the case of restoring customs tariffs resulting from the WTO Most Favoured Nation Clause, one can expect a breakdown in the Polish exports to the UK of the most important agri-food product groups.

Keywords: Brexit, CAP budget, agri-food trade

JEL codes: E62, F13, F50, H77, Q17, Q18

13.1. Introduction

In the referendum held on 23 June 2016, the British voted for the exit of the United Kingdom from the European Union. On 29 March 2017, after 44 years of membership, the British government notified the European Council of its desire to launch a procedure for the UK to exit the EU in accordance with Article 50 of the Treaty on the European Union. Thus, a two-year period of negotiating the conditions for the exit of the United Kingdom from the EU began. According to the schedule resulting from the Treaty provisions, the United Kingdom will cease to be a member of the EU on 29 March 2019. This will also happen when the agreement setting out the conditions for the exit is not adopted and when the European Council, in consultation with the United Kingdom, does not decide unanimously to extend the negotiations. Although there are voices indicating the possibility of withdrawal of Great Britain from negotiations on the

exit from the EU, as well as ideas of another referendum on the EU membership, the British government upholds its decision of March 2017, and is gradually preparing the country to withdraw from the European structures.

Brexit will, undoubtedly, be one of the most difficult moments and experiences in the history of the European integration. Due to the high degree of integration of the British economy with the economies of other EU countries, the economic costs of the British-EU divorce may be high. The UK's exit from the EU may significantly affect the shape of the future Common Agricultural Policy, including the framework of functioning of the agri-food sectors of the EU Member States. The UK is now both one of the main net contributors to the EU budget, including the CAP budget, as well as one of the main net importers of agri-food products from the EU countries. Therefore, Brexit will have important budgetary and commercial consequences for both the UK and other EU Member States. The Polish food sector can be particularly affected by the effects of Brexit. Poland is currently the largest net beneficiary of the CAP budget – in 2016, Polish farmers and rural residents received almost EUR 5 billion under direct payments and other support programmes. At the same time, Poland is one of the main exporters of agri-food products to the EU countries. The value of Polish agri-food exports has increased significantly in the recent period, mainly due to unrestricted access to the single European market. The particularly high growth rate concerned agri-food exports from Poland to Great Britain. In 2016, food producers exported products worth over EUR 2 billion to the British market, which accounted for nearly 9% of the value of Polish agri-food exports. Currently, the United Kingdom is the second, after Germany, recipient of the Polish agri-food products.

The purpose of the chapter is to discuss the possible consequences of Brexit for the Polish food sector. The potential impact of Brexit on the CAP budget and agri-food trade between Poland and the United Kingdom will be the main focus. The distribution structure is as follows. The second section will briefly discuss the main problems of negotiations on the UK's exit from the EU, the positions of both parties and proposals for arranging future relations between London and the EU mentioned in the discussions. Estimates about a possible EU income gap in relation to the UK's exit and the on-going debate on the multiannual financial framework and the CAP after 2020 will be presented in the third section. An analysis of the impact of possible changes in the level of CAP financing on the changes in the net balances of Poland in the CAP area and financial transfers to Polish agriculture will be presented against this background. The fourth section will be devoted to the assessment of the impact of possible changes in trading conditions on agri-food trade between Poland and the United King-

dom. The assessment in this part refers to the most pessimistic variant, assuming the restoration of customs tariffs in mutual trade, resulting from the Most Favored Nation clause (MFN) adopted in the framework of the World Trade Organization (WTO). The chapter finishes with a summary.

13.2. Negotiations on Brexit – what should be the model of the future relations?

Negotiations on the conditions for the United Kingdom to exit the EU began in May 2017. However, talks of the first phase of negotiations did not cover any issues related to the shape of future trade relations between Great Britain and the EU. The first discussions in this matter are to start in spring 2018 – an agreement on the exit of the United Kingdom from the EU is to be accompanied by a political declaration which will indicate the framework for future trade relations. For formal reasons, the negotiations and signing of an appropriate trade agreement between the United Kingdom and the EU will only be possible after the United Kingdom ceases to be a member of the EU. This means that it will be necessary to negotiate an additional agreement on the transitional period for the period after the UK's withdrawal from the EU and before the entry into force of the new trade agreement. In a joint report adopted at the beginning of December 2017 and closing the first stage of negotiations, the United Kingdom and the EU agreed that it would be crucial to negotiate terms for the transition period as soon as possible [Joint Report, 2017]. At the end of January 2018, ministers of the EU Member States decided that the transition period should not go beyond the current financial perspective, i.e. to the period after 31 December 2020.

As agreed in the Joint Report from the first phase of negotiations, the payment and disbursement of the UK from the EU budget will not change until 2020. The United Kingdom will most likely continue to participate in the EU programmes and policies and will maintain access to the single European market in return for respecting financial commitments until the end of the current financial perspective [Joint Report, 2017]. However, a significant problem may appear as early as 1 January 2021. As indicated by experts, the planned 21 months of the transitional period (from 30 March 2019 to 31 December 2020) seem too short a time to negotiate and enter into force a new and comprehensive trade agreement between the United Kingdom and the EU [cf. Matthews, 2017]. The problem is not only the limitations resulting from the adopted negotiation schedule, but also (and above all) the diverse expectations, interests and preferences of the UK and the EU regarding the form of the future agreement.

In the discussions, there are various proposals for arranging future relations between the EU and Great Britain, differing in the level of liberalization of mutual trade and the scope of co-operation. As part of the options allowing for the so-called soft Brexit, the Norwegian model is most often mentioned – integration and cooperation of Great Britain with the EU within the European Economic Area (EEA) – along with the Swiss model based on bilateral agreements providing a similar level of economic and trade integration between the parties. Agreements based on these models assume the creation of a free trade area and participation in the single European market. A country wishing to participate in the single market is required to adopt and apply the EU regulations in this area, together with relevant case law of the Court of Justice of the EU, and to make a specific financial contribution to the EU budget. However, it does not affect the prepared law and cannot participate in the work of the EU institutions. Other models referred to in the discussions assume the creation of a partial customs union between the United Kingdom and the EU, similar to the customs union between Turkey and the EU, or the creation of a deep and comprehensive free trade area, modelled on solutions adopted in the EU agreements with Ukraine or Canada. However, the British party underlines that none of the known models currently used in agreements linking the EU with third countries will be suitable for the United Kingdom [Treasury Committee, 2016]. The geographical proximity of Great Britain and the economic relations with the EU countries built for decades, resulting in close links at the level of sectors, industries and enterprises, make the United Kingdom a unique case. The EU-27 trade exchange with the United Kingdom is many times greater than the EU-27 trade exchange with Canada, Norway or Ukraine. The British economy is also a very important link in the EU's value chains[18].

As implied from the statements and political declarations of the British authorities, Great Britain will strive to conclude a completely new agreement (bespoken agreement) between the EEA agreement (Norwegian model) and the CETA agreement (Canadian model) [Owen, Stojanovic and Rutter, 2017]. The EU negotiators also stress the importance and meaning of maintaining the closest possible economic and trade relations. At the same time, however, both sides point out to the existence of red lines which they cannot cross in the negotiations. These are the points that significantly limit the possible compromises (Table 1).

[18] For example, in 2011, the share of the added value generated by the British economy in exports of products of the EU-27 food industry amounted to 2.11% on average. The British economy made a particularly large contribution to the added value of exports of agriculture and food products in Ireland (11.6% and 8.8%, respectively). The contribution of the EU-27 economies to the added value of exports of these product groups for the United Kingdom was at the level of 10.5% and 12.6%, respectively [Bellora and Foure, 2017].

Table 1. Comparison of the UK and the EU negotiating goals in Brexit negotiations

	Great Britain	European Union
Objectives	• secure the most frictionless possible trade in goods and services outside the single market and the customs union • avoide the necessity to build any physical infrastructure around the Irish border	• establish a close partnership with the UK and a balanced, ambitious and wide-ranging free trade area • avoide a hard border in the island of Ireland
Red lines	• end the direct jurisdiction of the Court of Justice of the EU in the UK • end of the free movement of people • end mandatory contributions to the EU budget • freedom to pursue an independent trade policy	• preserve integrity of the single market, including the indivisibility of the four freedoms • ensure a level playing field, particularly on competition and state aid, and create safeguards against unfair competitive advantages • preserve the autonomy of the EU legal order and its decision-making • safeguard financial stability of the EU, and respect its regulatory and supervisory regime and standards • ensure the UK does not have a better deal than EU Member States • avoid upsetting existing relations with other third countries

Source: Owen, Stojanovic and Rutter 2017, p. 41.

The British vision of a completely new type of agreement excludes participation in the common market and the customs union. However, it assumes duty-free trade as part of the free trade area and additionally it eliminates non-tariff barriers and other obstacles that usually occur in such zones. As the EU party points out, these are the benefits of participating in the customs union and the common market, which are linked to specific obligations. Granting access to the internal market without taking any commitment or meeting the EU requirements would mean that the United Kingdom (without having the status of a member) would enjoy greater privileges and benefits than the EU Member States.

13.3. The future of the EU finances and the CAP in the context of Brexit

Negotiations on the UK's withdrawal from the EU and its future trade relations with the Union will take place in parallel with the intra-EU negotiations on the future of the CAP and the EU's Multiannual Financial Framework (MFF) for 2021-2027. Both processes can interact with each other to some extent. If the United Kingdom does not divorce fully the EU, and the political declaration attached to the UK's exit agreement with the EU will refer to the possible finan-

cial commitments of the United Kingdom to the EU in the future, talks about the EU finances may be more favourable. However, it should be emphasized that the possible UK payments to the EU budget after 2020, being part of a possible agreement on the access of this country to the common market or to similar benefits, will not solve the problem of the permanent EU income gap that will occur as a result of Brexit. In the previous financial perspective 2007-2013, the contribution of the United Kingdom, after deducting the British rebate, accounted for 10.7% of the EU revenues on average per year. In recent years, this share has increased further. In the first three years of the current financial perspective (2014-2016), it amounted to 12.3% on average per year. None of the scenarios considered assumes that the possible payments negotiated under the agreement on future UK relations with the EU are close to the current membership contributions of that country. Currently, the United Kingdom ranks fourth in the EU in terms of the amount of contributions to the EU budget (after Germany, France and Italy). At the same time, it is the third largest net contributor to the EU budget (after Germany and France, before Italy, the Netherlands, Sweden and Austria) and the second largest net contributor to the CAP budget (after Germany, before Italy, the Netherlands, Belgium, France and Sweden). For this reason, the gap due to the lack of payment of Great Britain's contribution to the EU budget will be much greater than the reduction of expenses from the EU budget due to the United Kingdom's exit [Kawecka-Wyrzykowska, 2017].

The level of the gap in the EU income after Brexit is estimated in various ways. When counting based on the UK payments, not taking into account the UK rebate, after deducting transfers for the UK from the EU budget and based on the average for 2014-2015, it may amount to an average of EUR 16.6-17 billion per year [Kawecka-Wyrzykowska, 2017; Begg, 2017]. Calculations based on the methodology including the UK payments with a rebate and after deduction of transfers to the UK point out to a gap of around EUR 10 billion (both for the average for 2014-2015 and for 2014-2016) [Haas and Rubio, 2017]. There are also studies showing a smaller budget gap after Brexit, including the elaboration by Nuñez-Ferrer and Rinaldi [2016], who based on the data from 2014 and on the net payments of the United Kingdom on a reimbursement resulting from the rebate, indicated an amount of EUR 7.1 billion. Studies taking into account the British rebate in the calculations (reimbursement for the United Kingdom) assume that the amounts paid by other Member States to finance it, are already part of the national budget accounts and will not, therefore, mean new financial burdens for the EU-27 after the exit of Great Britain. Analysts also point to the fact that even in the case of hard Brexit, the revenue gap may be lower due to additional funds that will flow into the traditional EU own re-

sources as a result of customs duties on goods originating from the UK. Nevertheless, taking into account even the most optimistic estimates, the loss of British payments will mean either the need to increase the contributions of other Member States in order to cover the gap after Brexit, or the need to significantly reduce the current expenditure.

It can be expected that the pressure to limit expenditure will be the highest for those EU policies that are currently allocated the largest amount of the EU budget funds. Cohesion Policy is such a policy next to the CAP, they both collectively account for over 80% of the EU spending. As Haas and Rubio [2017] note, if contributions of the EU-27 Member States are not increased, the scope of the required expenditure cuts will be so great that reductions in any other areas (such as migration or defense policy) will not be able to solve the problem. If the expenditure on these policies was reduced, these amounts would be relatively small, from the point of view of the measures needed to fill in the gap caused by Brexit, and on the other hand, huge for these policies themselves. In addition, the new challenges faced by the EU mean that the EU's new policies focused on migration, security and defense are more needed by the EU than ever before. Therefore, the pressure to increase rather than limit spending on these goals is likely to grow.

The framework for discussion on the future EU priorities and their financing was outlined by the European Commission by publishing two documents in 2017 – the White Paper on the future of Europe [European Commission, 2017a] and the Book on Reflection on the future of EU finances [European Commission, 2017b]. Separate communication, published at the end of November 2017, was devoted to the future of agriculture and food production in Europe [European Commission, 2017c]. Although the Brexit budget effects are not analysed in the documents indicated, the proposals contained in them take into account the probable gap in the EU income related to the UK's exit. In the White Paper on the Future of Europe, the Commission presented five scenarios of the EU development outlining various reform proposals and their implications for the EU budget. The Commission has addressed these scenarios in more detail in the next document – the Reflection Paper prepared in June 2017 by the Directorate-General for Budget and devoted entirely to the future of EU finances. Four out of five scenarios set forth a reduction of the EU budget, including the CAP budget. Only the fifth scenario mentions significantly larger funds. However, in the case of the CAP, the Commission does not indicate any priorities in this scenario, which leads to the assumption that it is not seriously considered.

In the Reflection Paper, the Commission also mentions the possibility of introducing co-financing of direct payments so as to maintain the overall levels of current support under the CAP. This proposal is synonymous with accepting

a reduction in the CAP expenditure financed from the common budget. In a press release, Commissioner for Regional Policy, Corina Creţu pointed out that currently only agriculture is 100% financed from the EU budget. At the same time, she stressed that, given the likely limitations of the EU budget in the future, national co-financing could be a solution for direct payments[19]. This proposal was criticized by the Commissioner for Agriculture, Phil Hogan. The option of co-financing direct payments was rejected as inappropriate in the first and working version of the communication on agriculture and the CAP. However, the final version of the document emphasizes that the Communication does not prejudge the outcome of the debate on the EU budget and multiannual financial framework [European Commission, 2017c, p. 9]. This means that the option of co-financing direct payments will be subject to further analysis by the Commission services and may appear in the legislative proposals for the future financial framework and the CAP.

Matthews [2017] emphasizes that the CAP budget will most likely be reduced not only in relative terms but also in absolute numbers in the next MFF. On the other hand, the reduction of budgetary resources will affect the shape of the EU agricultural policy. In autumn 2017, the commissioner for EU budget Günter Oettinger pointed to the need to investigate the impact of possible cuts in the overall EU budget at the level from 15 to 30%[20]. At the same time, the Commissioner for Regional Policy mentioned above, suggested the possibility of adoption of a 5% co-financing rate for direct payments. It can be expected that a group of supporters of reducing the common budget for the CAP will grow among the Member States. The support for accepting co-financing of direct payments will also probably increase. As pointed out by Kaiser and Prange-Gstöhl [2017], the distribution between net contributors and net beneficiaries of the budget, based on the logic of fair return, will continue to play a dominant role in the MFF negotiations. However, it is difficult to predict the outcome of talks on the future EU financial framework and the budget for the CAP. On the one hand, the consent of Member States to increase national contributions to the EU budget is unlikely. On the other, Brexit may increase the pressure to conclude an agreement to overcome the crisis and strengthen the future EU.

[19] Radosavljevic Z., *Commission mulls CAP cuts, rebates in effort to shore up post-2020 budget*, Euractive, https://www.euractiv.com/section/uk-europe/news/commission-mulls-cap-cuts-rebates-in-effort-to-shore-up-post-2020-budget/, 28.06.2017.

[20] Eder F., *Commission gets glimpse of post-Brexit EU budget horrors*, Politico, https://www.politico.eu/article/commission-gets-glimpse-of-post-Brexit-eu-budget-horrors/ 22.11.2017.

13.4. Impact of possible changes in the CAP budget on the net balance of Poland and transfers to the Polish agriculture

Poland is currently the largest net beneficiary of the CAP in the EU. In the first two years of the EU membership (2004-2006), the net balance of Poland in the CAP area (financial transfers for Polish agriculture after deduction of contributions paid by Poland to the CAP budget[21]) amounted to EUR 328 million on average per year. This amount in the first two years of the current financial perspective (2014--2016) increased to EUR 3125 million on average per year. Without taking into account the financial settlements between the national budget and the CAP budget, the Polish agricultural sector received support of almost EUR 5 billion on average per year in this period. At the same time, the load on net contributors in the CAP budget increased significantly. Particularly strong growth was in the United Kingdom – the negative net balance of the United Kingdom in the CAP increased to approx. EUR 3 billion on average per year (from approx. EUR 1 billion on the basis of data from the first two years of the previous financial perspective). For the CAP budget, Brexit will therefore mean a loss of approx. EUR 3 billion on average per year. However, taking into account the total gap in the EU's revenue after Brexit, the pressure to limit the CAP budget may go beyond the amount resulting from the net balance of the United Kingdom in this area.

An attempt to take a closer look at the possible consequences of Brexit for the EU budget and the CAP budget was made by Haas and Rubio [2017] at the request of the European Parliament. The impact of Brexit was measured by these authors by changes in the net budgetary balances of Member States defined as payments made by Member States calculated on the basis of VAT receipts and based on GNP, less total EU expenditure in that state. The methodology used by Haas and Rubio to assess the impact of Brexit on the CAP budget required, in the first step, implementation of a simplified British rebate based on the CAP expenditure, so that adding the initial contribution of the Member State to the CAP budget, the effect of end of rebates and the costs of covering the missing UK net contribution gave a state's payment to the CAP budget[22]. The study by Haas and Rubio [2017] analyses five scenarios:

- Scenario 1, assuming an increase in payments of the Member States to the CAP budget by EUR 3 billion to cover the gap resulting from the missing payments from the United Kingdom;

[21] Although there are no official statistics concerning the Member States' contributions to individual policies in the EU budget statements, they can be estimated by comparing the state's share of the EU budget with the state's share of the EU spending in the given area.

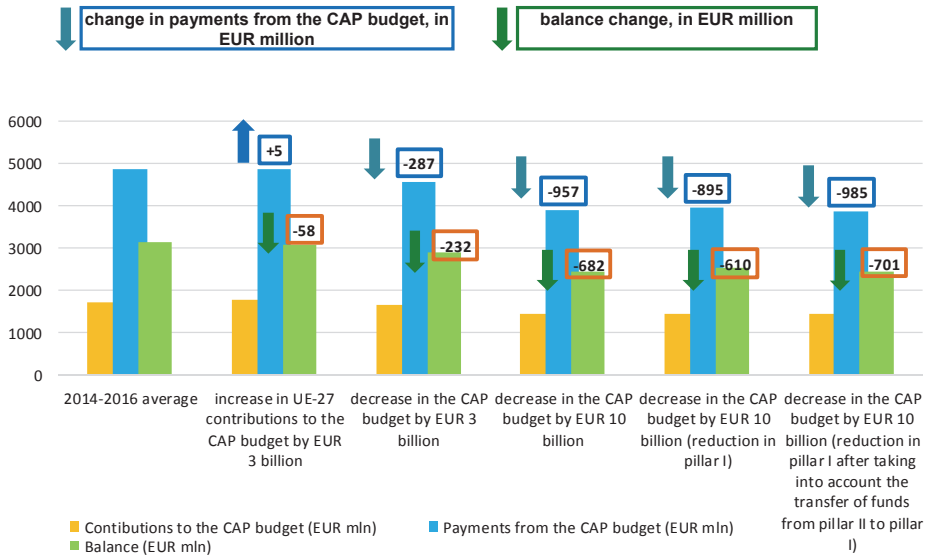
[22] Details of the methodology used are explained by Haas and Rubio on pages 27 and 28 of their study [Haas and Rubio, 2017].

- Scenario 2, assuming a reduction in the CAP budget by the missing amount of EUR 3 billion;
- Scenario 3, assuming a reduction in the CAP budget for both pillars by EUR 10 billion (i.e. by the amount corresponding to the total estimated budget gap after Brexit);
- Scenario 4, assuming a reduction in the CAP budget for 1st pillar in the EU-27 (direct payments) by EUR 10 billion;
- Scenario 5, assuming a reduction in the CAP budget for 1st pillar in the EU-27 (direct payments by 10 billion in the EU-14 (in the so-called old EU Member States).

The scenarios for adjusting the CAP budget to the upbeat reality proposed by Hass and Rubio will be the reference point in assessing the possible impact of Brexit on the net balances of Poland and transfers to Polish agriculture. However, the fifth scenario will be modified in the assessment presented below because the reductions provided for in it refer only to the old Member States. A scenario will be considered instead, assuming that direct payments paid to farmers after reallocation of funds between the pillars (in the case of Poland after reallocation 25% from 2nd to 1st pillar) will be taken into account for the possible reduction in 1st pillar at the level of EUR 10 billion. At the same time, due to the goal set in the introduction, a sectoral approach will be added – a summary of changes in financial transfers that would ultimately reach the Polish agricultural sector after the implementation of individual scenarios. The assessment of the effects of budget changes for Poland will be accompanied by a reference to changes in net balances of other Member States, so as to bring closer the interests and positions that may appear in the negotiations on the future EU financial framework and the CAP budget.

According to the estimates, in all the analyzed scenarios there would be a deterioration of Poland's net balances in the CAP area. With the exception of the first scenario (increase in membership fees by EUR 3 billion), there would also be a decrease in payments from the CAP budget to Polish agriculture (Figure 1).

Figure 1. Estimated Brexit effects for net balances of Poland and transfers in the CAP area (scenario 1-4 by Haas and Rubio and scenario 5 after reallocation of funds between the pillars)



Source: own calculations based on data from the European Commission, http://ec.europa.eu/budget/figures/interactive/index_en.cfm based on the Haas and Rubio methodology [2017].

Average payments and disbursements from the CAP budget for the period of 2014-2016 (for Poland they amounted to EUR 1717 million and EUR 4842 million, respectively) are the reference point in the assessment of changes in payments and disbursements from the CAP budget under the analysed scenarios. In the first scenario of supplementing the CAP budget gap with additional contributions from the Member States in the amount of EUR 3 billion, Poland would have to pay a bit more to the CAP budget (about EUR 60 million more than currently), but at the same time transfers to the sector would be higher by approx. EUR 5 million. The increase in payments would result in deterioration of the Polish balance by EUR 58 million. The deterioration of net balances in the area of the CAP would also be noted by other Member States. However, the largest burden would be borne by net contributors who used rebates for the British rebate (Germany, Austria, the Netherlands and Sweden) [Haas and Rubio, 2017]. It can be expected that these countries will protest most against the scenario of increasing payments to the CAP.

In the scenario with reductions of the CAP budget at the level of EUR 3 billion, both payments to and from the CAP budget would be lower than at present. Payments would decrease by EUR 287 million, and the net balance would get worse by approx. EUR 232 million. The net balance of the other main beneficiaries of the CAP (Spain, Greece and Romania) would also deteriorate. However, the planned cuts would be insufficient to maintain the current load of the main net contributors to the CAP budget. Implementation of this scenario would still result in a significant deterioration of their net balances. There will most probably be a strong pressure by the main contributors for deeper reductions, not so much as to reduce their payments, which will keep the current state of burdens.

In the scenario of radical reductions at the level of EUR 10 billion for both pillars, Poland would have to pay a little less to the CAP budget than in the previous scenario, but would receive much less funds. Transfers to Polish agriculture would decrease by over EUR 950 million, and the balance would worsen by approx. EUR 680 million. In this scenario, the cost of financing Brexit would fall on all major beneficiaries of the CAP – apart from Poland, it would be Spain, Greece, Romania and Bulgaria. If the budget of the CAP was reduced by EUR 10 billion, Germany could maintain a negative balance (currently – EUR 5 billion) at an unchanged level. Other net contributors to the CAP budget, however, would see an improvement in their balances, although there would still be negative balances. The adoption of this scenario, however, seems unlikely as it would undermine the principle of solidarity in force in the EU.

In the fourth scenario, assuming reductions at the level of EUR 10 billion only in 1st pillar (for direct payments), the unfavourable balance for Poland slightly decreases compared to the third scenario, but it would still be a huge drop. Transfers to Polish agriculture would be lower by approx. EUR 895 million, and the net balance would be worse by EUR 610 million. In this scenario, Poland and other new Member States are less affected by cuts than in the previous scenario due to the relatively higher importance of 2nd pillar in the support structure. It is worth emphasizing, however, that the estimates under this scenario do not take into account the possible reallocation between the pillars.

The largest declines in transfers and the balance of Poland would occur if direct payments are covered by reductions after reallocation of funds from 2nd pillar to 1st pillar (fifth scenario). Taking into account the financial flows only, this scenario would be more unfavourable for Poland than the scenario providing for reductions in both pillars. Under this scenario, Poland would contribute EUR 1432 million to the budget of the CAP (by approx. EUR 300 million less than at present) and would receive EUR 3856 million (by almost EUR 1 billion less than at present). Haas and Rubio [2017] indicate that the introduction of co-

-financing direct payments (after a reduction of EUR 10 billion) could change the budgetary impact of the cuts, especially if differentiated co-financing rates are foreseen, depending on the level of affluence of individual Member States. However, co-financing of direct payments is an option that will be difficult to accept for Poland and the other new EU Member States. The reason is not only the lower level of affluence of the new Member States, but also the existing disproportions in the distribution of direct payments between Member States resulting from the distribution criteria used in the past. In the Communication of November 2017, the Commission envisages further external convergence for direct payments. It is possible, however, that the level of payments being the reference point for eliminating disparities in the distribution of funds will be lower than at present. This may mean that despite the planned convergence, Poland may receive a smaller envelope of funds in the next financial perspective, or in a more optimistic scenario, not assuming a reduction in the CAP budget – to maintain the current envelope.

The reduction of the CAP expenditure, including the reduction of the budget for direct payments, may negatively affect the competitiveness of the Polish food sector. This is due to the relatively high share of direct payments in the incomes of individual farms in Poland. There are types of farms where direct payments account for more than half of the income. A particularly high level of dependence on external support concerns dairy farms and slaughter cattle farms – depending on the type and size of the farm, the share of direct payments in income ranges from 30% to 95% [Ziętara and Adamski, 2017]. Lowering the level of payments could not only have a negative impact on the economic situation of farms in Poland, but also threaten the stability of the raw material base for the food industry. Food production in Poland is still primarily based on raw materials from domestic agriculture [Szczepaniak, 2017]. The indicated solution in the form of supplementing the support level from the CAP budget with support from national budgets (co-financing of direct payments) could not provide the expected results. The co-financing rate referred to in the discussions at the level of 5% would imply a burden on the Polish budget of around PLN 680 million on average per year. However, it is not known whether additional support from the domestic budget would be possible. Concerns can also be raised as to whether introduction of co-financing of direct payments will lead to the strengthening of flexibility principle in the management of agricultural support in the EU and, as a result, to diversification of the conditions of competition in the common market.

13.5. The potential impact of Brexit on agri-food trade between Poland and the United Kingdom

Despite the ongoing negotiations between the European Union and the United Kingdom, it cannot be clearly excluded that an agreement between the parties will not be reached. Lack of agreement would mean that trade should be conducted on the general principles adopted in the WTO, i.e. reintroduction of customs duties under the Most Favoured Nation Clause (MFN). Assuming that the United Kingdom would adopt the EU customs tariff, in majority of the most important product groups in the Polish exports to the United Kingdom (according to the four-digit HS classification), relatively high (over 20%) MFN duty rates would apply[23].

Table 2. The most important product groups in Poland's agri-food exports to Great Britain in 2016

Code HS	Code description	Value in EUR million	Share in %	MFN customs duty on imports into the EU in %*
1806	Chocolate and chocolate products	282.7	13.0	*40%*
0207	Poultry meat and offal	234.4	10.8	*20-35%*
1905	Confectionery, cakes and pastries, biscuits and other bakery products	155.3	7.2	*40-45%*
1602	Other meat and offal, processed or preserved	139.8	6.5	*35-115%*
2402	Cigarettes	111.4	5.1	57.6%
1601	Sausages and similar products of meat and offal	100.9	4.7	*32-40%*
0210	Meat and offal, salted, in brine, dried or smoked	93.3	4.3	*18-56%*
0709	Other vegetables, fresh or chilled (including champignon mushrooms)	71.0	3.3	12.8%
0201	Beef meat, fresh or chilled	63.6	2.9	*65%*
1604	Processed or preserved fish	54.4	2.5	5.5-20%
Top 10 product groups in export		1306.8	60.3	×

* The rate of customs duty on imports into the EU of the most important products within a given group according to HS4. Italics indicate the estimated *ad valorem* equivalents of specific rates.

Source: unpublished data of the Ministry of Finance and TARIC.

[23] The duty rates for importing the most important products to the EU within a given group distinguished by a four-digit HS code are given.

The highest level of protection would concern Polish exports, among other meat (poultry and beef) as well as meat and offal products (e.g. sausages), cigarettes, chocolate and chocolate products as well as confectionery and pastry goods. It can be expected that the introduction of customs tariffs in the export to the United Kingdom will increase the prices of Polish products on the British market, deteriorate their price competitiveness and, as a result, decrease the exports. This effect may additionally be strengthened as a result of the increased level of non-tariff barriers (including sanitary and phytosanitary measures, technical barriers, certification procedures). According to estimates by Bellora et al. [2017], the equivalent of non-tariff barriers in the EU exports of dairy products to the United Kingdom may increase in the absence of agreement from 42% to 74%, processed meat – from 24% to 43%, fruit and vegetables – from 18% to 32%, fats and oils – from 22% to 38%, beverages and cigarettes – from 14% to 25%.

In the event of disagreement between the EU and the UK, the MFN duty rates in the Polish imports of the most important product groups from the United Kingdom would be lower than in the Polish exports to the British market (Table 3). In imports of five of the ten product groups analysed here, the duty rates would not exceed 15%. This would apply to fresh or chilled fish, fish fillets, sauces and preparations for them as well as pet food. Import of whiskey, which is the most important product in import, would still be duty-free. The highest duty (over 50%) would apply to imports of processed tobacco, poultry meat and offal. Increasing the protection would cause an increase in prices of British products on the Polish market and, consequently, a fall in demand and a reduction in imports. Similarly, as in the case of Polish exports to the United Kingdom, non-tariff barriers would also significantly increase imports to Poland from the UK. As implied from the estimates of Bellora et al. [2017], the equivalent of non-tariff barriers in some commodity groups may be even higher than in exports to the United Kingdom. Imports to the EU of dairy products would (in the absence of an agreement between the EU and the United Kingdom) amount to almost 84%, processed meat and offal – 58%, and vegetable fats and oils – 49%.

Based on the estimates of the authors mentioned above [Bellora et al., 2017] it appeared that, in the absence of agreement, the average MFN duty rate in Poland's exports to Great Britain (weighted by the structure of Polish exports to this country) would amount to 21.3%, and the non-tariff barriers equivalent would increase from 28% to 49%. In turn, the average weighted MFN duty rate for imports to Poland from the United Kingdom would be 14.2%, and the equivalent of non-tariff barriers would increase from 17% to 30%.

Table 3. The most important product groups in Poland's agri-food imports to Great Britain in 2016

Code HS	Code description	Value in EUR million	Share in %	MFN customs duty on imports into the EU, %*
2208	Whisky	95.1	18.2	*0%*
0203	Pork meat	75.2	14.4	*28%*
2106	Other food preparations (e.g. powders for production of creams, jellies, beverages)	42.1	8.1	*25%*
1806	Chocolate and chocolate products	39.0	7.5	*36%*
0302	Fresh or chilled fish	29.4	5.6	*2%*
2403	Other processed tobacco, tobacco extracts	23.5	4.5	*17-75%*
2103	Sauces and preparations for them, and mixtures of spices	17.6	3.4	*7.7%*
2309	Pet food	15.6	3.0	*0-9.6%*
0207	Poultry meat and offal	12.0	2.3	*52%*
0304	Fish fillets and other fish meat, fresh, chilled or frozen	9.4	1.8	*7.5-15%*
Top 10 product groups in import		358.9	68.7	×

* The rate of customs duty on imports into the EU of the most important products within a given group according to HS4. Italics indicate the estimated *ad valorem* equivalents of specific rates.
Source: unpublished data of the Ministry of Finance and TARIC.

13.6. Summary and conclusions

The UK's exit form the EU will result in many economic, social and political changes, both in the EU and in the UK itself. From the point of view of the development prospects of the Polish food sector, the gap in the EU revenues resulting in a possible reduction of the CAP budget will be one of the most important effects of Brexit. Reductions in this area may mean a lower level of support for Polish agricultural producers in the next EU 2021-2027 financial perspective. However, the outcome of the negotiations on the next multiannual financial framework is difficult to predict at this point. This will depend, e.g. on a new balance of power between net payers and beneficiaries of the EU budget, political compromises on the EU's financial priorities, as well as the provisions of the agreement on future relations between the UK and the EU.

The moderately optimistic scenarios for the future CAP budget assume reductions at the level corresponding to the United Kingdom's net contribution to the CAP budget (EUR 3 billion). Radical scenarios indicate cuts corresponding to the total UK contribution to the EU budget (EUR 10 billion). If we adopt these two scenarios, the range of possible reduction of transfers to the Polish agricultural sector would range from almost EUR 290 million to over EUR 980

million on average per year. The current course of the debate on the future of the CAP indicates that reductions may cover mainly direct payments. In the documents published in 2017, the European Commission considered lowering the CAP budget and also signalled the possibility of introducing co-financing of direct payments. If the reduction scenario is implemented, it is likely that the competitiveness of the Polish agricultural sector will deteriorate due to the currently relatively high share of direct payments in the income of the Polish farmers.

Brexit can mean unfavourable changes not only for farmers but also for all entities involved in agri-food trade. The scenario of introducing duties on agri-food products in mutual trade between Poland and the United Kingdom (hard Brexit) will most likely lead to the effect of shifting trade to cheaper suppliers in both countries. Therefore, one can expect a breakdown in the Polish exports to Great Britain of the most important groups of agri-food products, and the most of processed meat, cigarettes and beef (possible increase of prices on the British market by over 50%), chocolate and chocolate products as well as confectionery and pastry products. The increase in the level of non-tariff barriers will be an additional difficulty in access to the British market for the Polish agri--food products. Imports to Poland can be expected to encounter a clearly smaller decrease than exports to the British market. Among the most important import items, imports of poultry, processed tobacco, chocolate and chocolate products as well as pork meat can decrease the most.

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14. The Transatlantic Trade and Investment Partnership (TTIP): a threat or an opportunity for the EU-Mediterranean agriculture and agri-food sector? An exploratory survey

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Abstract

Agricultural and food sectors are well-developed in both the European Union (EU) and the United States of America (US), highly productive and strongly protected. Over the last 50 years, much of the current regulations which have emerged does not interfere with abundantly transatlantic trade, while some subsegments of the markets are still subject to quantitative restrictions, import duties or regulatory barriers. For these reasons, agriculture and food-related issues have always played an important role in trade negotiations. In June 2013, the European Commission (EC) launched negotiations on the Transatlantic Trade and Investment Partnership (TTIP), an agreement that aims to remove barriers to trade and investment between the EU and the US. However, important political responsiveness, regulatory regimes heterogeneity in particular agri-food safety standards are still existing. Furthermore, the EU Member States are fairly heterogeneous as regards the relative importance of agri-food trade for their economies. The agri-food industries are of particular strategic interest for many governments. Changes in the EU's Common Agricultural Policy (CAP) and thus the Euro-Mediterranean zone have direct implications for farmers, consumer protection and for the animal welfare. The research question was, if the EU Mediterranean countries will benefit from the TTIP and what effects would the TTIP have on the CAP, agri-food quality standards and food safety? The present article attempts to investigate whether the TTIP negotiations and the CAP instruments and their adjustments improve the prospects that the Euro-Mediterranean regions can be food secure in the future and a sustainable development is possible as well as to ensure food safety.

Keywords: Transatlantic Trade and Investment Partnership (TTIP), Common Agricultural Policy (CAP), agri-food, food safety, Euro-Mediterranean region.

JEL codes: F13, F14, Q01, Q17, Q18

14.1. Introduction

The European Union (EU) and the United States of America (US) are politically and economically closely interlinked and rank among the world's largest economies. Both are members of the World Trade Organisation (WTO). In June 2013, the two partners launched negotiations on a Transatlantic Trade and Investment Partnership (TTIP) [EC, 2013a]. It is defined as a bilateral Free Trade Agreement (FTA) with the primary objective of reducing tariff and non-tariff barriers [EC, 2013b]. The established food safety and quality standards as well as their certification systems are among the non-tariff barriers and have an effect on trade policy.

Due to globalization, trade policy debates have intensified in recent years and more trade agreements have been launched. Not only the major industrial nations but also the developing countries are affected.

The present paper is a sub-study of an on-going research project (PhD studies) aiming to identify the role of quality standards under trade agreements. Under the framework of the entire research project, different EU countries and defined EU zones as well as the US are considered. Therefore, the present study is focusing on the EU-Mediterranean countries. Furthermore, based on the TTIP background in the context of the CAP, the examination wasn developed around three specific research questions:

- What benefits do the EU-Mediterranean countries have from the TTIP?
- What effects would the TTIP have on the CAP?
- Will agri-food quality standards and food safety be affected by the TTIP?

In order to discuss the effects of the TTIP on the EU's Common Agricultural Policy (CAP), it should be pointed out that the FTA must be integrated into an existing framework of the current world trade regime. Moreover, economic aspects and regional specificities of the EU Member States must be considered. Consequently, the first theoretical part of this paper outlines the rationale towards a new model and simpler CAP 2020+ as well as agricultural trade statistics. Moreover, the differences in the EU and the US regulatory systems regarding the food law in the context of TTIP are highlighted. It follows a literature review of the most important studies. Based on two studies, the authors have formulated a thesis for the specific research question. To find an answer to the thesis, the third part of this paper describes an empirical analysis, which is based on an online survey. Regarding this, the results and a conclusion are presented.

14.2. Theoretical framework

Rationale towards a new model and simpler CAP post-2020

The relationship between increased trade and food security has been debated intensively for many years, because it is an essential element of trade policies and development strategies of most countries. It is generally acknowledged that an effective trade policy must be consistent with the development policy as well as with foreign policy. Thus, the pressure to liberalize agricultural trade in line with the rise of liberal economic policies on a global scale has been growing for the past decades. But how exactly trade liberalization affects food safety and security is a hotly contested question.

Worldwide there is over 30% of active workforce engaged in agricultural work [World Bank, 2014]. For 70% of the world's poor people who live in rural areas and are also among the most food insecure people in the world, agriculture is their main economic activity [World Bank, 2014]. Some 2.5 billion people are engaged in small-scale agriculture on either a full- or part-time basis [IFAD, 2013].

At European level, the European Commission (EC) has been reported in 2017, that the European agriculture sector (farming and rural areas) "is one of the world's leading producers of food and guarantees food security for over 500 million European citizens." Accordingly, 22 million people work regularly within the sector. Looking at the broad food sector, 44 million jobs are provided. Short recapped, a large number of jobs depend on agriculture [EC, 2017a]. Thus, agriculture sector plays a key role for sustainable economic development. To keep this up, the various measures of the CAP were set up to support their farmers.

An important component is the trade policy. Basically, the entire CAP has been subject to WTO discipline since 1995 and is "affected by agricultural concessions granted to a wide range of countries under several multilateral and bilateral agreements", for instance, with the African, Caribbean and Pacific countries, Mercosur, the Euro-Mediterranean Area, Mexico, Chile and others. "These preferential agreements must also be compatible with WTO rules" [Massot, 2017].

In this context, the EU has been set itself the goal of achieving "a balanced and progressive trade policy to promote globalization" and sustainable development [EC 2017d]. For this purpose, the EU defined specific rules for modern trade agreements, see Box 1.

With regard to the Agenda 2020 and the 17 Sustainable Global Goals (SDGs) proposed by the United Nations (UN) in 2015, the EU has transposed these themes into the EU policies. In this context the agriculture ministers of 69 nations "fully acknowledged their responsibility for improving food security and nutrition, sustainably improving the efficiency and profitability of the food and

agriculture sector and the right to adequate nutrition, in particular SDG 2" [GFFA, 2018]. "Notably, the CAP underpins the policies spelled out in the 2030 Climate and Energy framework, which calls upon the farming sector to contribute to the economy-wide emission reduction target of -40% by 2030 and EU Adaptation strategy" [EC, 2017a].

Box 1. Sustainable development in the EU trade agreements

The EU and its trade partners must:

- *follow international labour and environment standards and agreements,*
- *effectively enforce their environmental and labour laws,*
- *not to deviate from environmental or labour laws to encourage trade or investment, and thereby preventing a "race to the bottom",*
- *sustainably trade natural resources, such as timber and fish,*
- *combat illegal trade in threatened and endangered species of fauna and flora,*
- *encourage trade that supports tackling climate change,*
- *promote practices such as corporate social responsibility.*

The EU also uses its trade agreements to:

- *promote sustainable public procurement,*
- *remove barriers to trade and investment in renewable energy.*

Source: EC, 2018.

To emphasise the particular significance, a highly relevant statement of EU-Commissioner Hogan is cited in Box 2.

Box 2: Statement of Mr Hogan on behalf of the Commission, 1 February 2017

The agri-food sector is one of the most important and dynamic economic and job-creation sectors throughout the EU and currently supports some 44 million jobs in direct agricultural production and in the food-processing sector. One of the key purposes of concluding trade agreements is to increase employment and income opportunities as a whole as well as for the agri-food sector. Over the past decade, the value of agri-food exports from the EU has increased from EUR 60 billion to almost EUR 130 billion per year. Opportunities to increase food demand within the EU are limited while, at the same time, there is rapidly growing demand in many new markets, including a number of emerging economies. A recently published study confirms the opportunities in twelve major trade negotiations for many agricultural sectors such as dairy, pig meat, cereals, wines and other beverages. The study also reveals the sensitivities for important EU agricultural sectors in some of these negotiations, in particular for beef, sheep meat, rice, poultry and sugar. The Commission fully acknowledges these sensitivities in each individual negotiation and its negotiating position reflects those sensitivities by limiting market access in those particular sectors through the use of tariff rate quotas. Through its Common Agricultural Policy, the EU also provides basic income support, a safety net for market volatility and a wide range of rural development instruments, in particular encouraging farmers to innovate, improve environmental performance, food safety, quality and competitiveness and to explore new market opportunities.

Source: European Parliament, 2017.

However, the CAP has long been criticised for its damaging effects on developing country agriculture. Even if the EU's food security at short run is not threatened, the real food security challenge affects the poor and smallholders in developing countries including the Mediterranean ones. The CAP should respond to this challenge by promoting an open and stable trade regime for agri-

cultural products [Driouech et al., 2014]. With view on the developing countries the lack of a level playing field in the agricultural sector is evident. A study of the Quaker United Nations Office (QUNO) [Clapp, 2014] underlines that compared to the industrialized countries, which are members of the Organization for Economic Cooperation and Development (OECD), the developing countries paid enormously low subsidies to their own farmers. Hence, the level of state support to the agricultural sector is a key competitive advantage.

The principal point is that, the CAP, as a central component of the EU's internal policy, must continue to respond to well-established challenges but also has an essential role to play in realising the Juncker priorities (see Box 3). The main challenges are:

- boosting employment, growth and investment;
- harnessing the potential of the bio-economy, the circular economy and the Energy Union;
- bringing research and innovation out of the labs and onto the fields and markets;
- fully connecting farmers and the countryside to the digital economy; and
- contributing to the European Commission's agenda on migration [EC, 2017a].

Box 3: The Common Agricultural Policy (CAP)

CAP is the European Union's (EU) answer to the questions of how to ensure food security, the sustainable use of natural resources and the balanced development of Europe's rural areas. Its aim is to help provide a decent standard of living for European farmers and agricultural workers and a stable, varied and safe food supply for citizens. It also contributes to the EU's priorities such as creating jobs and economic growth, tackling climate change and encouraging sustainable development. The CAP has three interconnected routes to help it reach these goals: income support for farmers (the so-called "direct payments"); market measures, for example to combat a sudden drop in prices, and rural development.

Source: EC, 2017c.

Agricultural trade statistics

To underline the importance of trade relations, some statistics are presented.

The current trade statistics [EC, 2017e] show that in 2016, the total trade value of world export of the EU-28 amounted to EUR 1743.7 billion and the value of imports was EUR 1710.8 billion. Regarding the total agri-food trade of the EU-28, the export amounted to EUR 131.1 billion (share of total trade is 7.5%) and import is EUR 112.5 billion (share of total trade is 6.6%) in total.

Concerning the US the total value of exports from the EU-28 to the US amounted to EUR 362.1 billion (share of EU-28 total trade is 14.6%). The value of imports from the US amounted to EUR 249 billion (share of EU-28 total trade is 20.8%). Regarding the agri-food trade in 2016, the value for exports from the EU-

28 to the USA was at EUR 20.7 billion and imports from the US totaled EUR 11.2 billion. For exports, the annual rate of change is 4.7% and for imports it is 5.5%.

Figures (1 and 2) in Appendix I reveal the import and export figures of selected products, which represent more than 10% of the total EU trade with the US.

Differences in the regulatory system regarding the food law of the EU and the US regarding the TTIP

The European agri-food sector is characterized by a complex system of different economic actors. It covers all stages of the food supply chain. In the area of food production, traceability across all stages is essential in order to create high quality and safe products. Each participant has to be in close contact with the upstream and downstream stages. This is known as "from farm to fork" approach [Regulation (EC) 178/2002]. In addition to hygienic acceptability, food safety also includes aspects such as genetically modified organisms (GMO), safe manufacturing processes and product labelling, which were discussed in the context of the TTIP negotiations. With the aim of ensuring a smooth production process and guaranteed quality standards of the products, manufacturers from all sectors act according to established national and international standards [BfR, 2018; Regulation (EC) 178/2002].

Barrier-free international trade is based on the application and recognition of common standards. In the context of the TTIP, mutual recognition of standards, especially in the agri-food sectors, will play a much more important role than full harmonization [EC, 2016]. The EU's TTIP negotiators have always stressed that none of the existing European standards in the agri-food sector will be adapted to the US regulations [EC, 2016]. For instance, the European Consumer Organisation (BEUC) called on the EC, that they "should strive for upward harmonisation in the food area by upholding 'best in class' food safety and consumer protection policies which are currently in place on both sides of the Atlantic" [BEUC, 2014]. Since it cannot be generalized that the EU standards have stricter regulations in all areas, first the regulatory differences have to be considered. Table 1 shows the different EU and US regulations at a glance. Detailed investigations about the regulatory differences were made by Matthews [Matthews, 2014] and Rudloff [Rudloff, 2014], which were used to formulate recommendations for action in the negotiations of the agreement.

However, it can be assumed that both the TTIP partners are pursuing similar goals despite these differences. Both the EU's general food law [Regulation (EC) 178/2002] and the US Food Law revised by the Food Safety Modernization Act (FSMA) consider the entire supply chain and tracking linkages to international standards.

Table 1. Overview of the different EU and US regulations

In brief		
'Precautionary principle'	Fundamental part of risk management	Concept not endorsed as a basis for policy making
Societal, economic, ethical or environmental concerns	Taken into account in risk management decision in line with the consumer right to information and choice	'other factors' considered as barriers to trade
Approach to ensuring food safety	Integrated "farm-to-fork" approach	Safety mostly verified at the end of the process
Food risk evaluation	Full scientific assessment by EFSA for regulated products such as GMOs and additives.	Largely relies on companies' own private assessment

Source: BEUC [2014].

The controversial matters in food safety between the EU and the US are still the Sanitary and Phytosanitary issues (SPS), which are non-tariff trade barriers. The EC has recently been asked by the European Parliament to seriously consider the import restrictions on pork, chicken and beef from the US [Haeusling, 2018].

The reasons are worrying lack of hygiene in the US meat production, which was revealed by The Guardian. The British newspaper claimed to have internal records of the US government on hygiene violations in meat processing. "A new analysis reveals that as many as 15% (one in seven) of the US population suffers from foodborne illnesses annually" [Guardian, 2018]. The rates at which infectious foodborne illnesses occur in the US are significantly higher than in the EU. The US meat industry is accused of not engaging in serious consumer protection. One reason for the high number of food infections could be a loophole in law. This makes it possible to place Salmonella-contaminated meat on the market, since Salmonella detection does not require the entire batch to be withdrawn from the market. In the US, it has already been requested to revise the legal regulations on contamination with Salmonella. Other reasons for the problems in the meat supply chain are careless handling of animals, poor hygiene, contamination with faeces in meat production, and rationalization in processing. Experts pointed out the risk that infectious pathogens spread from carcasses to carcasses and between meat pieces [topagrar, 2018].

14.3. Literature review

Since the beginning of close debates on a possible trade agreement between the EU and the US, the question has been asked what economic effects can be expected from an FTA. Therefore, the European Commission funded studies to ex-

amine these effects and experts have thoroughly analysed the possible benefits. The groundbreaking studies, which forecast the macroeconomic consequences are presented in Table 2. Furthermore, the models and results are shown.

Table 2. Overview about the macroeconomic studies, models and results

	ECORYS[a] (2009)	**CEPII[b] (2013)**	**CEPR[c] (2013)**	**Bertelsmann/ifo[d] (2013)**
CGE[e]	GTAP[f]	MIRAGE[g]	GTAP	Gravity model
used datasets	GTAP 7	GTAP	GTAP 8	not specified
non-tariff barriers	Ecorys	CEPII and Ecorys	Ecorys	ifo Institute
forecast period	2008-2018	2015-2025	2017-2027	10-20 years
number of scenarios	7	5	5	3
tariff reductions to goods	75%-100%	100%	98-100%	100%
reduction of non-tariff barriers	25%	25%	25%	not specified
Change EU GDP[h] in %	0.32-0.72	0.0-0.5	0.02-0.48	0.52-1.31
Change US GDP in %	0.13-0.28	0.0-0.5	0.01-0.39	0.35-4.82
Change bilateral EU Exports in %	not specified	49.0	0.69-28.0	5.7-68.8
Change total EU Exports in %	0.91-2.07	7.6	0.16-5.91	not specified
Change EU real wages in %	0.34	not specified	0.29-0.51	not specified
rate of unemployment in %	unchanged	unchanged	unchanged	-0.42

[a] Ecorys is an international company providing research, consultancy and management services http://www.ecorys.com/about/profile-and-history. [b] CEPII is a French research center in international economics which produces studies, research, databases and analyses on the world economy and its evolution. http://www.cepii.fr. [c] Centre for Economic Policy Research. London. UK. https://cepr.org/. [d] ifo Institute – Leibniz Institute for Economic Research at the University of Munich. https://www.cesifo-group.de/ifoHome/CESifo-Group/ifo.html. [e] CGE is a Computable General Equilibrium Modell. https://www.gtap.agecon.purdue.edu/models/cge_gtap_n.asp. [f] GTAP is a Global Trade Analysis Project. https://www.gtap.agecon.purdue.edu/about/project.asp. [g] MIRAGE is for Modelling International Relationships in Applied General Equilibrium. https://www.gtap.agecon.purdue.edu/resources/download/1256.pdf. [h] GDP short for Gross Domestic Product.

Source: Ecorys, 2009; CEPR, 2013; CEPII, 2013; Felbermayr et al., 2013a; Team Stronach Akademie (2015); Ankenbrand, 2015.

An in-depth analysis [Bendini and De Micco, 2014] summarizes the results of the above-mentioned studies as follows:

- According to the EU funded study, TTIP will be beneficial to the EU economy.

- Not all EU Member States will benefit equally from the conclusion of the agreement, however.
- Studies produced by CEPR [CEPR, 2013] and ECORYS [Ecorys, 2009] have stressed that most gains would come from regulatory approximation and that the benefits from tariff cuts would be limited.
- The CEPR [CEPR, 2013] study was based on calculations for the EU as a whole and do not provide projections for individual Member States.
- The study published by Bertelsmann [Felbermayr et al., 2013a], used an alternative method and pointed out that north and Western Europe are projected to benefit greatly from TTIP.

As part of the literature review, the study about awareness of the TTIP abroad by Konrad-Adenauer-Stiftung [Maier, 2014] as well as the WTI study "TTIP and the EU Member States" [World Trade Institute, 2016] were considered in detail.

It was found that the results of both studies are a general assessment in all branches. Furthermore, the thesis that has been developed, based on the findings of the same studies, was: In the EU countries the attention for the TTIP negotiations is not high and so far has not been reflected in lasting implications. In addition, up-to-date studies were lacking on how stakeholders, in the EU-Mediterranean agri-food sector, have addressed these issues. The aim was, to examine the thesis based on an empirical analysis, which is explained in the next chapter.

14.4. Empirical analysis

Background

Based on the formulated thesis in the literature review, an empirical analysis was conducted. As a primary objective it was defined that the survey should focus exclusively on agri-food industry. In order to obtain a qualified opinion on the topic, the evaluation should only be carried out by market experts based in the EU-Mediterranean countries.

Material and Methods

To answer these research questions, fresh data were collected from a self--administered online survey. The survey was carried out by means of a software "EFS Survey" of Questback GmbH within the academic programme "Unipark".

The Euro-Mediterranean area target countries were Croatia, France, Greece, Italy, Portugal, Slovenia and Spain.

As for the online survey participants, the experts of the German Chambers of Commerce Abroad (AHK) were selected. The selection was based on the fact that their employees are intensive market knowledge in the respective country

[DIHK, 2018]. Respondents were personally invited. From the individual AHK several persons per country could participate. Only the personally invited persons have received a link to the website to complete the questionnaire. Participation in the survey was voluntary and anonymous and precise instructions on how to fill in the survey were given. The questionnaire used mainly close-ended questions (Likert-Type Scale), allowing free text inputs and comments.

The survey was made available between a period of 6 weeks in 2016. It was structured and developed into three technical sections and one section on demographic data:

- First section: 7 questions regarding the TTIP,
- Second section: 5 questions about trade with the US,
- Third section: 5 questions regarding quality management in agri-food sector,
- Fourth section: 4 general questions/ statistics.

Online survey findings and discussion

The following charts outline the most important empirical findings regarding the research question. The order corresponds to the structure of the questionnaire. The results are subjective assessments and provide insights about the TTIP in the EU Mediterranean countries, specifically in the agri-food sector.

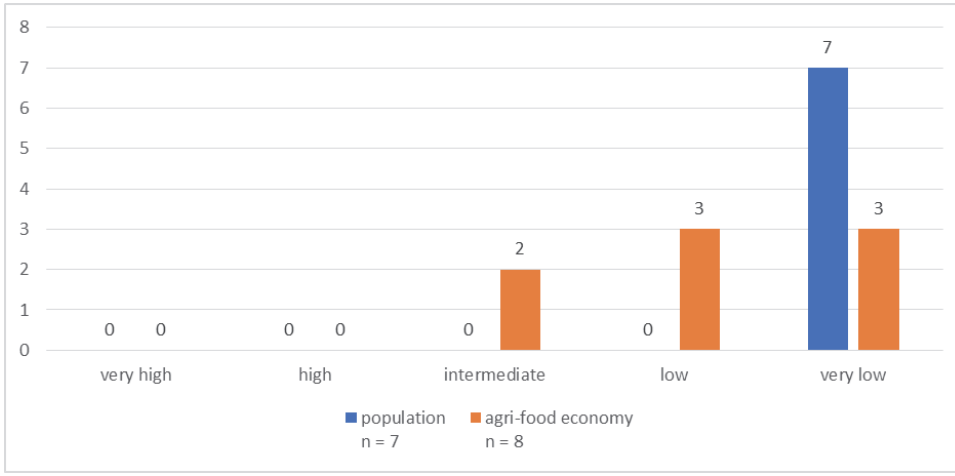
First section: questions regarding the TTIP

In order to be able to assess the level of knowledge about TTIP, the degree of information about the negotiations and the content of the contract had to be requested. It was shown how the population in the country is informed in comparison to the agri-food economy. The results in Figure 3 clearly show that the population in the EU-Mediterranean countries has a very low level of information on the topic. In comparison, it has been assessed that the agri-food sector is rated as average to low informed. It is noticeable that according to the respondents, nobody has high or very high knowledge of the TTIP negotiations and its contractual content.

One reason for this can be, that access to the information is not without barriers. The access to information was considered as generally very difficult. To an identical result came a media analysis which was carried out at the same time. In this, consumers were identified as uninformed and non-expert [Pietrzyck et al., 2017].

In a different investigation conducted with non-experts, it has been reported that only 50% of surveyed population had heard of the TTIP before this survey. “However, the level of knowledge about the TTIP was quite low, only 6% of the respondents knew in-depth what the agreement comprehends.” [Västi, 2016]

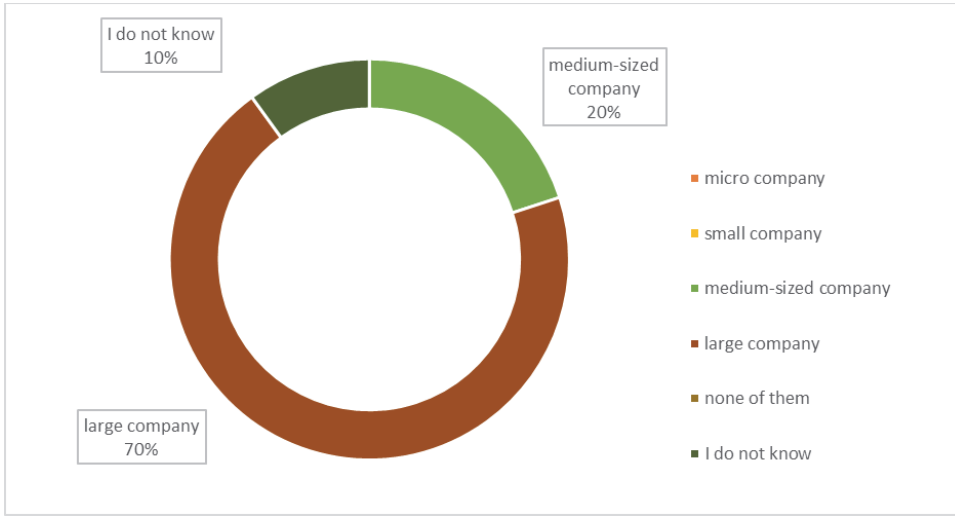
Figure 3. Level of information about the TTIP negotiations and/or content of the TTIP agreement in 7 EU-Mediterranean countries



Source: own calculations.

One of the most important question was, which companies will take advantage of the TTIP. The results of Figure 4 point out that, in the opinion of respondents, especially large companies (70%) will derive advantages from the TTIP agreement. Nobody suspects that it will be beneficial for micro or small companies. After all, two respondents (20%) believe that the agreement could also benefit medium-sized companies.

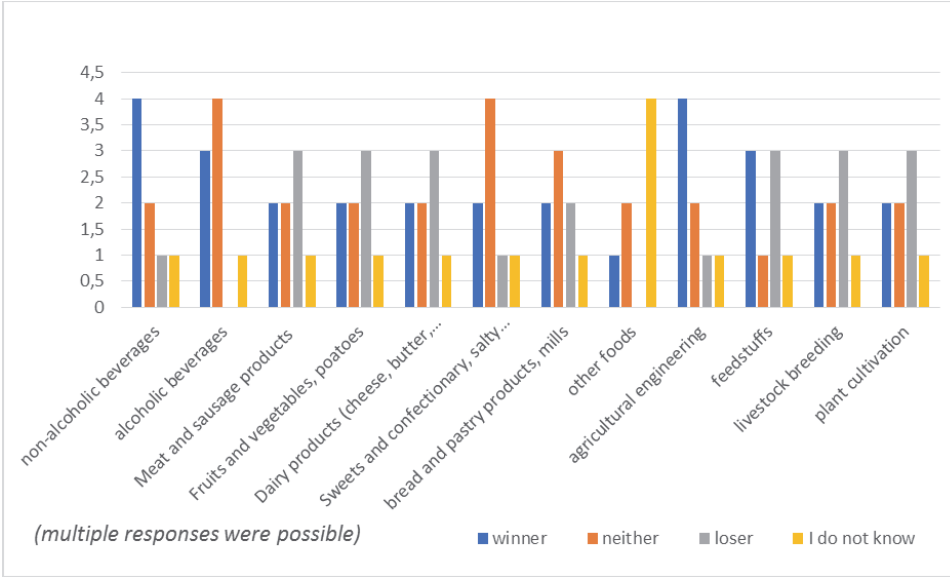
Figure 4. Total and share, which companies will take advantage of the TTIP (n=10)



Source: own calculations.

Another important question was, who will be the winners and losers of the agri-food industry on the TTIP. The results are shown in Figure 5. The participants were voted, that the beverage industry, which includes non-alcoholic and alcoholic beverages, will benefit the most. Moreover, the sector of agricultural engineering will be one of the winners. Secondly, it was noticed, that most industries should not have any winners or losers, because there are no clear indications. For example, there is a balanced result at the dairy production industry, which is a focused industry in the TTIP negotiations. Most other industries show a similarly balanced result, e.g. meat, fruit and vegetables, bread and pastry as well as livestock breeding and plant cultivation industries. It should be highlighted, that the sweets and snacks industry will be a stable economy. It was recognized, that no one in the agri-food sector might be the TTIP's total loser.

Figure 5. Presentation of expected winners and loser of the TTIP



Source: own calculations.

In another study with different approach, Felbermayr et al. [Felbermayr et al., 2013b] concluded that:

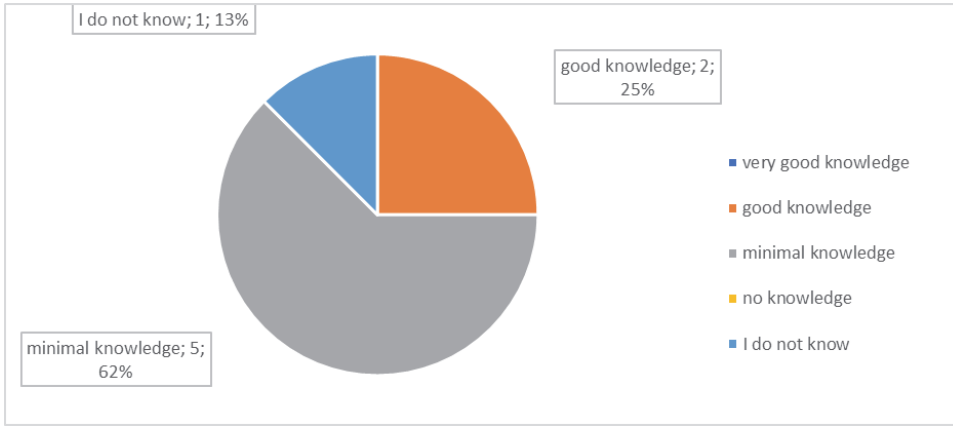
- EU trade with neighbouring states in North Africa or Eastern Europe would decline by an average of 5% from the comprehensive agreement. This results from the circumstances that the TTIP partially devalues existing preference agreements.
- A free-trade agreement between the United States and the EU has important welfare effects on the countries directly involved, and on countries

that are only indirectly affected by the agreement. Within the EU, as well, there are differences cutting across the countries. Within Europe, the Baltic States benefit most from eliminating tariffs in trade with the United States. Relatively high gains arise also for Great Britain and in the countries bordering the Mediterranean. Germany can expect an increase in real, *per capita* income of 0.24%. Located at the other end are France, the Benelux countries, and Austria, with its neighbours. The average is 0.27%.

Second section: trade with the US

In order to establish trade relations with other countries, it is important to have in-depth economic knowledge of the trading country. For this reason, it was important to know, as distinct is the export competence concerning the US market in the seven EU-Mediterranean countries. The following Figure 6 highlights the results. With regard to export competence, it is noted that the level of expertise is scored minimal. There is a need to improve the skills.

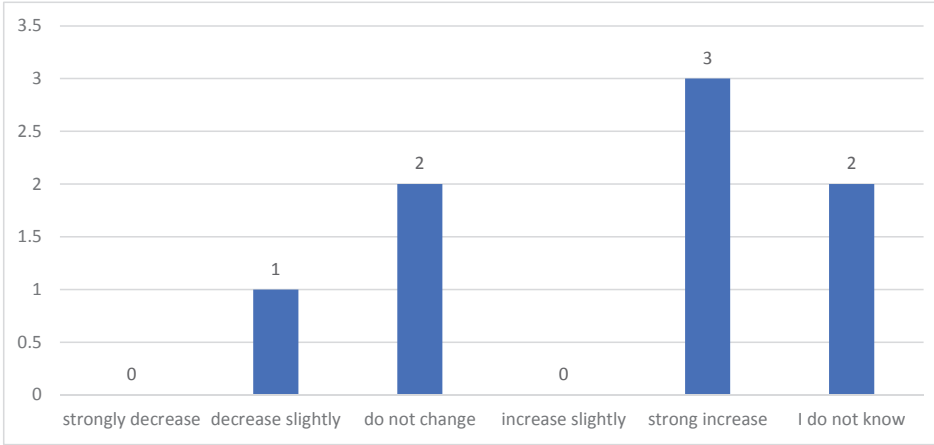
Figure 6. Display the export competence regarding the US-market of the 7 EU--Mediterranean countries (n=8)



Source: own calculations.

It was expected that the EU-US partnership will have an impact on the customer-supplier relationship. Associated with this, the coordination process between the partners will change along the entire value chain. By means of the question, how will the approval process along the value chain develop over the next twelve months, it can be concluded, that the customer-supplier relationship will not change or will possibly intensify (see Figure 7).

Figure 7. Expected transformation of the approval process along the value chain (customer-supplier relationship) due to the TTIP (n=8)

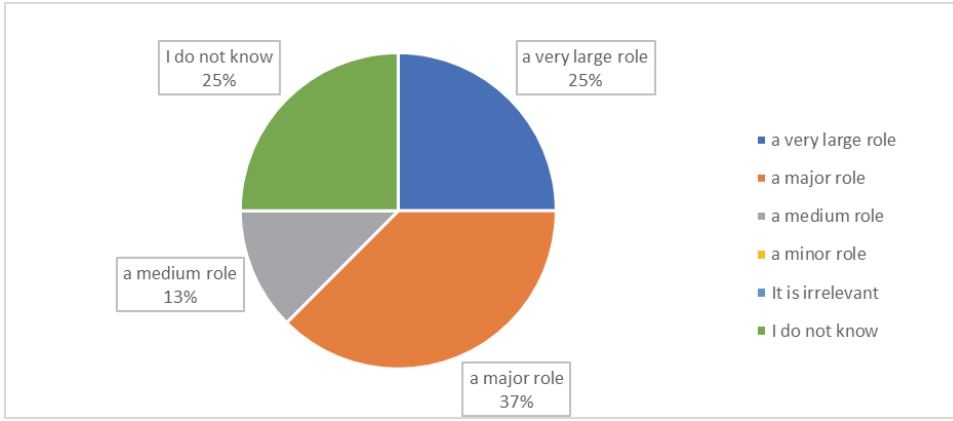


Source: own calculations.

Third section: quality management in agri-food sector

The question about the role of international quality standards in the agri--food sector was answered clearly. Figure 8 shows that over 60% of the participants agreed, that the standards have a very large or major role.

Figure 8. Role of international quality standards in the global trade in total and percentage share (n=8)



Source: own calculations.

A study on the TTIP, carried out by the German Federal Association of Green Business (UnternehmensGrün e. V.), reported that the "harmonisation of standards would represent an existential threat to many companies in the farming sector and to many medium-sized processing businesses in the food production sector" [Büchel and Reute, 2015].

14.5. Summary and conclusions

The results of this study show the complexity of the relationship between the CAP instruments and the planned free trade agreement, i.e. the TTIP as well as the quality standards in the agri-food sector and food safety with focus on the EU-Mediterranean countries. It is clearly stressed, that there is a need to coordinate the CAP with the EU trade policy.

There is an absolute need for more transparency of the TTIP negotiations, because the results of the online survey confirm the thesis that there is rather low focus in the EU countries on the TTIP negotiations and so far it has not been reflected in lasting implications.

Because of the current trend towards more trade agreements due to growing global markets and globalization, it is essential to ensure high standards of food safety and advance the process of international standardization. The resulting challenges consisted of developing know-how, increasing international competitiveness and seeking pragmatic regulations [Petersen et al., 2017].

In order to tackle these common challenges, well established networks of professionals from a variety of thematic areas have to be build between the EU and the US. To be effective and to achieve the aims of the CAP's objectives, it must take account of the trade policy. It is of primary importance that the agri-food trade will be integrated into CAP instruments beyond 2020 as well.

It could be concluded, in case the negotiations regarding TTIP will be reactivated or opened, that an independent academic study and investigation on agricultural implications of TTIP in the EU-Mediterranean countries should be carried out. The research must be progressed further and continued.

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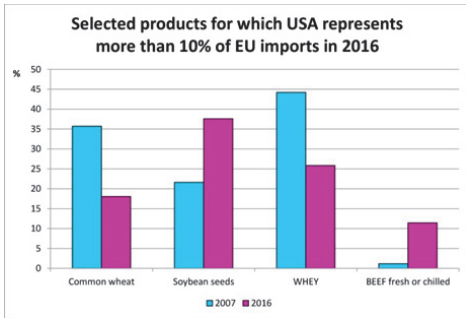
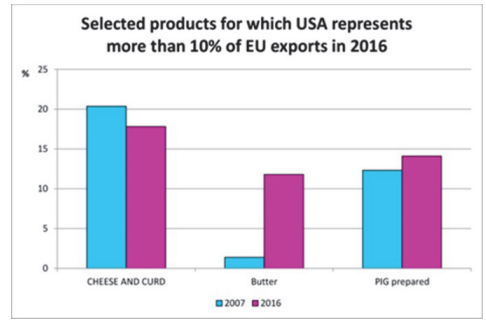
Appendix I: Overview of trade statistics regarding selected products

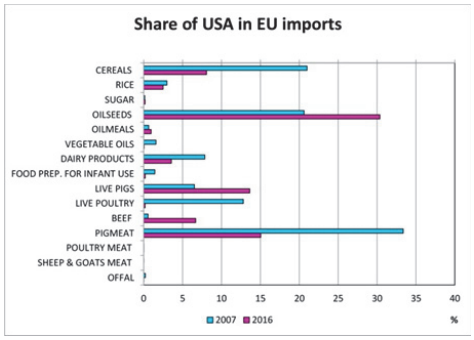
Figure 1. The EU's import and export of commodities, which represent more than 10% of the total EU trade with the US: comparison of 2007 to 2016

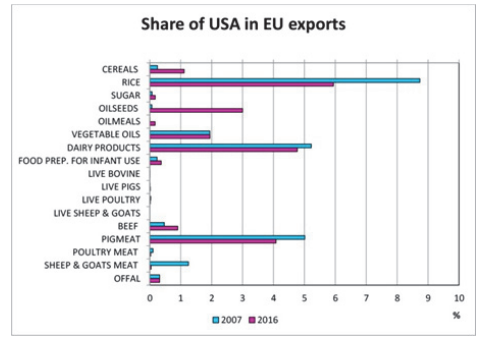




Source: EC [2017b].

Figure 2. Share of the US in the EU's import and export by commodity: comparison of 2007 to 2016





Source: EC [2017b].

15. The concept of short supply chains in the food economy

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Abstract

In the last two decades, the topic of sustainability has moved from the fringes of supply chain management research to the mainstream and is now an area of significant research activities, and in particular the short food supply chains (SFSCs). There are many different forms of SFSC, but they share a common characteristic of reduced numbers of intermediaries between the farmer or food producer, and the consumer. The growing interest in SFSCs reflects the consumer demand for quality and traceability. In this paper, the authors highlight the importance of the SFSC for sustainable economic development and present the barriers to the SFSCs creation. Furthermore, they point out the global context of the SFSCs. The SFSCs have the potential to increase farm value added (profit allocation), promote sustainable farming systems, diversify production and contribute to local economic development.

Keywords: short supply chain, sustainable development, profit allocation, TTIP, FTA, EU trade policy

JEL codes: A10, A11, A12, F13

15.1. Introduction

Agribusiness and food supply chains are transforming from the commodity system into a coordinated food system [Jarzębowski, 2013]. This leads to competition between various supply chains and networks, and not only to competition between individual companies [Lambert and Cooper, 2000; Christopher, 1998]. However, these trends of change require research to adapt old or develop new models of food business and food markets. Representatives of science recognized the importance of the supply chain management process in the agri-food sector primarily due to the instability of products and the need to improve product flow tracking [Hobbs and Young, 2000].

Consumers continuously increase their demand on food safety and its functionality, product diversity, packaging quality, and the quality of services and products [van der Vorst, 2000]. The issue of environmental protection and

the economy of sustainable development is also now more important. Sustainable development is a resource and society dependent [World Commission on Environment and Development, 1987]. In the literature dealing with the issues of sustainable development, more and more attention is paid to the relationship between supply chains and sustainable development of the economy. For example, Kashmanian, Keenan and Wells (2010) found that leading companies are systematically increasing their activities in the field of environmental protection.

An increasing number of consumers are looking for alternative sources of food produced near their place of residence [Cicia et al., 2010; Nie and Zepeda, 2011]. The dissemination of new forms of food distribution organization in recent years, referred to as short supply chains, can be linked to the increasingly important role played by credibility-based goods in shaping consumer preferences. Indeed, the growing popularity of short supply chains should be attributed to the distribution model, which allows consumers to support local agriculture while adding fresh products to their diet [Uribe et al., 2012].

15.2. Definition of the SFSC

A supply chain consists of two or more legally separated organizations, being linked by material, information and financial flows. These organizations may be companies producing parts, components and end products, logistic service providers and even the very (final) customer [Stadtler and Kilger, 2008]. This definition can be also adapted in to food sector as cooperating in various functional areas agricultural producers, intermediary (trade) companies, processing, production and service enterprises, and their clients, between which flow streams of agri-food products, information and financial resources [Jarzębowski and Klepacki, 2013].

The supply chain can be described by indicating its characteristics such as:

- Supply chain structure;
- Type of material flow;
- Objectives, functional areas and areas of interaction of participating entities;
- Contribution to the creation of added value (distribution of margins);
- Interventionism (market disruption);
- Regulations, standards and rules, product specific safety and quality requirements.

From the short supply chains perspective, the contribution to the added value creation related to distribution of margins, state interventionism and regulations related to market disruption are important points of reference.

In the market mechanism, the added value is distributed in such a way that the ones who are closest to the consumer benefit the most. The market redistributes value added, depreciating agriculture [Czyżewski et al., 2006] so that the state should enter into the sphere of inter-branch flows in order to retransfer the value added produced, but not realized by farmers [Kowalski and Rembisz, 2005]. The mechanism counteracting this depreciation may also be shortening of the supply chain by eliminating intermediaries.

Table 1. Examples of SFSC's definitions

Author	Criteria	Definition
The European rural development regulation (1305/2013)	Number of intermediaries, physical distance, social relations	A short supply chain means a supply chain involving limited number of economic operators, committed to cooperation, local economic development, and close geographical and social relations between producers, processors and consumers.
French Ministry of Agriculture, Food and Forestry	Number of intermediaries	Commercialization of agricultural products through direct selling or indirect selling when only one intermediary is involved.
Ilbery and Maye, 2005	Social relations, knowledge exchange	It is a common specific characteristic of SFSCs that they are highly value-laden and meaningful for their participants. The direct relationship between the producer and the consumer involves construction of knowledge, value and meaning about the product and its provenance, production and consumption, the producer and the consumer themselves, rather than solely an exchange of a product.
European Network for Rural Development [Peters, 2012]	Number of intermediaries and physical distance	The definition of local food networks and short supply chains is not only focused on the distance between production and sale of the product, but also the number of links in the food supply chain, with the goal being to reduce these as much as possible – the shortest option being direct sales from the producer. In other words, short supply chain means reducing the number of intermediaries who are necessary to deliver the final product to the consumer.
Parker, 2005	Number of intermediaries and physical distance	Very small number (or even the absence of) intermediaries between producers and consumers, and/or by the short geographical distance between the two (they ideally fulfill both conditions).
Slow Food	Governance, locality, number of intermediaries, physical distance	A short food supply chain is created when producers and final consumers realize they share the same goals, which can be achieved by creating new opportunities that strengthen local food networks. It is an alternative strategy enabling producers to regain an active role in the food system, as it focuses on local production - decentralized regional food systems that minimize the number of steps involved and the distance traveled by food (food miles).

Source: own work.

Short supply food chains have been central to a wide range of research on the recent emergence of alternative forms of agriculture and food supply in the countries of the global North and West [Goodman, 2003]. They have often been linked with the so-called quality turn in food as they are associated, among others, to more traditional, locally embedded and sustainable farming practices [Ilbery and Maye, 2005; Goodman, 2003].

SFSCs can also be seen as a means to restructure food chains in order to support sustainable and healthy farming methods, generate resilient farm-based livelihoods (in rural, peri-urban and urban areas) and re-localize control of food economies [EIP-AGRI, 2015].

Various definitions of SFSC are presented in the literature (Table 1). As a consequence, the definition of SFSC is not always clear, neither at national or European level. The "Short Supply Chain" is often used as an umbrella concept [Marsden et al., 2000], assuming context dependent economic, socio-cultural, policy, organisational characteristics, and having different impacts on local economies.

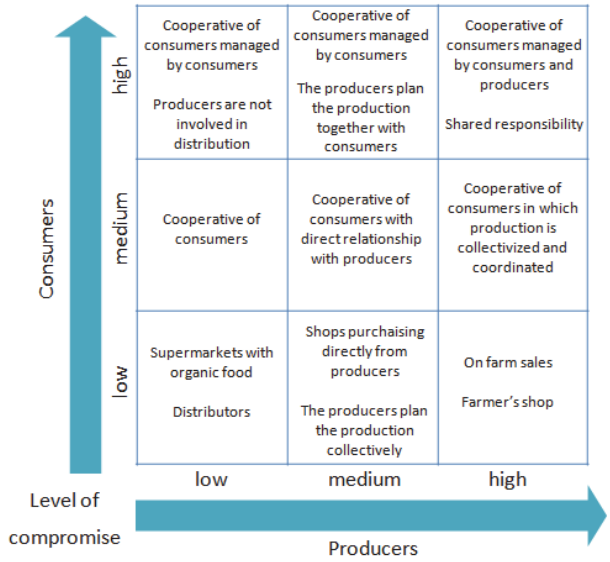
On the base of the criteria outlined above, a great variety of SFSCs can be identified and various classifications or typologies developed. Such classifications are useful for a more systematic exploration of SFSCs and development and implementation of necessary support measures [Galli and Brunori, 2013].

The EC IMPACT project [Marsden et al., 2000; Renting et al., 2003] proposed three main types of short food chains on the basis of the number of intermediaries, physical distance and organizational arrangements:

- Face-to-face SFSCs – a consumer purchases a product directly from the producer/processor on a face-to-face basis (e.g. on-farm sales, farm shops, farmers' markets).
- Proximate SFSCs – extend reach beyond direct interaction and are essentially delivering products which are produced and retailed within the within a specific region (or place) of production. Consumers are made aware of the 'local' nature of the product at retail level (e.g. community supported agriculture, consumers' cooperatives).
- Spatially extended SFSCs – value- and meaning-laden information about the place of production and producers is transferred to consumers who are outside the region of production itself and who may have no personal experience of that region (e.g. restaurants, certification labels, public food procurement to catering services for institutions).

According to the report elaborated by EHNE, a farmer's union of the Basque Country, Spain [Mundubat, 2012] SFSC can be classified on the basis of the level of compromise (low, medium and high) that may be adopted either by consumers or producers into nine categories (Figure 1).

Figure 1. SFSC classification based on the level of compromise between producers and consumers



Source: own work based on Mundubat, 2012.

The CROC project [Chaffotte & Chiffoleau, 2007] found it useful to distinguish between individual and collective, direct and indirect (with one intermediary) SFSCs. Whereas, the European Network for Rural Development have identified three types of SFSCs, in their report on SFSCs, on the basis of their individual or collective organization and initiators (consumers and producers):

- Direct sales by individuals,
- Collective direct sales,
- Partnerships of producers and consumers [Peters, 2012].

Shortening the supply chain may have some beneficial effects on the environment, economy and society. However, it should be noted that the way in which the supply chain is shortened is important. Not necessarily all short chains will bring the expected benefits. For example, if production and distribution systems in the supply chain are not geared to sustainable development, the short supply chain will not bring the expected economic, social and environmental benefits.

There are many benefits to be gained from engaging in collaborative activities while creating short supply chains [EIP-AGRI, 2015]:

- Higher margins / lower overheads: the often high costs charged by distributors can be split fairly between producers and consumers, allowing producers to receive a dignified income for their work, and for consumers to pay less and know exactly what they are paying for.

- Improved product range: the product range can be diversified and/or increased so that more producers can be involved and more jobs can be created through retaining the added value in each territory.
- Resource sharing: equipment, tools, processing facilities, transport and logistics can be shared in order to improve efficiency and share costs. Knowledge and skills can also be shared.
- Local food chain infrastructure: retaining or reinstating local processing facilities such as abattoirs or farmers' shop.
- Increased negotiating power: more weight in contract negotiations, ensuring fair terms and conditions, gaining access to public and larger scale markets.
- Reduced competition: between many small non-coordinated SFSCs in a region.
- Mutual support: collaboration can combat isolation felt by small-scale producers.

It is worth mentioning that cooperation within SFSCs can help to integrate new participants in the chain with the agri-food sector. In addition, the maintenance or restoration of local processing plants, such as slaughterhouses or agricultural stores, becomes more real.

15.3. Development of short supply chains in Europe

The success factors and barriers that may arise in several areas related to short supply chains ware identified. Above all, they refer to the key process of creating supply chains in the agri-food sector. Other areas are logistics and infrastructure, product development and access to markets and consumers. Selected success factors and related barriers of SFSC development in terms of access to market and consumer are presented below (Figure 2).

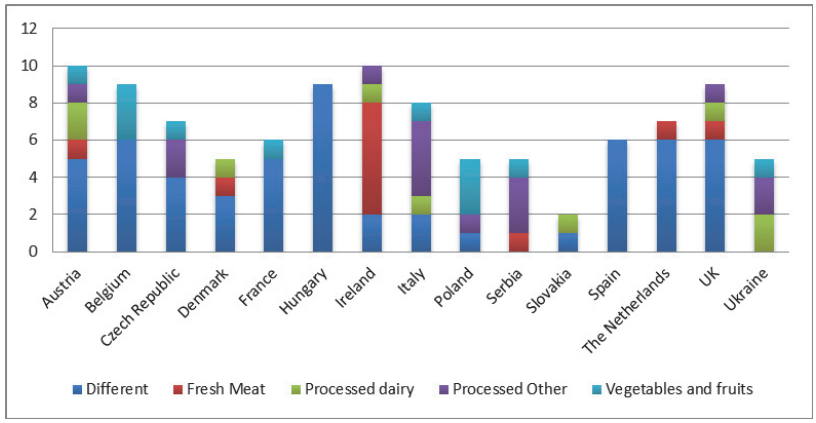
Currently in Europe as well as around the world there are many examples and types of short food supply chains. Usually these are small enterprises with limited local impact. However, these small initiatives indicate that these enterprises are able to provide solutions to improve the profitability and stability of agricultural producers. Therefore, there is a great need to identify, synthesize, exchange and present good practices in the short food supply chains management. These arguments were the basis for identifying examples of such chains in Europe. For this purpose, good practices regarding short chains in 15 European Union countries were analyzed. As part of the study, over 100 examples of initiatives were described and classified in specific sectors (Figure 3).

Figure 2. Factors of success and barriers in access to markets and consumers

Success factors	Barriers
On-line sales: reliable internet network, effective online store, ordering system and payment system, use of social media, reliable distribution.	Poor Internet network, weak IT systems, lack of affordable technical support, lack of knowledge on how to use social media, unreliable distribution.
Sales in the local community: key products that attract consumers, good interpersonal and communication skills required in dealing with consumers, variety of sales points and sales channels to increase access and convenience of shopping	Farmers may lack communication skills in sales. The costs of stalls and cooling systems on the market, the cost of owning or renting store space.
Public procurement: Application of social and environmental criteria in tenders for public procurement. Public authorities ask for potential suppliers before the offer is prepared. The division of orders into smaller parts increases the chance of local producers to obtain a contract.	A general lack of awareness of the flexibility and possibilities under the EU public procurement rules on the part of public authorities and potential suppliers. Farmers often do not have the skills and resources to submit an offer and meet the requirements (eg continuity of supply, consistency in quality).
Supermarkets: Cooperation centers gathering many small suppliers. Strong and distinctive products in the niche of premium products.	Small producers lack bargaining power to challenge supermarkets in trade negotiations. Supermarkets may require exclusive supplies, which increases the risk of suppliers and limits sales to other customers.
HoReCa: Specjalne wydarzenia promujące typu „spotkaj się z producentem".	Poor organization on the part of farmers compared to the professionalism expected by hotels.

Source: own work.

Figure 3. Good practices of SFSC in the EU by sector

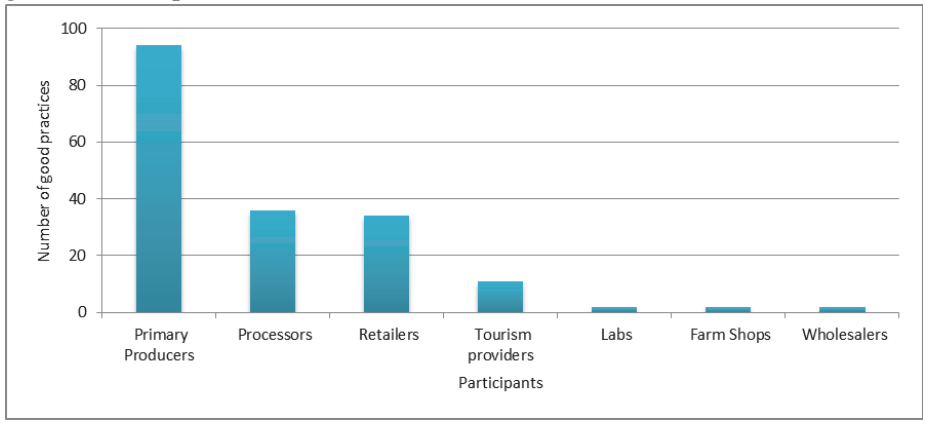


Source: own work based on results of the SKIN project, Horizon 2020.

The majority of good practices for short chains have been identified in Austria, Ireland, the United Kingdom and Hungary. In the analyzed examples, there is a tendency to include more than one agri-food sector within a single enterprise. These practices include, for example, distribution solutions for agri-food products, such as on-line sales with home delivery or collection at designated places or inviting consumers to farms to make a purchase. In Poland, the practices related to the fruit and vegetable sector were mostly identified, while in Ireland – with the meat sector.

The concept of short supply chains concerns many of its participants who can benefit from shortening the path to the consumer (Figure 4). Almost all identified good practices include a link with producers. In the case of one third of the analysed examples, there are processors of agri-food products and retailers. Labs, agricultural stores and wholesalers play a marginal role in the case of short chains.

Figure 4. Participants of SFSC



Source: as for Figure 3.

Within the framework of the project, topics that emerged in the researched good practices (Figure 5) were classified into 4 main groups (products, organizational / institutional / systems, governance and sales). The first group concerns topics connected with product and was divided into the following areas:

- Branding and Labelling: innovative way of communicating on consumers product characteristics/ product range;
- Valorization: novel approach to product development, e.g. a co-design, multi-actor design; a novel product or product range;
- Value: superior, gourmet taste; nutritional value; healthiness; freshness;
- Values:
  - Social Sustainability: trust, sense of community; connection between producers and consumers; community education; consumer empowerment; recognition of producers;
  - Economic Sustainability: profitability; synergies with other sectors; generating local employment; training and coaching initiatives;
  - Environmental Sustainability: food waste; greenhouse gas emissions; energy use and carbon footprint; food miles.

Figure 5. Hot topics in the analyzed SFSCs

Source: as for Figure 3.

The three remaining topic groups are described below:

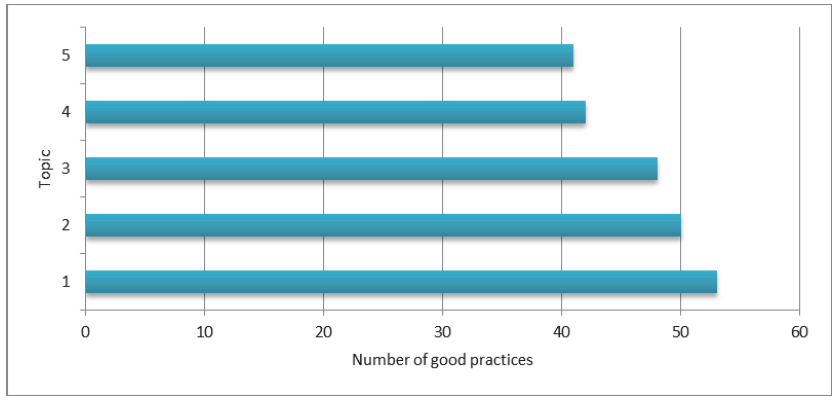
- Organizational / Institutional / Systems:
  - Learning and Empowerment: cross-learning between actors; networking along the supply chain and in the region;
  - Process Innovations: logistics and distribution; achievement of efficiencies through collaboration.
- Governance:
  - Internal: contractual agreements between producers, chain partners; decision-making structures;
  - External: enabling government policies and regulatory frameworks; tenders for public procurement with social and environmental criteria.
- Sales:
  - Efficiency: proximity; reliable distribution; effective ordering systems;
  - Variety: collaborative hubs bringing together supplies from many small producers;
  - Connection: events as "meet the farmer"; social media; reconnection and relationship.

The five most common topics within the analysed good practices (Figure 6) were as follows:

- Governance: internal (decision-making process in the supply chain);
- Organizational / Institutional / Systems: process innovations (logistics and distribution);
- Sales: efficiency (reliable distribution);

- Governance: internal (contractual agreements between producers, chain partners);
- Values: social sustainability (connection between producers and consumers).

Figure 6. Top 5 of the most often appearing topics across the analysed EU countries



Source: as for Figure 3.

In almost 50% of the analysed examples of SFSCs the actors involved in the chain focused on reliable distribution. It is worth mentioning here that factors leading to success in the area of distribution are recognizing that logistics and distribution are a separate service within the food chain and have to be costed and paid for accordingly, as well as combining deliveries with inviting customers to farms in order to increase awareness and trust [EIP-AGRI, 2015].

15.4. Global context of European short supply chains

The concept of SFSC might have also global aspects. This chapter investigates the link between SFSCs and the EU's trade policy by using the example of the Transatlantic Trade and Investment Partnership (TTIP). To show the interaction between the concept of short supply chain and trade with the US related to the need of the TTIP the literature review has been conducted. The TTIP, as a bilateral free trade agreement (FTA), is designed to remove trade barriers, simplify approval and certification, and standardization processes. It could pave the way for the definition of more technical and technological standards, creating new opportunities for the development of even more efficient value-added supply chains. The importance of short supply chains in the context of the expected benefits of the TTIP can be analysed in relation to the following aspects:

- transparency in supply chains,
- unified standards in food safety and quality management,

- simplified certification,
- uniform conditions for data protection,
- conformity on transmission of data,
- strengthening online sales,
- simplified public procurement,
- increasing negotiating power for the EU producers.

Trends and challenges related to the TTIP in the context of short food supply chains were identified and put together in the Table below (Table 2).

Table 2. Trends and challenges related to the TTIP

Trends	Challenges
▪ Increase in regulatory controls ▪ Shift in technological landscape ▪ Emergence of e-commerce ▪ Formation of an imbalance between intra-European economic relations and agreements with third parties	▪ Increase in complexity ▪ Pressure of costs ▪ Increase in customer expectations ▪ Lack of skilled employees and qualified personnel ▪ Pragmatically examine regulations ▪ Building up networks between the EU and the US

Source: own work based on Pietrzyck et al., 2017; Altenberg and Grünewald, 2013; World Economic Forum, 2013; Aichele et al., 2016.

Provided that agreement on uniform conditions for data protection and the transmission of data is reached, this could also greatly increase transparency in supply chains. This would, in turn, positively affect efficiency and flexibility.

15.5. Summary and conclusions

Short food supply chains (SFSCs) were established in parallel to conventional food chains, playing a key role in the emerging food networks that are continuously arising as an alternative to the globalized agri-food model. Due to the benefits of the SFSCs, an increase in the number of initiatives supporting the development of such activities in the agri-food sector is noticeable. These models have become an alternative to the globalized structure of the agri-food sector, enabling "bringing together" the two extreme links of the supply chain and satisfying the needs of both the consumption and production side, while affecting the well-established concept of sustainable development. Although short supply chain practices are becoming increasingly more common across Europe, their impact on economic sustainability seems limited by lack of experience and knowledge, which hinders the dissemination of this distribution model and the dissemination of innovation.

The exchange of information and knowledge as well as cooperation between actors involved in the agri-food network are, therefore, the main factors supporting the competitiveness and sustainable development of the SFSCs. It is necessary for small farms and agricultural producers to cooperate within integrated short chains in order to produce a sufficient number of products and to create a common approach regarding the attributes and quality of products. The concept of the SFSC might have also global aspects. The ongoing liberalization of trade in agri-food products and the growth in the volume of exchange might also create opportunities for development of the European short food supply chains.

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16. The CAP implementation in Wallonia – today performance and questions for the future – A brief supplementary comment from Warmia and Mazury perspective

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Abstract

The new Common Agricultural Policy was defined in 2013, with a stronger emphasize on the environment and the introduction of the "green payment", as well as a clear support for organic farming. This paper examines how the green payment was implemented for the first time in Wallonia (South of Belgium, one of the founders of the European Union) and shows the situation in both Wallonia and the Warmia and Mazury voivodeship in Poland, a new EU Member State. It appears that agriculture in both regions is on the way towards a more sustainable development model, though the future is more uncertain than ever.

Keywords: CAP, organic farming, green payment, Wallonia, Warmia and Mazury,

JEL codees: Q18, Q50, Q58, Q14

16.1. Introduction

Sustainability is a challenge for the European agriculture: better solutions must be implemented in order to develop economic activities and create jobs while respecting the natural resources [Cvik and MacGregor Pelikanova, 2015]. The current version of the Common Agricultural Policy, decided in 2013 and implemented since 2015, is the result of three years of difficult negotiations [Bureau, 2012]. One of its most important features is that it goes further than ever in favour of the environment [Matthews, 2013]. The so-called green payment, which must account for 30% of all direct payments in every EU Member State was established [Hart, 2015], proving that the relation between agriculture and environment is becoming a priority in the EU and international policies [Brezuleanu et al., 2013; Gazquez-Abad et al., 2011]. In addition, the CAP is also supporting organic farming, which is now considered as a trustable opportunity for a more sustainable development model all over the world [Dufumier, 2012; Petrescu et al., 2015] and is also more and more popular among consumers

[Petrescu et al., 2014] because they think that organic products can preserve their health and the environment [Petrescu and Petrescu-Mag, 2015] or have better sensory attributes [Bryła, 2016; Tobler et al., 2011].

Organic farming must be now considered in a broader context than agriculture itself: it also takes into account rural development, the environment and the society. Organic farming appeared in Wallonia in the 1980s [Burny and Gellens, 1988] and the first European legislation concerning organic farming was published in 1991, just one year before the MacSharry's reform of the CAP.

In such a rapidly and deeply changing context, the paper will examine the results of the implementation of the green payment in Wallonia and also the evolution of organic farming in this Southern region of Belgium, on the one hand, and the situation of organic farming in Warmia and Mazury, a province of a new EU Member State, Poland, on the other. Finally, some considerations regarding the future are presented.

16.2. Implementation of the green payment in Wallonia in 2015

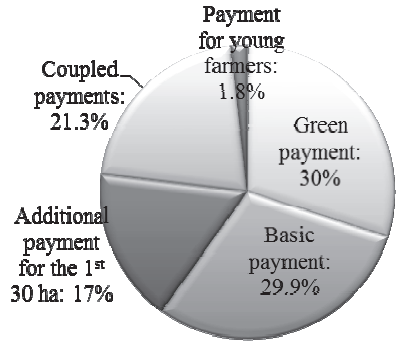
The difficult political agreement, which was finally reached in June 2013, led to four legal texts including the Regulation (EU) No. 1307/2013 of December 17, 2013, dealing more specifically with direct payments to farmers [Burny and Terrones Gavira, 2016]. A new architecture for direct payments was defined, leaving important decisions (some measures are optional and the relative importance of each of them can vary) to the Member States or the regions within them [Hart, 2015]. There is, however, one exception: the green payment, which has to account for 30% of the national/regional envelope for direct payments in each Member State/region. This is compulsory. Indeed, the green payment is considered as very important measure for the environment and the fight against climatic change.

In Wallonia, the new structure of the direct payments [Arrêté du Gouvernement wallon du 12 février 2015; Arrêté ministériel du 23 avril 2015], after notification to the Commission and its approval, especially about coupled payments (whose percentage in the total amount for direct payments is higher than the normally authorized one and needed a special approval by the Commission, but respecting the new regulation), is presented in Figure 1.

How to grant the green payment was the decision of the Member States/regions: either proportionally to the basic payment, or in the same amount for each eligible hectare. The Walloon government chose the first option, in order to avoid too rough changes for some farmers compared to the previous period of 2007-2013.

In addition, every year before August 1st, and for implementation the following year, each Member State/region can inform the Commission that the implementation ways of the greening will be changed.

Figure 1. New architecture of direct payments in Wallonia (2015-2020)



Source: Burny and Terrones Gavira [2015].

More specifically, the green payment is linked to three conditions (Article 43 of Regulation (EU) No. 1307/2013):

- Maintenance of permanent pastures,
- Crop diversification,
- Presence of an ecological focus area.

It is worth to note that organic farmers automatically get the green payment without any additional constraints and so they do not have to respect the three of the above-mentioned conditions.

Maintenance of permanent pastures

Permanent pastures are grassland since at least five years.

The reference year being 2015, each Member State/region establishes the reference ratio as the area of permanent pastures divided by the total agricultural area, at the national/regional or farmer's level. Wallonia chose the regional level.

In the future, the reference ratio cannot decrease by more than 5%.

The Member State/region must also define the permanent pastures which are considered as environmentally fragile. These areas cannot be ploughed or transformed for another purpose (Article 45).

In Wallonia, these permanent pastures are all situated in the Natura 2000 site.

Crop diversification

In order to get the green payment, farmers have to practice crop diversification if:

- They have between 10 and 30 ha of arable land: in such a case, they must have at least two crops, the most important not exceeding 75% of the area of arable land;
- They have more than 30 ha of arable land: in such a case, they must have at least three crops, the most important covering no more than 75% of the arable land area, and the two most important no more than 95%.

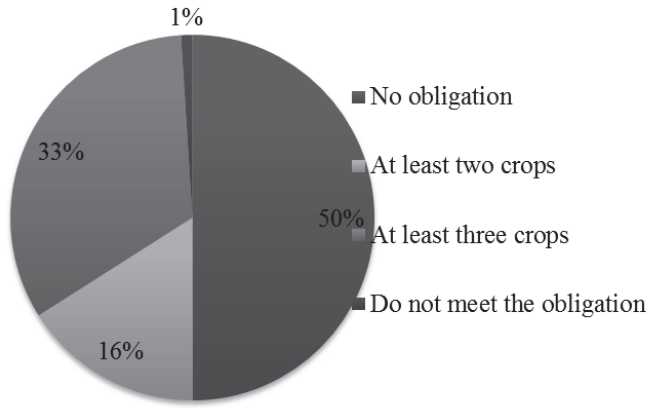
The following can be considered as "crops": land lying fallow, temporary pastures, one gender considered in the botanical classification (Triticum, Hordeum, Beta,…) or one species for Brassicaceae, Solanaceae and Cucurbitaceae.

No diversification is requested in the following cases:

- The farmer has less than 10 ha of arable land;
- More than 75% of the arable land are devoted to the production of grass (temporary pastures) or fallow and, at the same time, the remaining arable land area does not exceed 30 ha;
- More than 75% of the total agricultural area of the farm are devoted to permanent pastures or the production of grass and, at the same time, the remaining arable land area does not exceed 30 ha.

According to the area declaration of farmers for 2015, in Wallonia 50% of the farmers were not submitted to crop diversification, while 16% were obliged to have at least two crops on their arable land and 33% had the strongest obligation: to have at least three crops on their arable land. Around 100 farms (less than 1%) failed to meet the criteria (Figure 2).

Figure 2. Number of farms towhich applies crop diversification in Wallonia in 2015



Source: Terrones Gavira, Burny and Lebailly [2016].

The ecological focus area

According to Article 46 of Regulation (EU) No 1307/2013, farmers must devote at least 5% of their arable land to ecological focus areas when they have more than 15 ha of arable land.

The Member States/regions can choose which are ecological focus areas from the following list (Commission Delegated Regulation (EU) No. 639/2014):

- land lying fallow;
- terraces;
- landscape features, including such features adjacent to the arable land of the holding;
- buffer strips;
- hectares of agro-forestry;
- strips of eligible hectares along forest edges;
- afforested areas;
- areas with catch crops, or green cover (subject to the application of weighting factors);
- areas with nitrogen-fixing crops.

In Wallonia, all the above-mentioned points are considered as ecological focus areas, with the exception of terraces and afforested areas.

Some elements are directly converted into ecological focus areas, but others, like isolated trees for example, need a conversion coefficient to be considered as an ecological focus area (Table 1).

According to Table 1, it means, for example, that an isolated tree cover with an area of 20 m^2 on average has an influence on 20 x 1.5 = 30 m^2 (protection against winds, shadow, etc.).

In Wallonia in 2015, 54% of the farmers were not obliged to have ecological focus areas (they have less than 15 ha of arable land, these were organic farmers).

Among the remaining 5828 farmers, 47% devoted between 5 and 6% of their arable land to ecological focus areas, 21% had between 6 and 7% and 29% had more than 7%. A small number of farmers (2.4%) did not reach the minimim 5%.

The mean of ecological focus areas reached 6.9%, and the median was at 6%.

When farmers had at least 5% of ecological focus areas, it is observed that 79% of them declared only one element, mainly catch crops or green cover (95% of the cases) and 15% had only two elements.

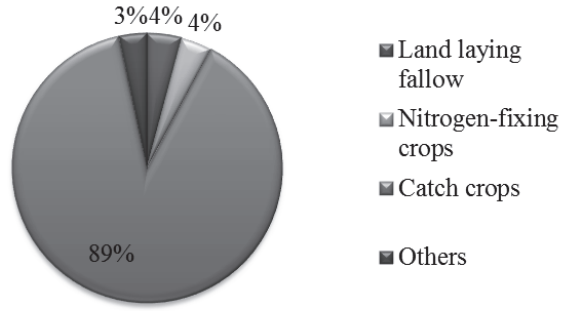
As far as the area was concerned (Figure 3), catch crops or green cover represented an overwhelming share of 88.8% of the total ecological focus area in Wallonia. Far behind, came land lying fallow (4.1%) and nitrogen-fixing crops (3.7%). The landscape features were marginal and represented only 2.1%.

Table 1. Conversion coefficients and weighting factors to transform some areas and landscape features into ecological focus areas

Element	Particularity	Description		Conversion coefficient	Weighting factors	Ecological focus area (m^2)
Surface elements (ha)	Plot	Land lying fallow	per 1 m^2	n/a	1	1
		Areas with short rotation coppice	per 1 m^2	n/a	0.3	0.3
		Areas with nitrogen-fixing crops	per 1 m^2	n/a	0.7	0.7
		Buffer strips	per 1 m^2	n/a	1.5	1.5
		Strings of eligible hectares along forest edges – without production	per 1 m^2	n/a	1.5	1.5
	Intercrop plot	Areas with catch crops or green cover	per 1 m^2	n/a	0.3	0.3
	Topographic elements	Ponds	per 1 m^2	n/a	1.5	1.5
		Group of trees/field copses	per 1 m^2	n/a	1.5	1.5
Linear elements (m)		Field margin	per 1 m	6	1.5	9
		Ditches	per 1 m	3	2	6
		Hedges/wooded strips	per 1 m	5	2	10
Punctual (nb)		Isolated tree	per tree	20	1.5	30

Source: Terrones Gavira et al. [2016].

Figure 3. Area of the different types of ecological focus areas in Wallonia in 2015



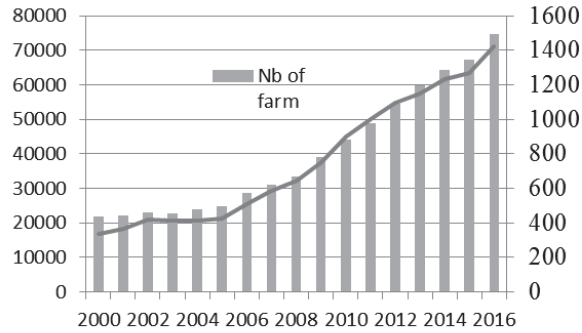
Source: Terrones Gavira, Burny and Lebailly [2016].

16.3. Organic farming in Wallonia

Evolution of the number of organic farms and of the organic agricultural area

The evolution of the number of organic farms and of the corresponding area is illustrated in Figure 4. The evolution was rather slow during the first years of the 21st century; however, an acceleration is clearly observed since 2005, with a continuous positive trend. In 2016, the total number of organic farms reached 1493 (+146 compared to 2015) and the corresponding agricultural area reached 71 289 ha (+12.4 % compared to 2015), representing, respectively, 12% of the total number of farmers and 10% of the total agricultural area.

Figure 4. Evolution of the number of organic farms and organic farming area in Wallonia from 2000 to 2016



Source Biowallonie [2017].

Public support

This success is partially due to the strong public support which is granted to organic farming. In 2016, organic farming was clearly defined as a tool within the "Walloon strategy for sustainable development", while in 2013 was launched the "Walloon strategic plan for the development of organic farming towards 2020" [Comase and Di Antonio, 2013].

Within the CAP and its second pilar, rural development, the financial support granted to organic farming is presented in Table 2.

The support is additional to direct payments and is even higher for farmers in transition from conventional to organic methods.

Table 2. Financial support (EUR/ha) for organic farming in Wallonia (2015-2020)

Crops	Area of organic farming		
	0 to 60 ha		over 60 ha
Meadows and forage crops	200		120
Other annual crops	400		240
	0 to 3 ha	3 to 14 ha	over 14 ha
Fruit trees, horticulture and seed production	900	750	400

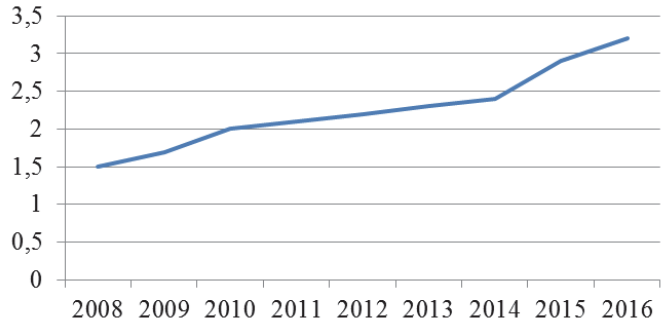
Source of the basic data: Service public de Wallonie [2015].

Evolution of the consumption of organic products

Market share of organic products in the Belgian food market

The market share of organic products in the Belgian food market continuously increased between 2008 and 2016, from 1.5 to 3.2% (Figure 5).

Figure 5. Evolution of the market share of organic products in the Belgian food market (%)



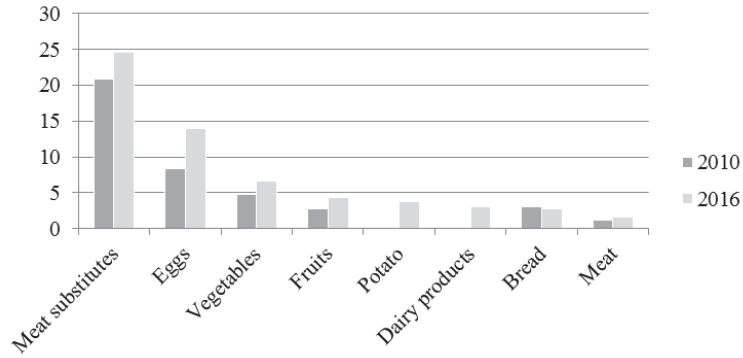
Source of basic data: Biowallonie [2017].

Organic food products, though more expensive than conventional products, are more and more popular; this phenomenon even accelerated during the last two years. In the future, this share could continue to increase as it reached 8.4% in Denmark in 2015 (the highest in Europe) or 7.7% in Switzerland and 4.8% in Germany [Biowallonie, 2017]. So, the target of 3.0% in 2020 defined in the Walloon development plan for organic farming has already been reached.

The market share of organic products is very variable according to the type of products (Figure 6). However, it increased for all products with the exception of bread [Burny, 2017].

As prices are very different from one product to another, the position of one product regarding the market share can be different from the position regarding expenses *per capita*. The highest market shares are observed for meat substitutes (a product which is not popular) and eggs (a cheap product), before vegetables and fruit, which are well known organic products. The market share for dairy products reached 3.0% while the expenses for dairy products are the highest, the prices per unit being higher than for other food products. Globally, the share of vegetal products is higher in the organic food market than in the conventional one.

Figure 6. Market share of organic products in 2010 and 2016 (%)



Source of basic data: Biowallonie [2017].

Compared to the situation of 2010, it appears that the market shares significantly increased, with the exception of bread. For dairy products, data are available for 2014, 2015 and 2016, showing an important increase: 2.1% in 2014, 2.7% in 2015 and 3.0% in 2016. For potato, no trend could be observed during the period between 2013 and 2016. So, it is clear that vegetables, fruit and dairy products show a strong and continuous positive trend in their demand.

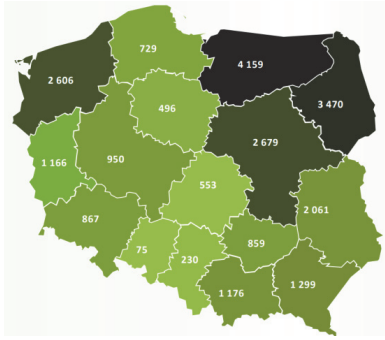
16.4. Organic farming in Warmia and Mazury

Region of Warmia and Mazury, placed in North-Eastern Poland, occupies the top place in the country by territory, but it is relatively low as the population is concerned. It is mainly due to peculiarities of the natural conditions: large percentage of forests and grassland, numerous lakes ("one thousand lakes" country – as a matter of fact it is more than double of that) and other factors, including climate, soils and terrain relief.

The region is well-known for its remarkable recreation of properties, but while social and economic conditions are concerned, the overall picture is not encouraging. High unemployment rate, lower GDP/*capita* or average incomes are a few of many indicators confirming that this area belongs to the least developed in Poland and even one of the less developed regions on the EU scale.

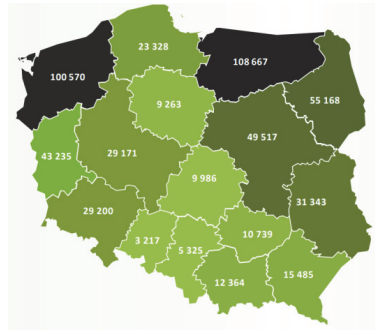
Turning to agriculture, natural conditions, lower population density and the heritage of the past (ca. 50% of agricultural land belonging to the state farm sector, more than double of the national average) results in differences in farm structure – the average farm is more than two-fold larger than the country average.

Figure 7. Number of organic producers in Poland in 2016



Source: IJHARS [2017].

Figure 8. Areage of organically cultivated agricultural land in 2016 (ha)



Source: IJHARS [2017].

As can be seen from the Figures 7 and 8, the voivodeship occupies the leading place in the country both as regards the number of organic producers and the area of agricultural land under organic farming. This position is confirmed by steady increase in the share of organic producers in the total number for Poland: from 7.05% in 2007 to 14.84% in 2016, more than two-fold growth during the period of only 9 years. Similar picture can be observed while taking into account the share of organically cultivated land in the province in the total country acreage of organically cultivated land – during the same period of 9 years, 2007 vs 2016 one can observe the increase from 5.35 to 10.28 %, respectively.

More careful insight, critical examination of the statistical data at the farm gate level and offices of different institutions involved leads to defining some problems making such an overall optimistic picture more complex and less optimistic:

- Large scale of the organic farming practices in Warmia and Mazury voivodeship is not entirely due to the large territory of the region and its specific environmental conditions. Some decline of an acreage of organically cultivated land, observed in recent years (2014 and 2015) calls, therefore, for an explanation.

  In the region, there are some landowners from far away, who just own land and are rather not interested in agricultural production at all. They focus mainly on "harvesting" money from the EU budget. Examples:

  (i) walnut, or other sophisticated plants cultivation – just to fill required data into the application form to get subsidies – with production even at null level!;

  (ii) grassland – cut but no grass being used as an animal feed.

  Such unhonest practices are now remarkably reduced because of an introduction of more effective control measures, like present requirement to keep some farm animals. Nevertheless, some are capable to continue their practice because of 5-year long period of former declarations.
- Under the new 2015package, forage plants introduction resulted in reduced level of payments for farmers of concern, in some cases even to ca. 60%.
- There are some 18 different payment options for organic farmers. Too many, making the overall picture complex and too difficult for an average farmer to comprehend and follow. Simplification of the CAP procedures is one of the declared objectives of ongoing adjustments but just opposite is often seen from the farmer's perspective.
- Organic farmers are susceptible to crop failures due to different agents: droughts, water-logging or pest invasion – no effective compensation measures are available.
- It is difficult to meet some criteria related to animal breeding. Procedures related to the purchase of new animals last too long.
- Organic raw materials and marketing of manufactured goods are a severe bottleneck. Large amounts of farm output are sold as unprocessed commodity. Customer, arriving to – say – the "Lidl" market in Olsztyn, could meet rather German organic products on the shelves. In some cases, raw materials (like cereals) are sold to Germany and – after manufacturing – sent back to Poland.

16.5. Questions for the future

The proceeding lines proved that things are changing more and more quickly. For agriculture in general, the future is more and more uncertain and the farming business is more and more risky. This is due in particular to price volatility, which makes income impossible to predict, organic farming included.

A very important topic is the future of direct payments, partially linked to the CAP budget. What about their future distribution among and within the Member States? Will they take into account the labour force? Will the coupled payments remain or be suppressed? Will the payments for the first hectares increase, as 20% of the benefiters still get 80% of the total amount of direct payments?

The role of farmers' associations will probably be reinforced within the value chain, allowing the farmers to keep a better share of the added value, in a food market where processed products are very important. However, the processing industry and the supermarkets are also becoming larger, so that the negotiating position of the producers is not always favourable, especially in a period of overproduction.

However, a contradictory trend is the phenomenon of direct sales and local consumption. Circular economy is also up-to-date. But what will be their success? Surely there is a specific niche for these initiatives, but to which extent? It is also the question for specific quality products. There is a market for these products, but it does not represent the bulk of production. It is the case for organic farming. It has a role to play, but can we imagine that the whole agricultural production would come from organic farming?

In a world of an always tougher competition, the classic production cost reduction will surely remain very important. In this context, is it wise to invest more or, on the contrary, to invest less in order to avoid a too heavy indebtedness? The public investment support policy should be more careful, not leading farmers to invest too much and be too indebted when farm income is so variable and unpredictable.

In a period of so many uncertainties, what about family farms? Will they survive, or will the farming activity be taken over by capitalistic large companies, so threatening our European farming model?

All these questions are open, and the answers will be given by the citizens' will.

16.6. Summary and conclusions

The implementation of the new CAP in Wallonia has been successful and stressed the role of the environment through the green payment, ecological focus areas and organic farming. As it is also the case in Warmia and Mazury, organic

farming presents today a significant share of the total number of farmers and of the total agricultural area. It so appears clearly that European agriculture, through these examples, is going towards a more sustainable development model. However, several problems and questions are still ahead. It is obvious that this positive evolution is significantly due to a strong public support and not only to the food market orientation or to the conviction of all farmers. The question of the prices paid by consumers is still open as a non-negligible share of the European population is rather poor and could not afford higher food prices. Anyway, the future is more uncertain than ever and there is a strong need for an agricultural policy with clear objectives supported by the EU citizens and provided with sufficient means to reach them.

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17. Afforestation of agricultural land financed from the RDP 2014-2020

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Abstract

The paper highlights the role of afforestations as an important method for management of agricultural land with adverse natural farming conditions in Poland. In the first place, it assessed natural farming conditions in Poland in regional terms and their impact on the economic situation and the possibility of afforestation on farms. The next step was to assess the state of implementing existing afforestations financed from the RDP 2014-2020. Then, it estimated their contribution to carbon dioxide (CO_2) sequestration from the atmosphere in the Land Use, Land Use Change and Forestry (LULUCF) area. The paper used the data from the Agency for Restructuring and Modernisation of Agriculture (*Agencja Restrukturyzacji i Modernizacji Rolnictwa*, ARiMR), Institute of Soil Science and Plant Cultivation – State Research Institute (*Instytut Uprawy Nawożenia i Gleboznawstwa – Państwowy Instytut Naukowy*, IUNG) and the data from farms conducting accounting for the Polish Farm Accountancy Data Network (Polish FADN) in 2013-2015, as well as the literature data.

Keywords: afforestations, RDP 2014-2020, APAV index, LULUCF, CO_2

JEL codes: Q15, Q54, Q57

17.1. Introduction

In Poland, an important difficulty for farms wishing to conduct the effective agricultural production are often adverse natural farming conditions, as evidenced by the average agricultural production area valorisation (APAV) index amounting to 66.8 points (pts) per 120 achievable points [Jadczyszyn et al., 2013]. What is more, 32.9% of cadastral districts are characterised by the average APAV index lower than 52 pts[24]. This indicates that these areas have particularly difficult natural conditions to conduct agricultural production, resulting from, *inter alia*, low soil quality, unfavourable land relief and adverse climate. These lands, due to their low suitability for agriculture, may, therefore, be a potential area for afforestation in the first place.

[24] Data from the Institute of Soil Science and Plant Cultivation National Research Institute (IUNG) in Puławy.

In Poland, in 2004-2015 the forest cover increased from 28.7 to 29.5%, i.e. by about 0.8 percentage points (p.p.) [GUS, 2010, 2016a], of which 0.3 p.p. accounted for afforestations made as part of the RDP 2004-2006, 2007-2013, and 2014-2020. As part of the existing RDP, afforestations covered the area of 78.1 thousand ha of land, of which 91.1% are afforestations financed under the RDP 2014-2020[25 and 26]. This means that a large impact on the increased forest cover in Poland is exerted by afforestations supported under the EU' Common Agricultural Policy. This is particularly important both in the context of meeting the objectives of the National Programme for the Augmentation of Forest Cover (NPAFC), which assumes that by 2020 Poland should achieve the forest cover at the level of 30% and potential participation of the LULUCF[27] area in reducing the effort to limit the greenhouse gas emissions from the Effort Sharing Regulation (ESR) area after 2020[28 and 29].

This paper first assessed natural farming conditions in Poland in regional terms and their impact on the economic situation and the possibility of afforestation in farms. Then, it analysed the state of implementing the existing afforestations financed under the RDP 2014-2020. In addition, in view of the increasing importance of the LULUCF area, including afforestations within the objectives of the EU climate policy for 2021-2030, the paper estimated the contribution of existing afforestations financed from the RDP 2014-2020 to CO_2 sequestration from the atmosphere in the LULUCF area.

17.2. Natural farming conditions in Poland in regional terms

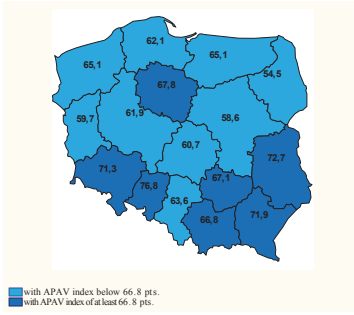
Among the factors having a significant impact on the economic situation of farms we should identify their natural farming conditions. In the paper, these conditions were described using the APAV index, whose value was determined by the IUNG for each commune and cadastral district in Poland. The structure of this index takes into account such components as: soil quality, agroclimate, hy-

[25] Status as of 31.12.2016.
[26] Afforestations financed under the RDP 2014-2020 apply to afforestations financed under new commitments, commitments from the RDP 2007-2013 (afforestation premium and/or maintenance premium) and commitments from the RDP 2004-2006 (afforestation premium).
[27] According to the methodology of the Intergovermental Panel on Climate Change (IPCC) in the LULUCF area we estimate the balance of CO_2 sequestration from the atmosphere in total from the sectors of forestry land, afforested, deforested, permanent grassland as well as arable, boggy and inhabited land.
[28] The ESR area covers greenhouse gas emissions from the following sectors: transport, waste, construction, fuel processing and transport, industrial processes not included in the ETS area and agriculture [Sytuacja emisyjna..., 2016].
[29] Proposal for a Regulation of the European Parliament and of the Council of 16 October 2017 on the inclusion of greenhouse gas emissions and removals from land use, land use change and forestry into the 2030 climate and energy framework and amending Regulation No 525/2013 of the European Parliament and the Council on a mechanism for monitoring and reporting greenhouse gas emissions and other information relevant to climate change – general approach [Proposal for a Regulation, 2017].

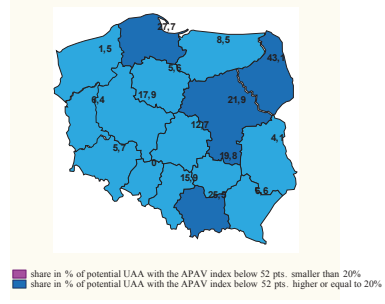
drographic conditions and land relief, and the importance of each of them is proportionate to its impact on the yield of crops [Krasowicz et al., 2011; Jadczyszyn et al., 2013][30].

As stressed in the introduction, in Poland the average APAV index is 66.8 points, although it is territorially diversified. In the voivodeships, it ranges from 54.5 points (Podlaskie Voivodeship) to 76.8 points (Opolskie Voivodeship) (Map 1). The largest share of potential UAA with the APAV index lower than 52 points[31] in the area of potential UAA[32] in total occurs in the Podlaskie Voivodeship (43.1%), Pomorskie Voivodeship (27.7%) and Małopolskie Voivodeship (25.5%), while the smallest in the Zachodniopomorskie Voivodeship (1.5%), Lubelskie Voivodeship (4.1%) and Kujawsko-Pomorskie Voivodeship (5.6%). There are no weak areas for the agricultural production in the Opolskie Voivodeship[33] (Map 2).

Map 1. APAVindex (points) in the voivodeships in Poland



Map 2. Share in % of potential UAA with the APAV index below 52 points in the area of potential UAA in total in the voivodeships in Poland

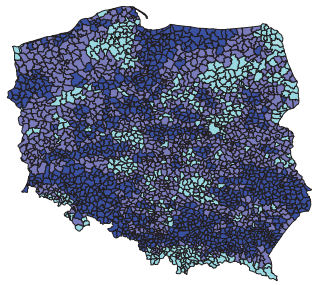


Source: own study based on the IUNG.

In the case of the communes, the average APAV index is contained between 0[34] and 108.3 (commune of Żórawina)[35]. In 58.6% of the communes, it is lower than the national average (66.8 points), of which in 18.2% of the communes it is lower than 52 points (Map 3). In the remaining 41.4% of the communes, their vast majority (80.9%) have the APAV index from 66.8 to 86.8 points.

[30] Soil quality is assigned 95 points at a maximum, agroclimate – 15 points and land relief and hydrographic conditions – 5 points each. The APAV index calculated as a total of these factors may have the maximum value of 120 pts.
[31] Applies to the potential area of UAA with the APAV index below 52 points according to the register and geodetic area of the country.
[32] Applies to the potential area of UAA in total according to the register and geodetic area of the country.
[33] Data from the IUNG database.
[34] This situation applies to seven urban communes in Poland [IUNG].
[35] Data of the IUNG in Puławy.

Map 3. APAV index (points) in the communes in Poland



APAV index below 52 points
APAV index of at least 52 and below 66.8 points
APAV index of at least 66.8 points

Source: as in Map 1 and 2.

17.3. The impact of natural farming conditions in Poland on the economic situation and the possibility of afforestation on farms

As determined in the previous subchapter, Poland is characterised by the spatial variability of natural farming conditions, with the large share of areas of low suitability for agriculture. One of the important possibilities to manage this type of land is afforestation. The more so that farms can now receive the aid to afforest their own land under the measure *Afforestation and creation of afforested areas* as part of the RDP 2014-2020. This aid takes a form of support due to the costs incurred for establishing and maintenance of forest stands (support for afforestation and maintenance premium) and lost income from agricultural activities (afforestation premium), but not only. Since 2015, it has been possible to receive additional direct payments to afforested land for the entire duration of the commitment [Przewodnik..., 2016]. According to the figures from Table 1, potential land for afforestation should be sought after on farms from the communes with the APAV index lower than 66.8 points, including primarily on farms specialising in field crops and with mixed production, where average income per 1 ha of UAA in 2013-2015 was lower than the afforestation premium rate (PLN 1215) plus the single area payment rate (PLN 453.7)[36]. This situation is understandable, since one of the important constraints for conducting the profitable agricultural production in the areas with lightweight soils with the low water holding capacity is the absence or scarcity of applying animal manure whose basic function on the farm is at least to maintain the resources of soil organic content.

[36] This paper also included an option for a farm to receive single area payment to afforested areas [Przewodnik..., 2016].

Table 1. Farm income per 1 ha of UAA (PLN thousand) on farms identified by type of farming and natural farming conditions (according to the APAV index) based on the data of the Polish FADN 2013-2015

Communes:	Farms with:					
	field crops	horticultural crops	permanent crops	grazing animals in total	granivores in total	mixed production
with the average APAV index below 66.8 points	1.6	11.0	3.8	2.9	3.7	1.5
with the average APAV index of at least 66.8 points	2.0	20.6	4.6	3.2	4.3	2.1

Source: own study based on the data from the IUNG and Polish FADN in 2013-2015.

17.4. Land afforestation financed from the RDP 2014-2020 in regional terms

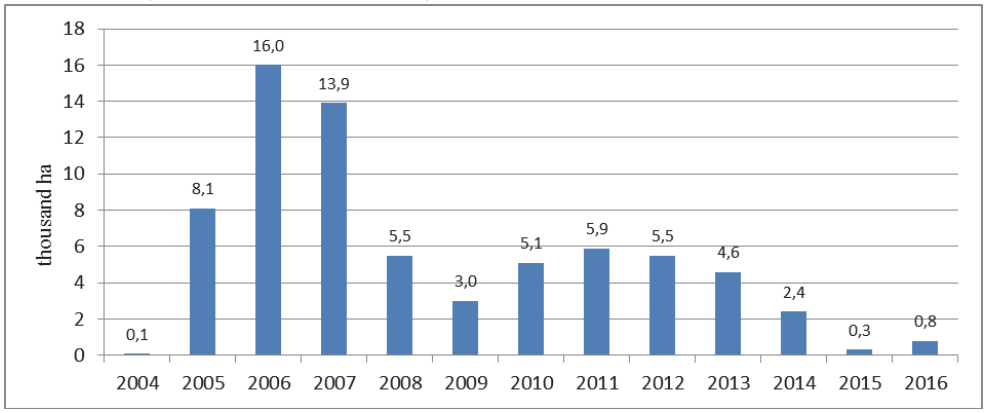
In 2004-2015 in Poland the area of potential UAA decreased by 2.7%, i.e. by 524.4 thousand ha, and of wasteland – by 5.3%, i.e. by 26.3 thousand ha [GUS 2007, 2016b]. The important reasons for this situation should be sought both in the increase in the area allocated for transport and housing purposes, as well as in the increased forestry land area. What is important, over the analysed period, the share of existing afforestations financed under the RDP 2014-2020[37] in the decrease in the area of potential agricultural land and wasteland in Poland amounted to 12.9%. This means that afforestations financed under the RDP 2014-2020 have a noticeable impact on the change in the land use type.

The RDP 2014-2020 has financed so far 71.2 thousand ha of afforested land[38], of which coniferous, deciduous and mixed forests amounted to, respectively; 17.7, 8.8 and 44.7 thousand ha of land. The largest area of land was afforested in 2006 and 2007, respectively, 16.0 and 13.9 thousand ha (Figure 1). However, in recent years, the process of reducing the area of afforestation is in progress. In 2015 and 2016, 0.3 and 0.8 ha of land were afforested, respectively.

So far, 72.9% of total afforestations supported under the RDP 2014-2020 were made in the voivodeships with the average APAV index below the national average. The largest area of land was afforested in the Warmińsko-Mazurskie (17.1 thousand ha), Mazowieckie (7.3) and Zachodniopomorskie (6.3) Voivodeships while the smallest in the Śląskie (0.9), Opolskie (0.5) and Małopolskie (0.5) Voivodeships (Map 4).

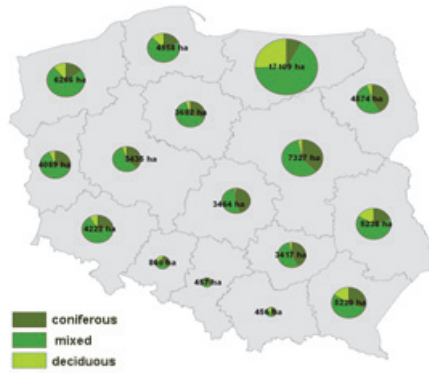
[37] Status as of 31.12.2016.
[38] Status as of 31.12.2016.

Figure 1. Area of afforestations made in 2004-2016 and financed under the RDP 2014-2020 (status as of 31.12.2016)



Source: own study based on the ARMA data.

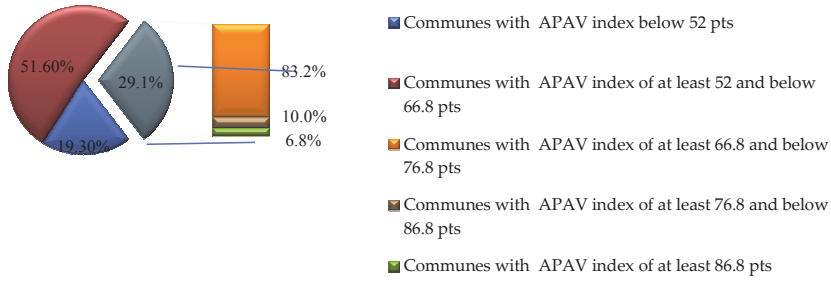
Map 4. Area of coniferous, deciduous and mixed afforestations (ha) financed under the RDP 2014-2020 by voivodeship in Poland (status as of 31.12.2016)



Source: own study based on the ARMiR and IUNG data.

In the case of the communes, the leading role was also played by afforestations in the communes with the average APAV index below the national average. In these types of communes, 70.9% of total afforestations supported under the RDP 2014-2020 were made, including 19.3% in the communes with the APAV index below 52 points (Figure 2). In turn, the remaining 29.1% of afforestations were made in the communes with the APAV index of at least 66.8 points, and were dominated by afforestations (83.2%) in the communes with the APAV index lower than 76.8 points. Definitely the lower share, accounting for, respectively, 10.0 and 6.8%, was that of afforestations made in the communes with the APAV index of at least 76.8 points.

Figure 2. Distribution (%) of afforestations financed under the RDP 2014-2020 by APAV index in the communes in Poland (state as of 31.12.2016)



Source: own study based on the ARMiR and IUNG data.

17.5. Importance of land afforestations financed under the RDP 2014-2020 in the EU climate policy for 2021-2030.

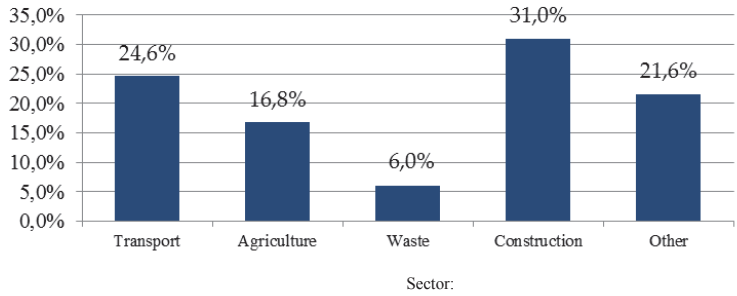
According to the Proposal for the Regulation of the European Parliament and of the Council of 16 October 2017, Poland should reduce greenhouse gas emissions within the ESR area in 2021-2030 by 7% when compared to the level of 2005 [Proposal for a Regulation, 2017]. Bearing in mind that according to the above, in the EU countries greenhouse gas emission reductions within the ESR area should cover all sectors, in this situation Poland will have to make efforts to reduce greenhouse gas emissions also in the agricultural sector, whose annual greenhouse gas emissions are at about 17% (in 2015 – 16.8%) of the total greenhouse gas emissions within the ESR[39] area (Figure 3).

It should be remembered that in the agricultural sector many contemporary greenhouse gas emission reduction practices can raise the production costs while not having any positive impact on its value[40]. In the light of the above, it is, therefore, appropriate to recognise two additional findings of the European Parliament and of the Council of 16 October 2017, which make it possible, in the selected EU countries (including Poland) to achieve more easily the objective of reducing greenhouse gas emissions within the ESR area in 2021-2030.

[39] The need to include the agriculture sector in reducing greenhouse emissions has also been included in the Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions of 29 November 2017 on *The Future of Food and Farming*. European Commission, 29.11.2017.

[40] The potential of reducing greenhouse gas emissions in Polish agriculture taking into account the effects of the Common Agricultural Policy. National Research Institute of Animal Production, University of Life Sciences in Lublin, Institute of Technology and Life Sciences, WULS, IERiGŻ-PIB, expert opinion for the MRiRW, Warsaw 2015.

Figure 3. Structure (%) of greenhouse gas emissions within the ESR area in Poland in 2015



Source: own study based on KOBIZE [2017].

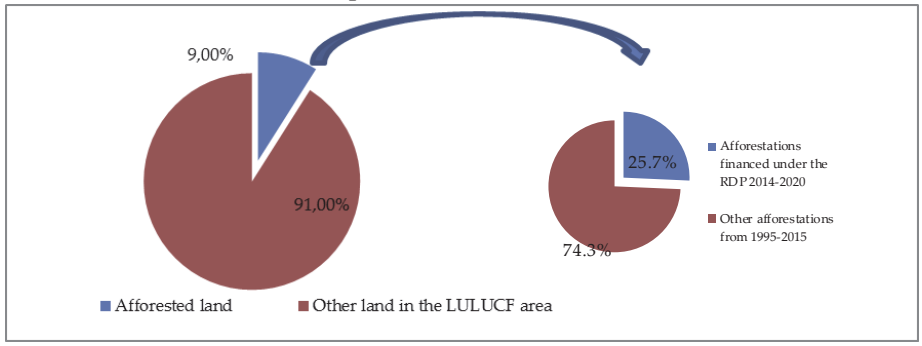
The first one applies to a possibility of using additional CO_2 equivalent units as part of the security reserve[41]. The other allows to include a certain contribution of the LULUCF area therein. In this case, the possibilities of CO_2 sequestration from the atmosphere in the LULUCF area likely to be used, to a certain extent, in limiting the effort to reduce greenhouse gas emissions from the ESR area in 2021-2030 should be sought, *inter alia*, in the afforestation sector. This is an advantage of this approach, as in this sector there are the possibilities of CO_2 sequestration from the atmosphere. Taking into account the data from the National Centre for Emissions Management (KOBiZE) in Poland in 2015, the LULUCF area absorbed 29.9 million tonnes of CO_2, including the afforested land sector – 2.7 million tonnes of CO_2[42]. Moreover, given that in 1995-2015 afforestations financed from the RDP 2014-2020 accounted for 25.7% in total afforestations, it can, therefore, be estimated that in 2015 those afforestations absorbed about 0.7 million tonnes of CO_2[43] (Figure 4). In this context, it is necessary to highlight the positive importance of afforestations financed from the RDP 2014-2020 in the EU climate policy for 2021-2030.

[41] The security reserve in the selected EU countries will aim at easier achievement of the target of reducing greenhouse gas emissions within the ESR area in 2021-2030. It will be 115 million tonnes of CO_2 eq. and it will be dedicated to the EU countries where, *inter alia*, GDP *per capita* is lower than the EU average and if their total emissions within the ESR area in 2013-2020 are below the established limits in 2013-2020 [Proposal for a Regulation, 2017].

[42] In Poland, the category of afforested land is the second largest source of CO_2 sequestration in the LULUCF sector (the first largest largest source of CO_2 sequestration in the LULUCF sector is the category of forestry land) [KOBIZE, 2017].

[43] According to the methodology of the Intergovermental Panel on Climate Change (IPCC), used by KOBiZE for the annual inventory of greenhouse gases in Poland, forestry land is treated as afforested land for 20 years from the moment of their afforestation. According to the GUS data, in Poland in 1995-2015, 276.7 ha of land were afforested [GUS, 2016a].

Figure 4. Share of afforested land, including afforestations financed under the RDP in 2014-2020 in total CO2 sequestration in the LULUCF area in Poland in 2015



Source: own study based on the data from the ARMiR, GUS and KOBIZE [2017].

17.6. Summary and conclusions

In the first place, the study took account of natural farming conditions in Poland in regional terms, and their impact on the economic situation and the possibility of afforestation on farms. Then, it estimated the state of implementing afforestations financed under the RDP 2014-2020 in regional terms and their contribution to CO_2 sequestration from the atmosphere in the LULUCF area.
Analysis showed that:

- In Poland, there is the large share of potential UAA with low suitability for agriculture. It should be noted that 32.8% of cadastral districts have the average APAV index lower than 52 points per 120 achievable points. Therefore, these are the areas with land having the particularly unfavourable physical structure of soils and frequently negligible organic matter content. The worst situation in terms of the share of such poor soils in the potential area of UAA in total is in Podlaskie, Pomorskie and Małopolskie Voivodeships. Given the above, it should be stated that one of the alternatives to manage this type of land is afforestation. The more that on farms characterised by the absence or scarcity of animal manure and operating in the areas with unfavourable natural farming conditions, afforestation of their weakest land is economically reasonable.
- Afforestations financed under the RDP 2014-2020 have a noticeable impact on the change in the land use type. In 2004-2015, their share in the decrease in the area of potential UAA and wasteland in Poland amounted to 12.9%. Moreover, so far, 72.9 and 70.9%, respectively, of all afforestations supported under the RDP 2014-2020 were made in the voivodeships and communes with the average APAV index below the national average

(66.8 pts). This means that existing afforestations are made mostly in the areas with the large share of poor soils with low suitability for agriculture.

- In recent years, there was a decrease in afforestations financed from the RDP 2014-2020. It should not be ruled out that the important reasons for this situation is the progressive process of increased specialisation and concentration of the agricultural production in Polish agriculture, which results in the increased production potential and economic power of farms and the possibility for potential beneficiaries to participate in other measures as part of the RDP 2014-2020, which strengthen their tendency to conduct the agricultural production. However, taking into account that in Poland there are still afforestation needs resulting from the large share of poor soils with low suitability for agriculture, it should be noted that farmers would still be willing to implement afforestations. Importantly, this tendency will probably be strengthened by the effects of climate change in a form of, *inter alia*, drought, currently escalating in Polish agriculture and resulting in the largest production losses on poorer soils.
- Taking into account the current findings of the European Parliament and of the Council on the EU climate policy for 2021-2030, it should be noted that afforestations financed under the RDP 2014-2020 will be able to contribute to limiting the effort to reduce greenhouse gas emissions from the ESR area, including agriculture after 2020. It is an important finding, as in the case of the agricultural sector the possibilities of further reducing greenhouse gas emissions without any loss to its economic effects are negligible.

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18. The scale and conditions of deagrarianisation in Poland

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Abstract

Deagrarianisation constitutes one of the regularities of the economic development. This phenomenon is becoming increasingly apparent also in Poland and manifests itself in, for instance, the decline in the importance of the agricultural sector as a type of occupation. However, the Polish economy is still characterized by high agricultural employment, which determines the low labour productivity in this sector and results in its weak adaptation to the functioning in the conditions of competition. Further changes in agriculture are subject to the labour outflow to other sectors. This process is one of the objectives of the Polish labour market policy. The paper examines the scale of deagrarianisation of employment and its exogenous and endogenous conditions in the Polish economy. The effects of the support of labour outflow from the agriculture, which had been implemented through the Cohesion Policy as well as the RDP in the years between 2007 and 2015, were also assessed. According to the research results, the process of deagrarianisation of employment is continuous and sustainable. It was determined by many various factors, which can be divided into two groups: internal – pushing the labour force out of agricuture (supply), and external – identifying the needs for employment outside agriculture (demand). As the analysis of ways and effects of the impact of projects financed from the EU funds on changes in agricultural labour resources proves that these initiatives contributed to the growth in non-agricultural employment, at different levels of effectiveness and sustainability of support depending on the type of allocation.

Keywords: deagrarianisation, employment, conditions of deagrarianisation, Cohesion Policy, RDP

JEL codes: J21, J23, J43

18.1. Introduction

Presently, the regularity of the economic development is the progressive deagrarianisation of the economies of individual countries [Timmer, 1988]. This phenomenon was increasingly observable also in Poland, and expressed itself in constantly decreasing number of people employed in agriculture. However, despite a clear downtrend trend, the Polish economy, compared to other European countries,

was characterized by one of the highest employment rates in this sector[44]. A large number of people working in the domestic agriculture led to the adverse relations between the labour resources and the resources of land and capital. Consequently, this situation determined generally low work productivity [Baer-Nawrocka and Poczta, 2016]. As a result, the Polish agriculture was still poorly adapted to the functioning in the conditions of global competition [Ziętara, 2014], and further effectiveness-oriented changes of agricultural structures were determined by the pace of the agricultural labour outflow to other segments of the economy [Sikorska, 2013; Karwat-Woźniak, 2016]. The increase in employment in services and the limitation of hidden unemployment on farms had long been one of the objectives of the Polish labour market policy [Krajowa Strategia…, 2005; NSRO, 2007]. Together with the accession to the EU, the catalogue of public intervention tools aiming at supporting the implementation of this task has broadened[45].

The aim of the paper was to analyse the current changes in the scale of agricultural employment in Poland, particularly in the family farming sector. The endogenous and exogenous conditions of deagrarianisation of labour were also outlined and the impact of the EU Cohesion Policy instruments and the agricultural and rural development policy (Rural Development Programme for 2007-2013, hereinafter RDP 2007-2013) on changes in the allocation of rural labour resources was determined. The paper uses the primary data gathered by the official statistics (GUS, Eurostat) as well as the results of panel surveys conducted by IERiGŻ-PIB (Institute of Agricultural and Food Economics-National Research Institute). The paper was supplemented by the analysis of secondary data including information on the implementation of national and regional operational programmes as well as RDP 2007-2013, studies commissioned by the government and self-government administration, as well as the relevant literature. The period covered by the observation concerned the period between 2007 and 2015 and partly earlier and later periods[46].

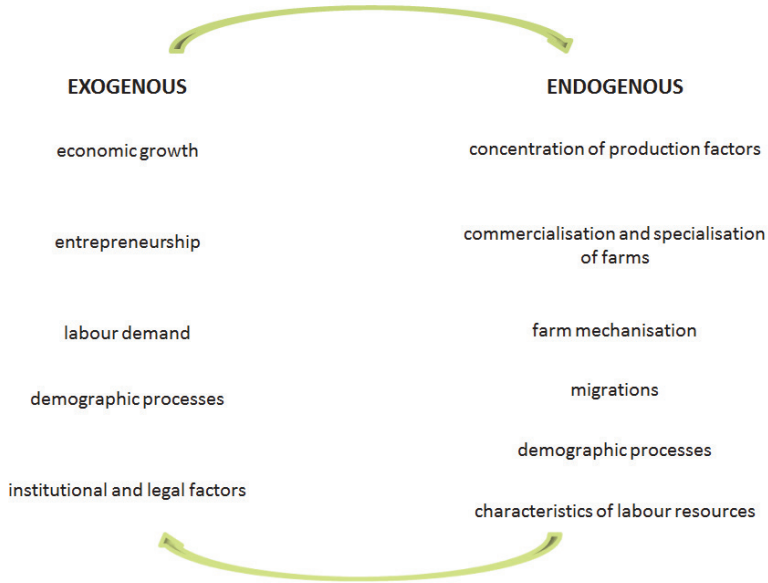
18.2. The conditions of the decrease in employment in agriculture

The process of deagrarianisation, that is the decrease in the role of agriculture in the economy, is visible in many aspects: socio-economic, cultural, organic, manufacturing, legal and institutional [Roszkowski, 2009; Halamska, 2011; Wojewodzic, 2017]. Within the economic dimension, what is often analysed is

[44] According to the Eurostat, in 2016 the share of persons working in agriculture it total working population amounted to 10.6%, while this rate for the EU-28 constituted 4.5%. Higher employment rate in this sector was noted in Romania (24.0%), Bulgaria (18.0%) and Greece (11.3%) was noted [European Commission, 2017].
[45] The data concerning agriculture involve also forestry, hunting and – since 2008 – fishing.
[46] This was done due to the fact that, within the frames of the financial perspective of 2007-2013, the projects supported from the EU funds were implemented in Poland in accordance with the n+2 rule until the end of 2015.

the decrease in the significance of agriculture as a type of occupation on the macro-scale, which is referred to as the deagrarianisation of employment. The deagrarianisation of employment entails numeruous consequences and results or a number of reasons. Those factors can be generally divided into the exogenous, which are outside the agricultural sector, and endogenous, which relate to this area of economic activity (Figure 1). The first of the mentioned groups of determinants includes e.g.: the pace of economic growth, the level of entrepreneurship, the demand for work in the economy, demografic trends, legal and institutional issues.

Figure 1. The conditions of decrease in employment in agriculture



Source: own elaboration.

In modern economies, the force absorbing the labour recources from agriculture is the significant creation of value added and the employment in the service sector of the economy, which is accompanied by establishing and liquidating non-agricultural economic entities. At the same time, in the conditions of demografic ageing of populations, the competition on workers increases. As a result, those branches which offer better-paid jobs at better conditions are rewarded. The shape of legal and institutional solutions in the scope of social insurance, the taxation as well as the support of the professional activity affecting the working conditions in particular sectors of the ecoomy is also significant for the allocation of the labour force.

Among the endogenous determinants affecting the proccess of deagrarianisation, the important issues are: the level of concentration of means of production, commercialization and specialization of farms as well as the mechanization of works. Those phenomena of various intensities are effects of the escalating competition among the agricultural producers, which generates the pressure to increase the effectiveness of production. It is connected to the declining demand for labour force, which is determined by social and demographic characteristics of the rural population and its tendency for the occupational mobility. Those numerous external and internal premises of deagrarianisation accumulate increasing the pace of this proccess or work in opposite directions (often neutralising their influence), which results in the further persistence of the significance of agriculture in employment.

18.3. The change in the scale of employment in agriculture in Poland and its conditions

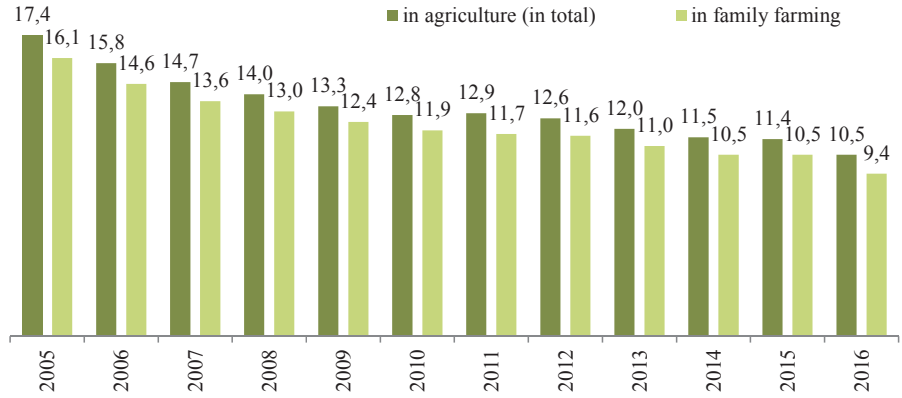
In 2005-2016, the decrease in the significance of the acricultural sector in the employment of working people working in the Polish economy was observed. This proccess was expressed in both relative and absolute terms. The share of people working in agriculture in the analysed time interval decreased from 17.4% to 10.5% (Figure 2). The number of people working in this sector decreased, in turn, by 31%. This changes resulted mainly from the decrease in the number of people working in the family farming, which decreased by ca. 33%. Even though the scale of changes in the allocation of labour could be considered as significant, still it was one of the highest in Europe (twice as high as the average for all EU Member States and four times higher than in the so-called old Member States). In the analysed period, the role of agriculture as the area of occupational activity of rural population was also changing. Even though the rural inhibitants still dominate among those working in agriculture, they worked in this sector less frequently. In 2009-2016, the percentage of Polish rural inhabitants employed in agriculture decreased from 32% to less than 25%.

The described changes in the scale of deagrarianisation of employment of the domestic economy were related to the favourable macroeconomic factors. The significant growth of the gross domestic product could be observed in Poland[47]. However, the dynamics of those changes in particular years varied. Nevertheless, in each analysed year, the real increases in GDP, expressed in both current prices (by at least 1.7%) and in constant prices (by at least 1.4%), was noted. The growth in production created the demand for work, especially in non-

[47] In 2016, in Poland, the level of GDP in the current prices amounted to 1.8 trillion and was over twice as high as in 2005. During this period, the GDP of current prices increased by almost 50%, that is by 1.47% each year on average.

-agricultural branches, both in respect to the urban and rural population. In the analysed time span, this phenomenon was reflected in the changes that were reported in the values of the employment and unemployment rates. Since 2005 to the third quarter of 2017, the employment rate increased by 7% in the case of rural population and by 10% in the case of urban population. In consequence, the level of employment of the rural and urban inhabitants was similar and amounted to over 54%. The unemployment rate, in turn, was decreasing and reached the same level for both urban and rural populations (5%). At the same time, the increase in the number of job offers reported by enterpreneurs was observed. In the third quarter of 2017, this number amounted to almost 450 thousand and was over twice as high as in the corresponding period in 2012.

Figure 2. The people working* in the agricultural sector** and family farming in Poland in 2005-2016 (%)



*Annual averages – arithmetic mean of quarterly data, the total of working people in Poland = 100. **Agriculture, hunting, fishery and fishing.
Source: based on GUS, LFS.

The decreased allocation of the labour factor in agriculture was also influenced by demographic determinants. The processes of population ageing were becoming visible in rural areas. These trends were accelerated, as evidenced by the increasing median age. In the case of urban inhabitants, it amounted to 41 years and increased within the last period (2010-2016) by ca. 5%. The median age of rural inhabitants in 2016 amounted to 38 years and was higher by 6% compared to 2010. However, the rural population was still demographically younger than the urban population, which is also indicated by the structure of population according to the economic age groups. In 2016, about 20% of the

rural residents were people in pre-working age, and 17% – in the post-working age. In the case of the rural population, these proportions were reversed. The demographic forecasts developed by GUS showed that the aging process of the population will continue. The number of people in the post-working age will increase. In 2040, the share of this group will constitute over 25%. The group of people in the pre-working age will decrease, which means that smaller number of people will enter the labour market. The ageing of the population will also create new vacancies, e.g. for nursing services.

Among the endogenous factors of deagrarianisation of employment in the economy, relatively dynamic concentration processes, especially of the agricultural land, should be emphasized. The majority of the resources of agricultural land were in the group of large farms (over 50 ha of UAA) and amounted to 32% of the total. However, still relatively large part of land was owned by small agricultural holdings, which – due to their small area – are considered as non-developing (about 13% of land was used by farms with the area of up to 5 ha, which constituted more than a half of all farms in Poland). When it comes to the EU Member States, with which – due to the structure of agricultural commercial production – the Polish agriculture competes, the share of agricultural land owned by the farms with the area of 50 ha and higher amounted to 80-90%. Together with the concentration proccesses of land, the investment expenditures on the fixed assets in agriculture were increasing. In 2015 this expenditures in constant prices were higher by 50% compared to 2010, and by 80% compared to 2005. On average, approximately one third in those investments were aimed at the mechanization of works, which led to the growth of the capital-labour ratio. From the point of view of the demand for labour force, the comprehensive mechanisation of all phases of the production process is important. Based on surveys conducted by IERiGŻ-PIB, the scale of comprehensive mechanisation was assessed. The number of farms with complex mechanisation increased up to 20%. This process was visible particularly in the group of commercial farms, regardless of the production profile.

18.4. The instruments of the Cohesion Policy and agriculture and rural development of the EU policy and employment deagrarianisation in Poland

In 2007-2015, the Cohesion Policy and the agriculture and rural development policy contributed to the deagrarianisation of employment in the Polish economy. It should be noted that both types of public intervention that were mentioned had directly or indirectly articulated aim in the form of decreasing the role of this sector as a place of employment, and the scale of financial resources

engaged in their implementation was relatively significant[48]. The activities oriented at the increase in the non-agricultural occupational activity were an important element of the EU policy appointed by the Lisbon Strategy and CAP's objectives. They concerned the creation of a competitive and knowledge-based economy, providing jobs as well as the economic, social and spatial cohesion.

The shape of domestic systems of implementation of the Cohesion Policy and the agricultural and rural development policy were the reflection of the assumptions and rules of the support shaped at the EU level. The Cohesion Policy financed by the European Regional Development Fund (ERDF), the Cohesion Fund (CF) and the European Social Fund (ESF) were implemented in Poland primarily through five nationwide programmes (Operational Programme: Infrastructure and Environment – OP I&E, Innovative Economy – OP IE, Human Capital – OP HC, Development of Eastern Poland – OP DEP, Technical Assistance – OP TA, which covered 74% of the financial funds allocated to Poland by the EU) as well as sixteen regional operational programmes (ROPs, 25% of total allocation)[49]. A part of the total envelope of EUR 85.6 billion (EUR 67.3 billion came from the EU budget, EUR 11.9 billion from national public funds, and EUR 6.4 billion from private sector) were allocated for the projects related, among others, to the promotion of entrepreneurship, trainings, occupational extension and retraining. These actions had to contribute to the equalization of opportunities for development and supporting the structural changes in the countryside, as well as to the growth of its non-agricultural functions. The diversification and development of the rural economy in the direction of non-agricultural functions and the employment promotion among rural residents in Poland were also supported by the CAP funds coming from the European Agricultural Fund for Rural Development (EAFRD), provided for the implementation of RDP 2007-2013 [Regulation No. 1698/2005 2005, RDP 2007-2013]. The total budget of this programme in the country amounted to over EUR 25 billion, and it was planned that less than EUR 3 billion of this sum (that is 12% of the total budget of the Programme) would be allocated to instruments directly aimed at increasing of the non-agricultural employment and entrepreneurship[50]. These funds were available mainly as part of the RDP 2007-2013 measures of the third and

[48] It is estimated that, within the entire programming period, PLN 109 billion were allocated to the interventions undertaken within the framework of structural funds and the CF, the purpose of which was to generate the employment effects. This money constituted 44% of the EU total allocation in projects [Wpływ realizacji…, 2016]. For the implementation of the RDP 2007-2013 PLN 4.3 billion (i.e. about 6% of total public budget of the RDP) were allocated to the projects linked with the support and promotion of non-agricultural occupational activity of rural population.

[49] 1% of all EU funds allocated to Poland in the programming period from 2007 to 2013 were devoted for the financing of the European Territorial Cooperation Programmes.

[50] Due to the problems in implementing the measure no. 312 of the RDP 2007-2013, the final allocation was almost halved [Ocena wpływu…, 2016].

fourth axes, i.e. Diversification into non-agricultural activity, The establishment and development of micro-enterprises and The Implementation of the Local Development Strategies (measures no. 311, 312 and 413).

Both in relation to the Cohesion Policy and the RDP 2007-2015, the impact of public intervention on the deagrarianisation of employment in Poland was indirect (the overall impact of programmes on the demand for work of non-agricultural entities) and direct (effects of instruments strictly focused on supporting workers' moving away from agriculture and establishing new jobs outside this sector). In the case of the Cohesion Policy, in the entire programming period, the total number of jobs created as a result of this policy was estimated at 173-282 thousand of jobs, which translated into about 190 thousand jobs expressed in full-time equivalent. This growth was mainly determined by ROPs, but also by the OP IE and the OP HC[51] [Wpływ realizacji…, 2016]. It is estimated that, out of the total number of jobs established as a result of the intervention of European funds, approximately 30% were created in rural areas and in towns of up to 5 thousand inhabitants [Wpływ realizacji…, 2016]. New jobs were created mostly in the construction and in services sectors, as well as – but to a lesser extent – in the industry. It is worth noting that the Cohesion Policy's intervention in Poland did not contribute to the growth of the employment in agriculture, what proves its clear deagrarianisation effect (Table 1). However, it should be mentioned that a relatively high proportion of new jobs was created strictly to implement the EU-funded projects [Wpływ realizacji…, 2016].

Within the Cohesion Policy, the projects directly related to the increase of rural, non-agricultural employment were implemented by the instruments of the ESF funds as a part of OP HC, OP DEP and ROP (self-employment, promoting employment, entrepreneurship, business creation)[52]. One of such forms of the improvement in the case of employment and in the labour market was the support for setting up a business available in the OP HC [Badanie skuteczności…, 2013]. This support allowed to establish 247.7 thousand businesses [Sprawozdanie końcowe…, 2017]. It is estimated that about 99.7 thousand of these companies were established in rural areas [Badanie skuteczności…, 2013, Sprawozdanie końcowe…, 2017].

[51] The majority of full-time jobs' equivalents were established at the beneficiaries as a result of implementation of the ROP (98 thousand). In this regard, a smaller contribution was noted for OP IE (around 52 thousand of EPC) and OP HC (around 35 thousand of the EPC). Relatively small impact in the case of the OP DEP (4 thousand) was observed.

[52] In the entire programming period, 583.6 thousad of rural residents participated in the projects aimed at the employment growth within the framework of the OP HC Priority VI *Labour Market Open to Everyone*. Six months after the completion of the participation in these projects, 76% of the participants from these areas were employed [Sprawozdanie końcowe…, 2017].

Table 1. Selected programmes as well as instruments of the EU Cohesion Policy and CAP supporting the deagrarianisation of employment in Poland, 2007-2015

Details	the number of created jobs* (thousands)	impact on agricultural employment
OP HC**	34.5	-
OP DEP	4.1	-
OP I&E	5.2	-
OP IE	51.7	-
ROP	97.5	-
Measure 311 of RDP 2007-2013	13.8	+/-
Measure 312 of RDP 2007-2013	24.0	+
Measure 413 of RDP 2007-2013	1.9	+/-

* In the case of the programmes financed by the ERDF and the ESF, the number of jobs was expressed as the equivalent of full-time jobs. The estimates did not include the effects of the OP TA. ** In addition, it is estimated that as a result of the support offered within the OP HC Priority VI concerning starting up a business, 250 thousand new jobs were created.
Source: own elaboration based on [Sprawozdanie… 2015, Wpływ realizacji… 2016, Sprawozdanie końcowe… 2017].

Regarding the overall impact of the RDP 2007-2013 on employment, within the entire programming period, the average annual increase of 41 thousand jobs was reported. In absolute terms, it covered all sectors of the economy [Zaleski, 2015]. The impact of the Programme on the increase in the share in the structure of employees working in the services sector and construction sector was noted, which, at the same time, translated in this respect into a relative decline in the importance of agriculture. However, it should be assumed that the overall deagrarianisation effect of the RDP 2007-2013 was limited by direct payments and other support provided within CAP, which may have caused a part of the rural population to remain in the sector [Olper et al., 2014].

The RDP measures, directly supporting the increase in the non-agricultural employment, in the entire programming period, contributed to the creation of 37.9 thousand of new jobs. In this respect, the relatively largest effects were associated with poviding the support in order to run or develop a non-agricultural business (Measure 312). Thanks to the received subsidy, over 14.5 thousand projects were covered by the support (funds were mostly allocated to rural businesses established before founding), as a result of which 24 thousand non-agricultural jobs were created [Sprawozdanie…, 2015]. These were mainly jobs related to the provision of services (construction and installation, agricultural, tourism, recreation and sports services). Low effectiveness and sustainability of the support, as well as the limited impact on non-agricultural employment characterised, in turn, the Programme measures associated with the diversifica-

tion of agricultural activity[53] and the implementation of the Local Development Strategies[54] (Measures 311 and 413). The financial support was usually used for development of traditional forms of farming activity, which was not conducive to outflow of employees from agriculture [Ocena wpływu…, 2016].

18.5. Summary and conclusions

In 2005-2016 the process of deagrarianisation of employment in the Polish economy was observed. The employment rate in domestic agriculture decreased from 17.5 to 10.5%. As a consequence, the level of agricultural employment observed in Poland reached the maximum value which is considered for highly developed economies. It should be noted that exogenous factors associated with the increase in the global production and the increase in the demand for jobs in non-agricultural sectors were of essential significance for this process. The favourable economic situation was accompanied by demographic and social trends that contributed to shrinking of the agricultural labour resources. At the same time, determinants inherent in this sector turned out to be significant for the outflow of employees. In particular, they concerned gradual concentration of agricultural land, improvement of the level and complexity of production mechanization, as well as the increase in the production specialization. These changes resulted in a decrease in the demand for labour force, mainly in family farms.

Instruments of the EU Cohesion Policy and the CAP contributed to the increase in non-agricultural employment of rural population. In 2007-2015 in Poland, according to various estimates, the number of 213-495 thousand of new non-agricultural jobs were created thanks to these interventions. These numbers could be supplemented by 250 thousand jobs resulting from the actions supporting the sturt-ups' creation. However, it should be taken into account that the results, effectiveness and sustainability of individual projects varied depending on the subject of allocation. Many of the induced employment effects were expensive, unsustainable and unnecessarily involving public funds. It should be expected that the deagrarianisation trends in Poland, which are decribed in the text, will persist in the coming years. Regardless of the significance of the instruments of public policy aimed at increasing non-agricultural employment in the

[53] As a part of diversification into non-agricultural activity, 15.3 thousand people received support and they implemented 15.7 thousand projects. They were allocated to the activity consisting in offering services for agricultural holdings and forestry (10.9 thousand projects, which constituted 70% of all operations under the Measure 311). The research carried out among the beneficiaries indicated that 13.8 thousand jobs outside agriculture were created thanks to the received subsidies, 11.9 thousand of which were of permanent full-time positions [Sprawozdanie…, 2015].

[54] Within the LEADER approach, 1.8 thousand people associated with farms and running additional economic activity (in more than a half of the cases in the form of services for agriculture and forestry) and 1.4 thousand projects undertaken by the new and existing non-agricultural economic entities were supported. With the support of the EAFRD, 1938 new jobs were created [Sprawozdanie…, 2015].

future, the pace of the economic development and the scale of demand for labour created by services sector will be crucial for the continuation of the structural changes in the Polish agriculture. In coming years, the latter should be stimulated mainly by demographic trends, particularly population aging.

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19. Socio-economic and environmental parameters and results of rural development under the CAP: the case of Bulgaria

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Abstract

During the ten years of our country's membership in the EU, the implementation of the Rural Development Programme have become a driving force for raising income and improving living conditions in the rural areas.
The purpose of this report is to assess the impact of the CAP on rural development after Bulgaria's accession to the EU. For this purpose an analysis and evaluation of the state and changes of the socio-economic, and environmental results, and parameters of the rural areas was performed for 2007-2016. The report's thesis is that rural development depends on the type of farming, its organization and the prerequisites for diversification of the rural economy. Demonstration will use statistical data on demographic, economic and environmental indicators on the rural areas.

Keywords: production agriculture, northern and southern types of agriculture, rural areas

JEL codes: Q15, Q16

19.1. Introduction

The models of agriculture have always had an impact on rural development. The production models which have been implemented over the last decades have led to an increase in production through an "intensive, industrially driven and expansionist agriculture with state support based primary on output and increased productivity" [Lowe et al.,1993, p. 221]. At the same time, some authors rightly emphasize that "the industrial agriculture, driving people out of farming and rural areas, contributed to a decrease or, in many cases, decline, of the economic and socio-cultural viability of rural areas" [Zegar, 2012, p. 25]. As a result of those transformation processes today's rural areas have to face multiple socio-ecological problems and crises.

The structural change leads to modified working conditions and property situations in rural areas, with negative effects on small-scale farming, whose farmers are often forced to give up agricultural production [Feindt, 2008]. Placed in the context of diverse natural-climatic conditions, agricultural traditions and socio-economic conditions and structural changes are a prerequisite for various impacts and results for local development that are the subject of analysis by various researchers. Reviewing their findings and conclusions it can be summarized that at the end of the twentieth century the European Commission highlighted the existence of two types of European agriculture – the South and the North – with different characteristics, opportunities, problems and development barriers [EC, 1997].

Diversity studies are active mostly in Southern European countries where both models exist. Some authors [Fabiani and Scarano, 1995] analyse the dualism of the structure of agriculture – in Italy through the prism of differences backward versus productive holdings in Greece by comparing modern and traditional farming and drawing conclusions on the need for a transition to hybrid structures [Beopoulos and Damianakos, 1997; Beopoulos, 2003]. Analysing differences between northern and southern agriculture, researchers focus primarily on physical and economic indicators, and emphasize that the "relative balance of permanent/annual crops also shows notable differences in productive orientation of farms in the two groups of countries" [Arnalte-Alegre and Ortiz-Miranda, 2013, p. 42].

The purpose of the paper is to assess the impact of the CAP on rural development after Bulgaria's accession to the EU. For this purpose an analysis and evaluation of the state and changes of the socio-economic, and environmental results, and parameters of the rural areas is performed for the period of 2007-2016.

The report's thesis is that rural development depends on the type of farming, its organization and the prerequisites for diversification of the rural economy. Demonstration will use statistical data on demographic, economic and environmental indicators on the rural areas.

19.2. Changes in Bulgarian rural areas – socio-economic and environmental aspects

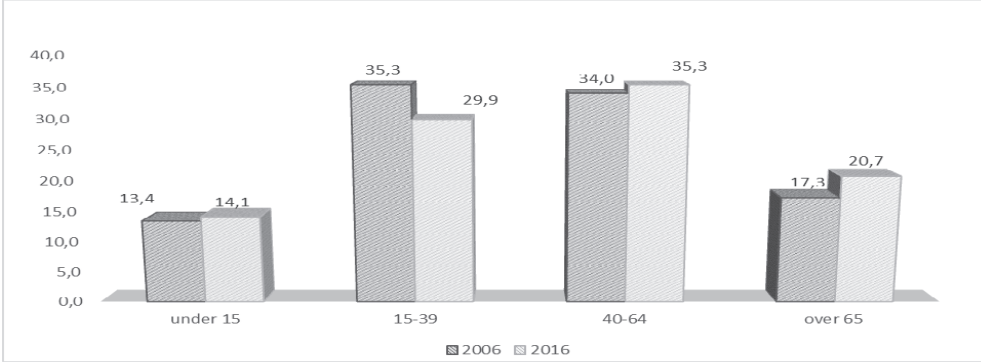
In Bulgaria, 88% of the municipalities are classified as rural areas (LAU 1), which are spread across 81% of the country's territory.

The population of these areas was 39% of the total count in 2007 and 27% in 2016. Overall, in the years of Bulgaria's membership in the EU, there has been a population decline of more than 8%, worsening its age structure and average life expectancy. The total number of people living in Bulgaria was 7679 million in 2006 and by 2016 this number has changed to 7102 million. Life expectancy has also gone down to 70.4 years – 71.2 for males and 78.2 for females.

Figure 1 shows that there was growth in the last two age groups. The most significant is the increase in the relative share of people over 65 – by more than 3.4 points. This group reaches 20.7%, while children and young people under 15 are only 14.1%.

These negative processes are accompanied by an increase in income by more than 47%, as the most significant increase is in pensions (54.6%). Apart from the fact that many projects were implemented to stimulate entrepreneurial activity, the income from ownership and self-employment is preserved and remains low.

Figure 1. Age structure of the population (2006 and 2016)



Source: own study based on NSI data for population.

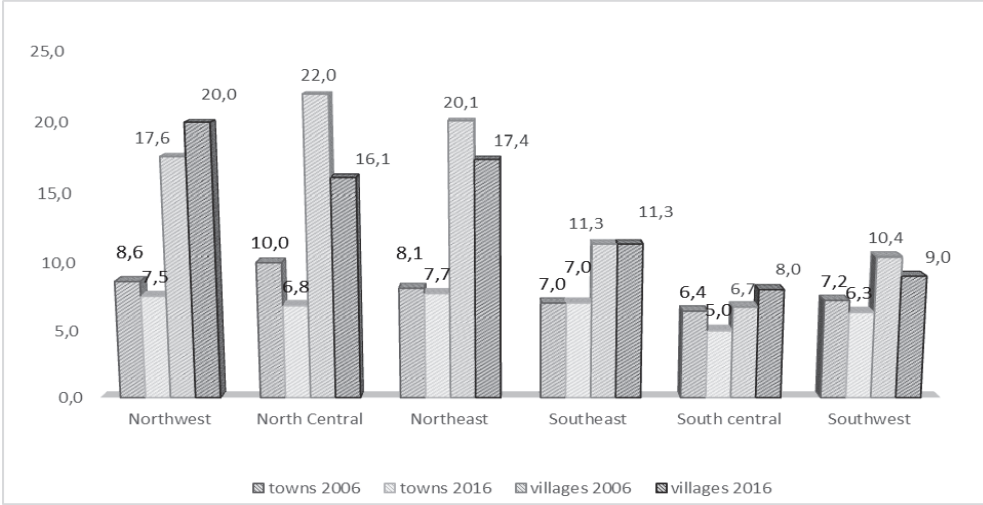
Figure 2 shows that unemployment declines mainly in urban areas, while in some rural areas' it remains high and it is even rising. The processes of income growth and population decrease are the result of the ongoing restructuring of the Bulgarian economy and the localization of some sectors only in the big cities.

Broken down by regions, Figure 2 shows that unemployment in urban areas drops in all regions, while for rural areas in 2 of the regions it is rising – up to 20% in Northwest and 8% in South Central. It is quite interesting, that in the Southeast region the unemployment rates remain the same both for urban and rural areas.

These results show that despite the implementation of the RDP, which supported more than 25 000 farms (Table 1), the unfavourable trends in rural development continue.

Positive change is observed in transport and social infrastructure in rural areas. The implementation of Bulgaria's first RDP improved the quality of life for rural residents. The implemented projects in the field of transport structure and urban development resulted in more than 2 thousand kilometers of new and renovated roads and more than 0.4 thousand km of streets; more than 2.5 thousand km are water systems. The social infrastructure, especially the local cultural centers, sports facilities and social services, was also significantly improved.

Figure 2. Unemployment in the towns and villages of Bulgaria (%)



Source: National Statistical Institute, Unemployed and unemployment rates.

Table 1. Agricultural holdings within implemented projects under measures of the Rural Development Programme (2007-2013)

Measures	Number or agricultural holdings
Modernization of farms (M 121)	4552 farms, investments worth over EUR 1 billion and financial assistance worth over EUR 515 million
Support for semi-market holdings (M 141)	7696 semi-market holdings
Setting up of young farmers (M 112)	5678 young farmers
Compensatory payments	more than 7000 farms – payments for environmentally friendly and climate friendly activities as well as organic production

Source: MZFF.

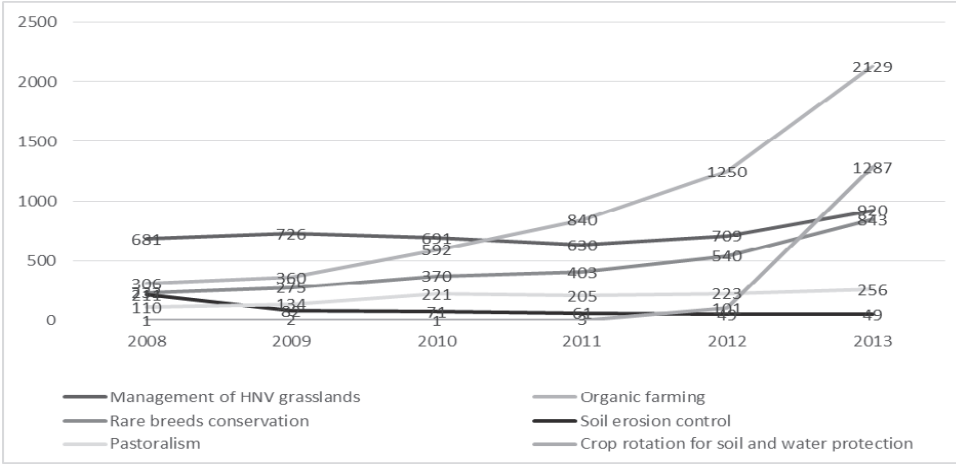
The environmental parameters of the rural development in Bulgaria can be traced out by examining the implementation of the agri-environmental scheme for 2007-2013. On the other hand, analyzing some of the basic agri--environmental indicators, which integrate environmental concerns into the Common Agricultural Policy in the EU, it is necessary to draw a conclusion about the state of the environmental aspects such as soil, atmosphere and water.

Agri-environmental scheme

As seen in Figure 3, the uptake of organic farming is continuously increasing from 2008 and 2013, with a more noticeable increase in 2012 and 2013. During 2008, there were only 306 of submitted applications and in 2013 there were 2129, which is almost seven times higher. The number of biological opera-

tors applying under Measure 214 for Agroecology and climate 2007-2013 is steadily rising and in 2012 it reaches 1250, which is 4 times higher than in 2008. In 2012 the certified areas are 11 974 hectares (43% growth compared to 2007) and the areas in transition to organic farming in 2012 are 27 164 ha (growth over 5 times compared to 2007). In 2012, the main certified areas by type of plantation are as follows – permanent crops are about 26%, meadows and pastures – about 19% and arable crops – 53%.

Figure 3. Number of submitted applications for agri-environmental measures in 2007-2013



Source: Lessons learned, Assessment of the Rural Development Programme 2014-2020.

The measures for rare breeds' conservation and management of high-nature valued grasslands, as well as pastoralism note almost a constant growth, as the first two have grown during 2012 and 2013. In comparison, the measure for soil erosion starts with high level in 2008 and since than it constantly decreases. The most noticeable change is in the crop rotation measure. In 2011, the uptake was close to zero, rising to 101 in 2012, and then sharply reaching 1287 applications in 2013.

The overall tendency is for significant increase in the areas where environmentally and climate friendly activities are carried out, as the uptake of agri-environmental measures has risen up to five times from 2008 to 2013.

Environmental indicators

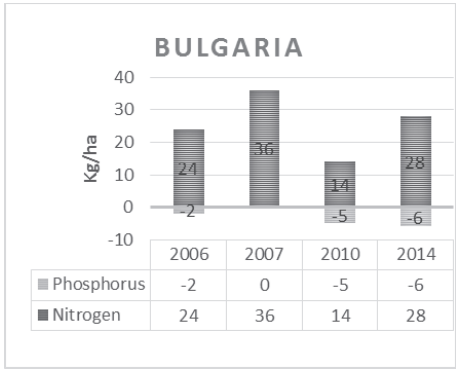
Analysing some of the basic environmental indicators give us an insight into the effect which agricultural activity has on the environment.

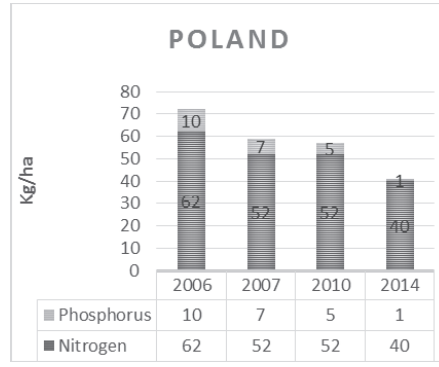
The gross nutrient balance represents the total potential threat to the environment of nitrogen and phosphorous surplus or deficit in agricultural soils.

A lack of both nutrients can cause degradation in soil fertility and erosion, while an excess may cause surface and groundwater pollution and eutrophication. Therefore nitrogen and phosphorous balance surpluses are being monitored in order to follow the requirements under the Water Framework Directive and the Nitrates Directive. For this purpose several sources of pollution have been examined, including the consumption of fertilizers, livestock population, crop production and areas of various types of crops.

The nitrogen balance added to an agricultural system and nitrogen removed from the system per hectare of agricultural land is regulated via the process of adding the nitrogen with mineral fertilizers and animal manure as well as nitrogen fixation mainly by legumes and deposition from the air. Comparing to 2007, in 2014 there is a slight increase in the nitrogen surplus from 24 to 28 kg/ha (Figure 4).

Figure 4. Gross nutrient balance on agricultural land in Bulgaria and Poland





Source: own study based on Eurostat data.

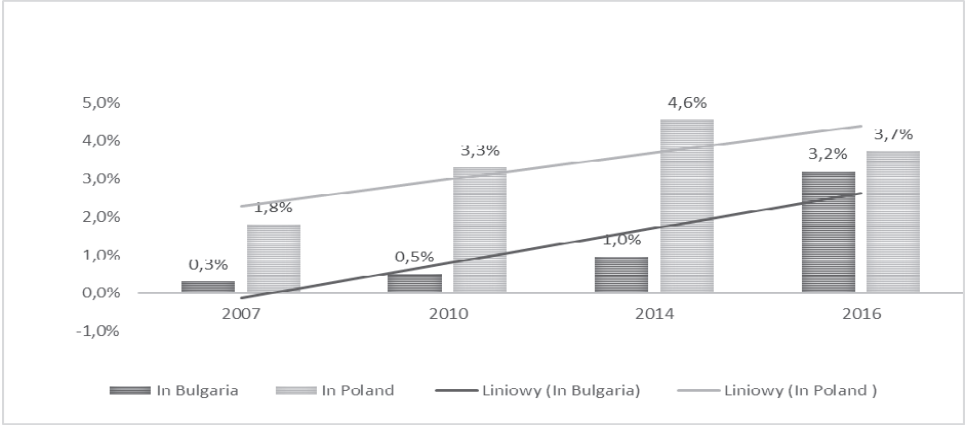
This may be at some part due to the fact that in Bulgaria between 2007 and 2014 there has been a rise of about 80% in the consumption of inorganic fertilizers, including nitrogen. For the same period the decrease in the EU (28) is 12%. For comparison the nitrogen balance in Poland has decreased from 62 to 40 kg/ha for the same period.

A lack of phosphorous appeared in 2014 compared to 2006 when this balance was -2 kg/ha, despite the fact that for the same period the consumption of phosphorous as fertilizer has almost doubled. In comparison, there is a slight decrease in the balance for the Union from 4 kg/ha to 2 kg/ha, which shows a positive tendency between the input and output of this inorganic fertilizer. As for the data in Poland, the phosphorous balance reached 1 kg/ha in 2014.

Next indicator is the total utilized agricultural area (UAA) occupied by organic farming (existing organically farmed areas and areas in the process of conversion). For 2007-2016, the share of organic farming in Bulgaria has grown

from 0.3% to 3.2% (Figure 5). This positive outcome has followed the bigger uptake of submitted applications for the organic farming measure under the Measure 214 Agri-environment payments.

Figure 5. Share of total utilized agricultural area under organic farming in Bulgaria and Poland



Source: own study based on Eurostat data.

It can be concluded, that there is a positive effect from the agri-environmental measures on some of the environmental aspects. This is the most visible and traceable aspect regarding the organic farming, which increased from 0.3% of the UAA to 3.2%.

For 2007-2013 there is a significant growth in the adoption of agri-environmental measures. One of the most important ones – soil erosion measure – does not share this trend.

19.3. Types of agricultural holdings and rural development

Despite the relatively small territory, both types of agricultural models are present in Bulgaria – the northern and southern one. The first model developed successfully in the years of transition and membership of the country in the EU, becoming dominant in some rural areas of northern Bulgaria. It is based on the three main processes of modernization – "intensification (through mechanization, use of chemicals and variety selection), specialization (farmers concentrate on few products with higher returns) and concentration (production comes from fewer farms and specific regions)" [Ilbery and Maye, 2010]. Applied mainly on farmed agricultural land in agricultural holdings specializing in the production of arable crops, it has led to a high efficiency of production and labor productivity based on the modernization of applied technologies.

In the southern regions of the country, the number of family-type farms, combining the production of vegetables and fruits with different livestock, predominate in the number and distribution. They are mainly used in family labour, as mechanized part of the work processes. Some of the key features of the two farming models are shown in Table 2.

Table 2. Key features of farming models

Type of agriculture	Northern agriculture	Southern agriculture
Specialization	Narrowly specialized in cereal and technical crops	Various productions – livestock husbandry, vegetable specialization, permanent crops
Applied technologies	Highly mechanized	More limited use of mechanization (for part of the work processes)
Utilized agricultural areas	Large areas of utilized agricultural area	Smaller areas of used agricultural land
Predominant type of agricultural holdings	Sole traders, LTD company	Family farms
Used labour	Mostly hired	Mostly family labour
Capital input per unit area	Large	Relatively limited

Source: own study.

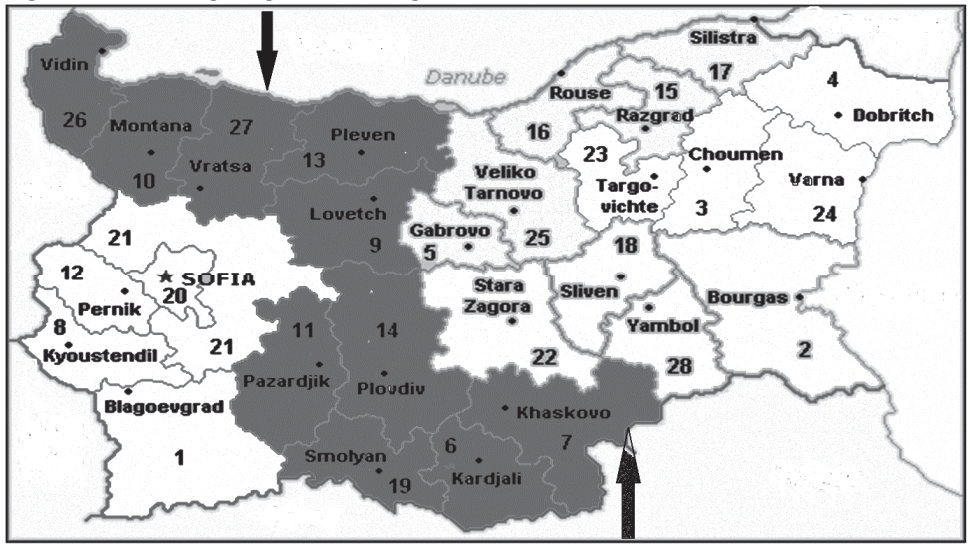
To compare the implications of applying two models of agriculture in Bulgaria, two planning regions (NUTS2 level) are selected – Northwest and South Central (Figure 6). The Northwest region is concentrated on the production of cereals and some crops grown on large areas. The most numerous are farms cultivating arable crops.

Agriculture in the South Central region is specialized in the production of field vegetables, fruit and grapes. Livestock is well developed. This specialization is also a reason for the differing characteristics of the farms with regard to the average sizes, the combination of crops, the factors of production used and others.

In the Northwestern region, most agricultural land is used by commercial companies (45.64%) and farms of natural persons (26.20%), while in the South Central – by farms of natural persons (49.9%) and commercial companies – 29.34% (Figure 7).

Essential (more than 4.4 times) are the differences in the average size of a farm. In the Northwest, the average size of utilized agricultural area per holding is 28.5 ha versus 6.47 ha in South Central. In the holdings of individuals, these differences are 7.78 ha (Northwest) versus 3.28 ha (South Central); in cooperatives – 885.6 ha (Northwest) versus 394.1 ha (South Central), and in companies – 583.4 ha (Northwest) versus 179.5 ha (South Central).

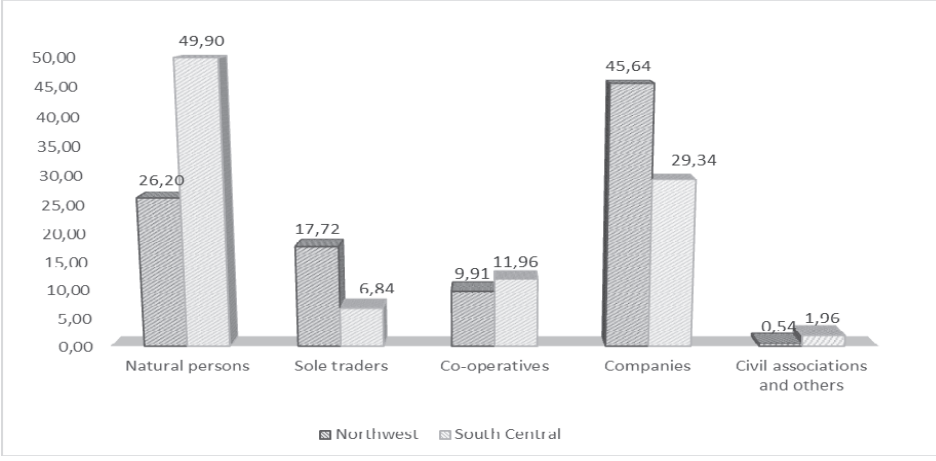
Figure 6. Planning Regions in Bulgaria



Source: own study.

Despite the high relative share of agricultural land leased before Bulgariaąs EU membership, the importance of renting continues to increase. In the Northwest area, the relative share of agricultural land used in lease agreements is higher.

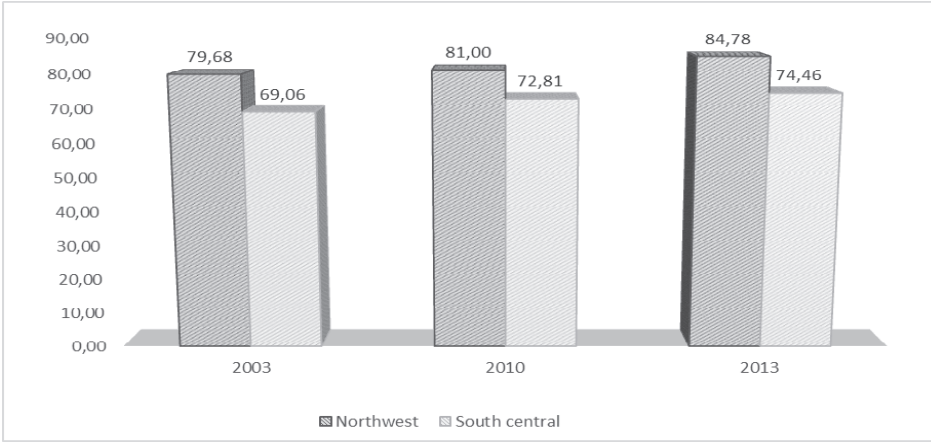
Figure 7. Allocation of used agricultural land according to the legal status of holdings (%)



Source: MZFF, Department "Agrostatistic".

For 2013, the relative share of rented land reached 84.78%, while in South Central it was 74.4% (Figure 8), which represents an increase of 6% and 7.25%, respectively.

Figure 8. The relative share of rented land in the Northwest and South Central regions (%)



Source: National Statistical Institute, Agricultural land market and rent.

Differences are also observed with regard to the labour used. The share of family labour is 76% in the Northwest region versus 89.5% in the South Central region. Agricultural employment declined in the first region by almost 10%, while in the South Central it grew by 13% in the ten-year survey period (Figure 9).

In the South Central Region, the opportunities for diversification of the economic activity towards the processing of agricultural products and other activities are used to a higher degree. Holdings by the other gainful activities carried out in the holding – South Central Region – 27% of all in the country versus only 8.1 % in Northwest.

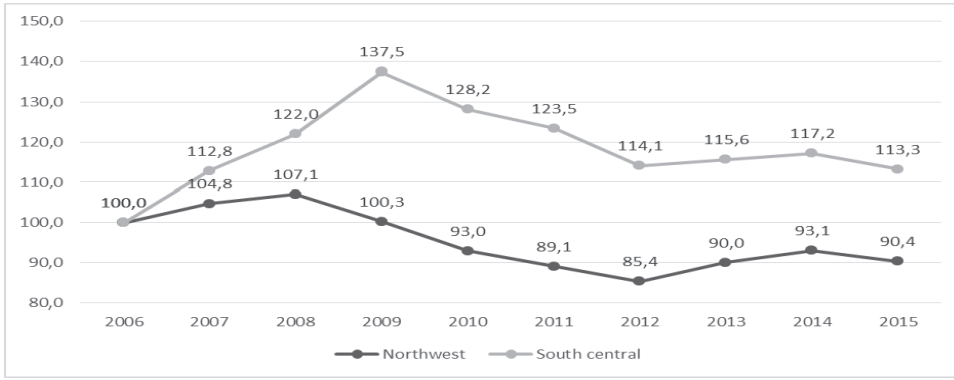
To a large extent, the different agricultural models have also affected the demographic processes in both regions. The population decreases in both regions, but while in the South Central it is about 8%, it is 18.5% in the Northwest. At the rate of population decline, this is the fastest depopulating area in the last decade across the EU (Figure 10).

It can be summed up that in areas where the northern model agriculture exists:

- unemployment is risingł
- the population is aging;
- migration processes are higher;

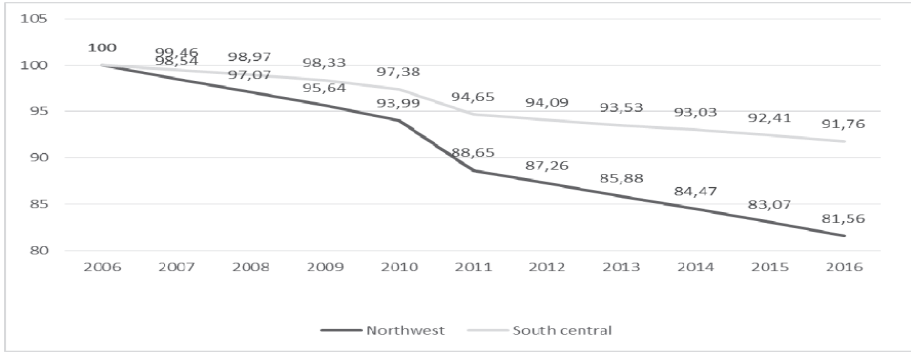
- the concentration of agricultural production is faster (74.3% of the farms were destroyed in the last 10 years, while 61.6% in the Southern Central Region) and the average size of farms is growing;
- high degree of specialization of production on farms;
- the relative share of rented land increases;
- reduction in the use of labour and the family labour in agriculture.

Figure 9. Dynamics of the number of employed workers in agriculture in the Northwest and South Central regions (2006-2015)



Source: own study based on NSI data for Employment.

Figure 10. Dynamics of population in Northwest and South Central regions for 2006-2016



Source: own study based on NSI data for Population

Overall, this leads to higher business efficiency of farms, but at the cost of low income and population decline. In areas where the Southern model of agriculture is developing:

- Unemployment in rural areas is lower ;
- Employment in agriculture is increasing;
- Family farms dominate, a large part of which is semi-marketable;

- Farmers grow more and more diverse products creating higher added value;
- There is an increase in the number of farms that develop other activities that are the source of additional income.

Overall, in the South Central region a more diversified rural economy with higher entrepreneurship initiative is observed, as well as higher added value, including agricultural activities and tourism.

19.4. Summary and conclusions

In Bulgaria, both European agricultural models are developing together and successfully, as the effects for the development of the rural areas are well known and studied in other European countries. This creates opportunities for our country to implement foreign positive experience in developing the national agricultural policy and rural areas.

In areas with the predominance of narrowly specialized, large-scale farming, the focus should be on improving the market infrastructure. This might be possible when networks of producers are established, which will allow smaller producers to carry out effective economic activities. For this purpose more efforts must be put into adapting different measures of the national policy for stimulating the creation of networks of producers and improving the distribution and use of the direct payments. It is also necessary to take measures to reduce the adverse effects of specialized monoculture farming on the utilized agricultural area, water sources and other environmental aspects.

For the areas where the southern model of agriculture prevails, efforts for improvement and creation of new mechanisms to stimulate the development of family farms and the so-called vulnerable sectors should continue. Thus, expanding the production of fruit, vegetables and various livestock products will create the conditions for increasing the added value of the used resources and will increase the incomes of farmers.

Good practices from other countries, as well as Bulgarian traditions for cooperation between producers, demonstrate the need to create different forms of association and cooperation among farmers. This also may have an impact on the collective implementation of agri-environmental measures, which will contribute to a more effective and lasting provision of ecosystem services from farmlands. This in turn will influence in a positive manner the agri-environmental indicators for major aspects such as water, soil, atmosphere and biodiversity.

Last but not least, it is necessary to motivate local residents to use the "Community-led local development" approach in order to improve the market infrastructure for farmers in rural areas, as well as diversification of the economy and developing strategies for improvement of the quality of life of rural residents.

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Instead of a summary

As the editors of the Monograph "The Common Agricultural Policy of the European Union – the present and the future – EU Member States point of view", we are aware that, despite the great scientific effort of the authors of all papers as well as the Committees: Scientific and Organizational, participating in the work related to the organization of the international scientific conference in Stare Jabłonki on 5-7 December 2017 entitled "The CAP of the European Union – the present and the future" we have not exhausted all problems related to the analysed issues. It is also not possible to make a comprehensive and complete summary of conclusions of the conference and this monograph. However, at this point we would like to stress that the CAP (despite the entire bureaucratic burden as well as numerous, often justified, words of criticism regarding the efficiency, effectiveness and sustainability of its actions) is a great common European project which contributed to the unification of Europe, building the foundations of its economic and political stability, relative prosperity of the society and high norms and standards of food safety, environmental protection and well-being of animals, rural cultural heritage and quality of life of the entire society.

The changing political, economic, social and environmental conditions, however, pose new challenges for the rural policy defined today also through the prism of the region and cohesion of the EU. In the face of these challenges and crises, some of the EU societies cease to tolerate the sectoral expenses. They accept, however, the so-called green economy, sustainable territory, social cohesion and good governance.

In this way, they are turning towards closer integration of the EU territory and stronger foundations of sustainable development. The key to this is transnational and cross-border cooperation, which exceeds the boundaries of agriculture and rural areas, and covers the area of transnational cooperation in operational and decision-making dimension. This is an innovative approach to the agricultural policy, which takes into account the characteristics and individual conditions of each region. It also gives more freedom to countries and regions in the adaption of the programmes to their individual needs.

At this point, the mechanisms of stronger impact on the creation of the EU development strategy are worth considering. This would bring an opportunity for simplification of complicated administrative procedures related to the implementation of programmes, audit thereof or the implementation of the EU solutions in the national legislation. These actions would certainly be able to lead to the reduction of the excessive transaction costs. The radical change of the means of informing the EU citizens of the effects of the cohesion policy and ru-

ral policy is also necessary. Although their accomplishments are undeniable, an average citizen hardly notices them or does not connect them with the EU support. In order to increase the acceptance for the EU programmes, in particular in regions with partial participation, particular attention should be paid to the capacity building, extending knowledge and participation in local development.

Sustainable and multifunctional rural development, along with spatial cohesion of the EU, requires looking through the prism of many different sectors and regions. Because of their diversity, the policy after 2020 should reflect these differences and give the choice to the local rural communities. It is also necessary to focus more extensively on the territorial matters when distributing the financial resources. The improvement of the fund allocation mechanisms in terms of increasing their spatial concentration remains another challenge. The ability to maximize the advantages, synergy and achieve the territorial cohesion depends mainly on the CAP implementation itself as well as the cohesion and regional policies in each of the Member States, on the appropriate public funds allocation mechanisms, regional decision makers and finally on the people.

Public aid is desirable when discrepancies between the private and the social product occur. However, it is not always the best way to resolve the market failure problem. The results of measures taken by the state are difficult to foresee precisely, e.g. because we are dealing with the failure of public institutions (state failure). The beneficiaries of the public aid (regardless of whether it means the administrative authorities or private persons) often prefer their own interest (political, private) over the general interest and often adapt their actions to the opportunities it provides.

The public aid materialised by the public policy also is not able to provide social equality and justice, although it is generally believed that, in the greater social interest, public funds supporting the realisation of certain objectives should be provided. Such a solution, despite the fact that it is more of an attempt to cure the symptoms of a ‘disease’ than a systemic solution, is more advantageous than the lack of it. Therefore, we work towards targeting the agricultural policy after 2020 so that its benefits concerned all citizens and the entire society.

Annex I

List of conferences organised by the Institute of Agricultural and Food Economics – National Research Institute from 2005 to 2017 under the three editions of the Multi-Annual Programme and conferences proceedings related thereto.
All publications from research held under the Multi-Annual and monographs of proceedings from conferences organized by the Institute are available on the website: www.ierigz.waw.pl

Multi-Annual Programme 2005-2009
"Economic and social factors conditioning Polish food economy development after Poland EU accession"

Conference	Conference Proceedings
Economic and social factors conditioning Polish food economy development in the first year after Poland's accession to the EU, 12-13 December 2005, Warszawa, Poland	
Polish rural areas and agriculture two years after Poland's accession to the EU, 31 May 2006, Pułtusk, Poland	
Economic and social factors conditioning Polish food economy development after Poland's accession to the EU, 11-12 December 2006, Pułtusk, Poland	
The Polish agro-food economy after the four years of the EU membership, 12-14 December 2007, Pułtusk, Poland	Seria: Multi-Annual Programme 2005-2009, no 67.1
Farms in Central and Eastern Europe – today and tomorrow, 4-6 June 2008, Białowieża, Poland	Seria: Multi-Annual Programme 2005-2009, no 98, 98.1
Development of the agri-food sector in Poland at the background of global trends, 8-10 December 2008, Pułtusk, Poland	Seria: Multi-Annual Programme 2005-2009, no 101
The structural changes in the rural areas and agriculture in the selected European countries, 1-3 June 2009, Sterdyń, Poland	Seria: Multi-Annual Programme 2005-2009, no 128, 128.1
Economic and social conditions of development of the Polish food economy after Poland's accession to the European Union, 30 November - 2 December 2009, Pułtusk, Poland	Seria: Multi-Annual Programme 2005-2009, no 184, 184.1

Publications are available on the website:
https://www.ierigz.waw.pl/publikacje/raporty-programu-wieloletniego-2005-2009

Multi-Annual Programme 2011-2014
"Competitiveness of the Polish food economy in the conditions of globalization and European integration"

Conference	Conference Proceedings
European Union food sector after the last enlargements – conclusions for the future CAP, 14-16 June 2011, Rajgród, Poland	Seria: Multi-Annual Programme 2011-2014, no 6.1
Expectation and challenges for food sector from the EU enlargements perspective, 17-18 November 2011, Warszawa, Poland	Seria: Multi-Annual Programme 2011-2014, no 31.1
Competitiveness of food economy in the conditions of globalization and European integration, 5-7 December 2011, Pułtusk, Poland	Seria: Multi-Annual Programme 2011-2014, no 60, 60.1
Proposals for CAP 2013+ and competitiveness of food sector and rural areas, 18-20 June 2012, Kazimierz Dolny, Poland	Seria: Multi-Annual Programme 2011-2014, no 61, 61,1
Economic, social and institutional factors of agri-food sector growth in Europe, 10-12 December 2012, Ciechocinek, Poland	Seria: Multi-Annual Programme 2011-2014, no 67, 67.1
The new solutions of the CAP 2013+ to the challenges of the EU member states agriculture, 12-12 June 2013, Suchedniów, Poland	Seria: Multi-Annual Programme 2011-2014, no 91, 91.1
The new EU agricultural policy – continuation or revolution?, 9-11 December 2013, Jachranka, Poland	Seria: Multi-Annual Programme 2011-2014, no 99, 99.1
Achievements and challenges in the food sector and rural areas during the 10 years after EU enlargement, 12-14 May 2014, Rawa Mazowiecka, Poland	Seria: Multi-Annual Programme 2011-2014, no 123, 123.1
The CAP and competitiveness of the Polish and European food sectors, 26-28 November 2014, Józefów, Poland	Seria: Multi-Annual Programme 2011-2014, no 146, 146.1

Publications are available on the website:
https://www.ierigz.waw.pl/publikacje/raporty-programu-wieloletniego-2011-2014

Multi-Annual Programme 2015-2019
"The Polish and the EU agricultures 2020+. Challenges, chances, threats, proposals"

Conference	Conference Proceedings
Economy versus the environment – competitiveness or complementarity, 23-25 November 2015, Jachranka, Poland	Seria: Multi-Annual Programme 2015-2019, no 23
Competitiveness of the economy in the context of social policy measures, 22-24 June 2016, Jachranka, Poland	Seria: Multi-Annual Programme 2015-2019, no 26, 27.1
Risk in the food economy – theory and practice, 23-25 November 2016, Jachranka, Poland	Seria: Multi-Annual Programme 2015-2019, no 48, 49.1
Strategies for the agri-food sector and rural areas – dilemmas of development, 19-21 June 2017, Licheń Stary, Poland	Seria: Multi-Annual Programme 2015-2019, no 52.1
The Common Agricultural Policy of the European Union – the present and the future, 5-7 December 2017, Stare Jabłonki, Poland	Seria: Multi-Annual Programme 2015-2019, no 73.1, 74.1

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