

**Competitiveness
of the Polish food economy
in the conditions
of globalization
and European integration**



INSTITUTE OF AGRICULTURAL
AND FOOD ECONOMICS
NATIONAL RESEARCH INSTITUTE

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COMPETITIVENESS OF THE POLISH FOOD
ECONOMY UNDER THE CONDITIONS OF
GLOBALIZATION AND EUROPEAN INTEGRATION

Warsaw 2014

The book has been prepared by the researchers working at the IAFE-NRI and it is a synthesis of Multi-Annual Programme “Competitiveness of the Polish food economy in the conditions of globalization and European integration”. According to the authors the publication comprises selected and the most important pieces of research conducted by the Institute in 2011-2014. A more extensive discussion of the research results of eight Multi-Annual Programme’s topics, divided into 26 tasks, could be found in the relevant thematic syntheses published as a monograph and available free of charge on www.ierigz.waw.pl website.

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Introduction

The Multi-Annual Programme entitled “Competitiveness of the Polish food economy in the conditions of globalization and European integration”, implemented by IAFE-NRI in the years 2011-2014 was the biggest and most complex research programme that evaluated the competitiveness of the Polish food sector through the prism of changes in agriculture, food industry and rural areas within the process of European integration and under the influence of globalisation factors. Its implementation was authorised on application of the Ministry of Agriculture and Rural Development by the resolution of the Council of Ministers No. 19/2011 of 1 February 2011 on Programme implementation. The research carried out during four years covered issues concerning: the development of the agricultural and food sector, monitoring of food markets, the effects of the implementation of CAP instruments, competitiveness of conventional agriculture, changes in the socio-economic structure of rural areas and finally the application of economic modelling in the analysis of sectoral competitiveness. The Programme’s research area covered issues particularly important for the implementation of strategic objectives achieved by the Minister of Agriculture and Rural Development. The Programme supported the agriculture and rural development policy in the financial perspective for the years 2007 – 2013 and 2014 – 2020 in the European Union.

At the same time, the research carried out by IAFE-NRI as part of the Multi-Annual Programme 2011-2014 was fully consistent with the strategic objectives included in the programmes of the Council of Ministers, such as: National Strategic Reference Framework 2007-2013; Infrastructure and Environment Operational Programme; Innovative Economy Operational Programme; Development of Eastern Poland Operational Programme; Human Capital Operational Programme; National Regional Development Strategy 2010-2020: Cities, Regions Rural Areas; Long-term National Development Strategy; Medium-term National Development Strategy, Concept of the National Spatial Planning for the years 2008-2033, National Strategic Plan for Rural Areas, Rural Development Programme 2007-2013, National Cohesion Strategy. The research also became a part of the implementation of EU objectives included in: Lisbon Strategy, Cohesion Policy in Support of Growth and Jobs: Community Strategic Guidelines, Community Strategic Guidelines for Rural Development and Sustainable Development Strategies.

The implementation of this programme by IAFE-NRI created reasonable grounds for the recognition of Polish needs in the area of development and improvement of competitiveness in rural areas and agriculture. The results of the

aforementioned endeavours proved to be significant when assessing the outcomes of the agricultural policy implemented in Poland and when establishing Poland's priorities against the planned agricultural policy in the EU.

In its research, IAFE-NRI mostly drew from the knowledge and experience of its own researchers. At the same time, it also cooperated with over 100 domestic and foreign scientific centres, central government units and budgetary organisations, which broadened and deepened knowledge about socio-economic processes that take place in the food industry and in rural areas of Poland, other EU Member States, candidates for membership in the EU as well as the leading countries in the global economy. The cooperation with central government units, especially with the Ministry of Agriculture and its dependent Agencies, resulted in numerous opinions, expert's reports and studies concerning the evaluation of the current and future situation in the food economy and rural areas. As a result, the research conducted by the Institute through the Multiannual Programme supported the implementation of the Polish agricultural policy in 2011-2014 and in the negotiations over the future CAP and EU budget for the years 2014-2020. The Multi-Annual Programme also contributed to the strengthening of the pro-growth policy by supporting the science and knowledge sector as a basis for innovation and modern economy and the dissemination of knowledge about challenges, opportunities and threats to food economy in the 21st century, and facilitated its transition to the so-called "business practice".

In the subsequent chapters of this book, authors try to refer to the most important problems using a competitiveness concept differently defined by them. These issues include:

- assessment of the development conditions and challenges for the agri-food sector in Poland at the background of the global trends,
- monitoring of agri-food markets in the changing economic situation,
- analysis of the effects of selected instruments of CAP and RDP,
- competitiveness of sustainable agriculture,
- financial grounds for the improvement of competitiveness of the Polish agriculture,
- analysis of changes in the socio-economic structure of rural areas as a factor for competitiveness of rural areas,
- assessment of the competitiveness of Polish agricultural holdings and products in a mid-term perspective,
- application of economic modelling in the analysis of the premises of competitive development of the agri-food sector.

We hope that this book will answer at least some of the questions concerning various aspects and areas of competitiveness of the Polish agri-food sector under the conditions of globalisation and European integration. We are also aware that not all questions associated with the title of this publication have been answered and that despite the extensiveness of the study, the analysed issues are far from being fully discussed. Hence, we hope to continue our discussion on the aforementioned subject in the future. This will be possible thanks to a new Multi-Annual Programme entitled “The Polish and the EU agricultures 2020+. Challenges, chances, threats, proposals”, implemented between 2015 and 2019 by the IAFE-NRI. The discussion on this topic will be continued at scientific seminars and conferences organised by the Institute and in papers concerning the Multi-Annual Programme. Thus, we would like to invite all readers to follow the results of our scientific studies and inquiry, which will be published on the Institute's website at www.ierigz.waw.pl.

prof. dr hab. Andrzej Kowalski
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1. Factors shaping competitiveness of agriculture

1.1. The concept of competitiveness and its factors

Competitiveness is one of the most ambiguously defined economic terms. It results primarily from the fact that it is derived from various economic theories – mainly theories of economic growth, foreign trade, microeconomics, location and management, and analysis of competitiveness with diverse level of aggregation¹. With regard to the entire economy, but also to individual sectors, the definition that seems to be appropriate is the one formulated in economic growth theories, where competitiveness at the level of the entire economy is at the same time linked to the welfare of citizens and foreign trade results². As far as economic sectors (including agriculture) are concerned, this means the necessity of a simultaneous analysis of change in the income of producers and the position of the products of the industry on foreign markets. Competitiveness research should at the same time regard the so-called internal and external competitiveness. Internal competitiveness in the sense of the level of and change to economic and production situation of market entities (and branches of economy) has significant influence on the opportunities and chance of growth in their share in international trade³.

Internal competition of economic sectors (including agriculture) is determined by numerous factors (sources of competitiveness), and this concerns the external competitiveness to an even greater extent. Literature presents those factors as price and non-price, external and internal, dependant and not dependant from market entities, controlled and not controlled by sector entities or the state, supply- and demand-related, soft and hard, active and passive⁴. At the sector level (meso-level analysis) the primary internal factors are production factors resources at the disposal of sectors and their quality and efficiency of use, mutual relations between market entities within the sector, institutional environment of sector entities, supply concentration level, used production techniques. The primary external factors are: sector policy of government

¹ J. Misala, *Międzynarodowa konkurencyjność gospodarki narodowej*, PWE, Warszawa 2011.

² B. Nosecka, K. Pawlak, W. Poczta, *Wybrane aspekty konkurencyjności rolnictwa*, Multi-Annual Programme 2011-2014, no. 7, IAFE-NRI, Warszawa 2011.

³ A. Woś, *Konkurencyjność potencjalna polskiego rolnictwa*, IERiGŻ, Warszawa 2001.

⁴ K. Pawlak, W. Poczta, *Międzynarodowy handel rolny. Teorie, konkurencyjność, scenariusze rozwoju*, PWN, Warszawa 2011.

administration and country groups related to the monetary and fiscal system, education, research and development, but also quality standards, technical or sanitary requirements, and the situation on the international market (relations between supply and demand, global and regional trade policy)⁵. All the factors that influence the level of competitiveness should be treated as “equally important”. Change to and impact of a single competitiveness factor results in a change to the impact of an entire set of factors that contribute to the competitive advantage of specific sectors⁶. What is more, building competitive advantage on the basis of one or two factors may lead to difficulties in maintaining it in the long run. Economic reality at the national, and primarily the international level results in the change to the importance of individual factors for building competitiveness of sectors and their entities. In the modern world, the primary driving force for competitiveness is access to information (which ranks fifth, following the capital, land, work, and organisation of production factor resources) and acquisition of knowledge that makes it possible to achieve position that distinguishes participants in the market – primarily through investment and creating the company or product brand. Thus, development of information and communication technologies, innovativeness of activity undertaken by market entities and effective marketing become issues of primary importance.

Building competitive advantage based on those sources depends on the quality of production factors, particularly workforce (education, knowledge, occupational training). Development of competitiveness using those sources of competitiveness advantage is the basic objective of economic policy in the European Union, which is defined in Strategy 2020⁷. The strategy puts particular emphasis on development of information society and environment that supports innovativeness of economic entities, and education within the knowledge-based society. In the modern world, the importance of food quality and safety as well as environmental protection is increasing, which may significantly change the approach to the analysis of competitiveness and indicators used to measure it, which are currently based primarily on studying factors that make it possible to increase production effectiveness.

⁵ M. Olczyk, *Konkurencyjność w teorii i praktyce*, CeDeWu Sp. z o.o., Warszawa 2008.

⁶ E.M. Jagiełło, *Strategiczne budowanie konkurencyjności gospodarstw*, Poltext, Warszawa 2008.

⁷ W. Rembisz, A. Kowalski, *Rynek rolny w ujęciu funkcjonalnym*, Wyższa Szkoła Finansów i Zarządzania, Warszawa 2007.

1.2. Specific nature of agriculture in competitiveness research

The specific nature of the agricultural sector and its entities boils down primarily to the limited mobility of production factors involved in this sector. This particularly regards land, family labour resources, and, to a significant extent, the capital adjusted to agricultural activity. Agriculture and its entities are deprived of the benefits from transferring resources to more effective sectors, which determines the nature of competitiveness⁸. What is more, the agrarian structure, which is difficult to change, and the resulting atomisation of agricultural entities result in opportunity to act independently on the internal and international market that is smaller than in the case of entities in other sectors⁹.

The dominant share of processing in the disposal of agricultural products determines its great influence on the volume and structure of agricultural production – potential of the processing sector and the competition system used by this sector. The competitiveness of agriculture has to be studied primarily with regard to cost and in the perspective of factors that are decisive for the opportunities to reduce it. The basic source of reduction in production cost is the change to the relation between production factors – particularly the relation between capital on one hand, and land and labour on the other. In Poland, the equipment of labour with land and capital is much lower than in most EU countries, which determines relatively low labour and land productivity. Low cost of labour in Poland is the primary factor that contributes to the advantage of Polish agriculture over agricultural products of the majority of EU countries with regard to cost and prices. Low remuneration for labour, however, cannot be the basis for maintaining competitiveness of agri-food sector product on the European and global market. Improvement in efficiency of use of land and labour means also the improvement in the quality of production conditioned by technical and technological progress, and the level of producers' knowledge. At the same time, the land cultivation system, which is less intense in Poland than in most EU countries, is a kind of competitive advantage because Polish agriculture can become “sustainable” agriculture faster than agriculture of other EU countries, which is the EU objective in the 2050 perspective¹⁰. Increase in crop yield and compliance with environmental protection principles is possible through the increase in the level of soil liming and enriching soil in organic

⁸ A. Czyżewski, *Uniwersalia polityki rolnej ujęcie mikro i makroekonomiczne*, Akademia Ekonomiczna w Poznaniu, Poznań 2007.

⁹ A. Woś, *Konkurencyjność potencjalna polskiego rolnictwa*, op. cit.

¹⁰ S. Krasowicz, J. Kuś, *Kierunki zmian w produkcji rolniczej w Polsce do roku 2020 – próba prognozy*, Zagadnienia Ekonomiki Rolnej 2010, No. 3.

substances¹¹. Reduction in production cost through introduction of innovative solutions with regard to methods and organisation of production depends on the quality of human capital to a great extent. At the same time, the level of education of farm managers in Poland is lower than in most EU countries (competitive gap) and employment in research and development facilities in Poland as well as share in the investment in agricultural development and research activity in total investment in research and development are decreasing¹². Improvement in the quality of “human capital” is one of the basic objectives of Strategy 2020, which is presented in the guideline that refers to the development of economy in EU countries based on knowledge and innovativeness. Both with regard to agriculture and the entire economy, Poland’s position in knowledge-based development in the EU is distant¹³ (based on the analysis of global competitiveness rankings).

Overcoming the barrier of product supply scale, which makes it possible to reduce negative economic effects resulting from the existing agrarian structure (both with regard to the income situation of the sector entities and the links between agriculture with food industry and foreign markets) is possible by improving the organisation of the primary market. This particularly regards producers organising themselves into groups as well as producer organisations and associations. Only large organisations can apply competition tools that are available for processing companies (marketing, advertising, sales logistics). Building competitive position of the agricultural sector compared to other sectors of the national economy, including the position on foreign markets, through support for the establishment of producer groups and organisation has been reflected by the increase of funds for the aim in the EU budget in the 2014-2020 perspective. In Poland, the share of producer groups in the supply of the majority of agricultural products is lower than the EU average and significantly lower than in EU-15.

Limited mobility of production factor results in the fact that improvement in the productivity in agricultural production factors, change to relations between them, and the general improvement in the position of agriculture on the internal and external market are not possible without the financial and institutional support for the sector. Thus, external factors, primarily macroeconomic conditions (that determine the scale of transfers to agriculture to

¹¹ H. Terelak, S. Krasowicz, T. Stuczyński, *Środowisko glebowe Polski i racjonalne użytkowanie rolniczej przestrzeni produkcyjnej*, Pamiętnik Puławski 2000, No. 120(II), pp 455-469.

¹² *Statistical Yearbooks by the Central Statistical Office of Poland*, 2000-2014.

¹³ B. Nosecka (ed.), *Czynniki konkurencyjności sektora rolno-spożywczego we współczesnym świecie*, Multi-Annual Programme 2011-2014, no. 54, IAFE-NRI, Warszawa 2012.

a great extent), institutional environment of the sector, state policy related to agriculture¹⁴, and the EU CAP instruments currently in use are more important in the case of agriculture compared to other branches of the national economy (including food industry).

Macroeconomic conditions that are shown by such indicators as GDP growth rate, inflation rate, unemployment rate, financial reserve, debt balance, and balance of payment determine the state of the economy and the framework and opportunities for structural changes in agriculture, and also shape the level of use of the support for the agricultural sector from the national funds defined by the EU legislation¹⁵. Issues that are important among the numerous external factors (i.e. factors outside the sector) that influence the functioning of market entities (basic and technological infrastructure, education system, economic freedom, banking system, institutions in the environment of the sector) are the efficiency of the banking system (availability of loans), government agencies that support agriculture, non-governmental organisations that function in the institutional environment of agriculture (primarily chambers of commerce), and the academic and research support of the agricultural sector. Such factors, just like other external factors that affect the functioning of economic entities and environmental producers, fit the research of competitiveness because they determine the freedom of and the opportunities for managing competitiveness by providing a framework for activity of entities.

What is important is the activity of governments with regard to simplification of the access to the national and external sources of support, stimulation of implementation of scientific and technological achievements in the sector (the role of the academic and research support), primarily those that make it possible to increase land productivity and labour quality and productivity. The activity of governments of EU countries is evaluated primarily in the perspective of the effectiveness of their influence on the final shape of the EU agricultural policy (including trade policy). An important element of active policy of the state at the sector level is support for, but also direct involvement in, promotion of agricultural products on international markets.

Macroeconomic conditions, the level of technical and economic infrastructure, measures taken by governments of individual countries with regard to compliance with the principles of economic freedom, effectiveness, freedom of labour market and business activity as well as environmental protection are systematically studied by a number of global institutions and organisations, including particularly the World Economic Center, World Bank,

¹⁴ A. Woś, *Konkurencyjność polskiego sektora żywnościowego*, IAFE, Warszawa 2003.

¹⁵ J. Misala, *Międzynarodowa konkurencyjność...*, op. cit.

and the International Institute for Management Development in Lausanne. According to the evaluation by those institutions, Poland took a distant position in summary rankings of competitiveness. Apart from the level of innovativeness, the low ranking aspects in our country is the freedom of business (bureaucracy and changing tax legislation). Relatively favourably ranked aspects are the overall condition of the economy (which is very important from the perspective of the possibility to support agricultural entities) and the respect for property, which is what foreign investors take into account when deciding whether to invest in Poland, which in turn is one of the carriers of technical, technological and organisational process in Poland¹⁶.

1.3. Evaluation of internal competitiveness of agriculture and food industry

Lower position of agriculture compared to other economic sectors indicates the continuing necessity of supporting agriculture from EU and national funds. What is more, the position of agriculture is declining, which is shown by the growth in the global production and added value in Polish agriculture, which is lower than in other sectors. After the accession to the EU, the ratio of private farm income to other household subsectors has clearly increased. In 2011, however, the monthly disposable income of farmers' household still amounted to 79% of employees' monthly disposable income and 66% of disposable income of self-employed persons¹⁷.

Worse economic position of the agricultural sector compared to non-agricultural sectors is to a great extent shaped by the definitely lower fixed asset productivity and capital to labour ratio compared to the "rest" of the economy. Labour productivity is also lower in the agricultural sector. Fixed asset productivity ratio (gross added value compared to gross value of fixed production assets) increased after the accession to the EU, but the productivity of fixed assets in agriculture still does not exceed 45% of productivity in non-agricultural sectors. The GDP to employment ratios in agriculture and non-agricultural sectors (gross added value per employed person) have grown. Farmers' income is insufficient for the development of production potential in

¹⁶ B. Jankowska, *Metodologia badań konkurencyjności gospodarek narodowych – rankingi konkurencyjności*, [in:] M. Gorynia, E. Łązniewska (ed.), *Kompendium wiedzy o konkurencyjności*, Wydawnictwo Naukowe PWN, Warszawa 2009; W. Nowiński, E. Łązniewska, *Miejsce Polski w rankingach konkurencyjności i ocena gospodarki polskiej przez pryzmat różnych mierników ekonomicznych*, [in:] M. Gorynia, E. Łązniewska (ed.), *Kompendium wiedzy o konkurencyjności*, Wydawnictwo Naukowe PWN, Warszawa 2009; Nosecka B. (ed.), *Czynniki konkurencyjności sektora rolno-spożywczego...*, op. cit.

¹⁷ Based on *Statistical Yearbooks by the Central Statistical Office of Poland*.

agriculture, as the average investment rate for the entire Polish agriculture (i.e. net investment to fixed assets ratio) is negative. At the same time, share of spendings on agriculture in state expenditure (including social and health insurance) is not increasing. In recent years, the differences in the indicators of share of agriculture in state expenditure and the sector's contribution to the budget are relatively stable and oscillate between 7 and 9 percentage points.

Food industry is growing at a rate that approximates the economic growth of the country, but faster than the domestic demand. Thus, the source of increase in production is the rapid growth of exports¹⁸. Financial results of food industry companies are relatively favourable and make it possible to continue economic activity, including investments. Investment growth rate in the food industry is higher than the average for industrial processing, but the consumption of fixed capital in the food industry is lower than in the entire industry. The food industry maintains its high competitive position compared to many other processing industry sectors. The sector has thus a potential to support raw material suppliers (agriculture) also in the aspect of sharing price market resulting from the volatility of the situation on selling markets – primarily foreign markets. Thus, there is the need to increase the share of agriculture in the process of taking over accumulation from non-agricultural sectors, but also to create stimulus and conditions for more effective use of means of support and reinforce the position of agriculture in the context of its environment.

After the accession to the EU, the global share of Polish agri-food exports in the total Polish exports increased more than the share of the sector in total global exports (an increase in the RCA indicator). Positive foreign trade balance related to agri-food products and the coverage of imports by exports have grown significantly. The exports growth rate was higher than the one for EU-28¹⁹. The share of food products in the total agri-food exports is also higher than the EU average (80-85%). The share of exports in sold production of the agri-food sector is also systematically growing. This indicator for products of the agri-food industry increased by about 14% in 2003, by over 30% in 2013, and it does not exceed 10% with regard to agricultural products.

The improvement in all the analysed competitiveness indicators clearly shows the positive impact of the accession to the EU on the improvement in external competitiveness of the Polish agri-food sector. Apart from the opening

¹⁸ *Sytuacja produkcyjno-ekonomiczna przemysłu spożywczego*, [in:] A. Kowalski (ed.), *Analiza produkcyjno-ekonomicznej sytuacji rolnictwa i gospodarki żywnościowej w 2012 roku*, IAFE-NRI, Warszawa 2013.

¹⁹ I. Szczepaniak (ed.), *Monitoring i ocena konkurencyjności polskich producentów żywności (2)*, Multi-Annual Programme 2011-2014, No. 40, IAFE-NRI, Warszawa 2012.

of the EU market to Polish products, an important phenomenon was the decrease in custom tariffs in raw material imports, which made it possible to increase imports “for exports” and reduce the production cost of many processed products (which particularly regarded the fish and tobacco sector as well as tea and coffee products). Aid from EU funds made it possible to improve the quality of products in its broad sense, but also to increase the supply of agricultural product by supporting the establishment of producer groups. Another factor that greatly contributed to the growth in exports (mainly to third countries) was the common use of EU and national funds promoting Polish products on foreign selling markets by Polish producers and exporters. The increase in exports, which is greater in Poland than in the new member states, clearly shows better use of opportunities to improve international competitiveness of agri-food products that were created due to the accession to the EU. The success of the participants’ with regard to the improvement in external competitiveness indicators would be much more difficult to achieve without Poland having price advantage on the market for most of agricultural and food products.

1.4. External trade conditions

In the modern world, the geography of the flow of goods, but also services, production factors, knowledge and production technologies is increasingly affected by the growing importance of regional economic and political organisations, whose policy, particularly with regard to trade, is an important factor that determines constraints and opportunities for using instruments of competition by individual economic entities on the global market. Policy of regional groups (EU, NAFTA, ASEAN, Mercosur, ANCOM, CARICOM, ECOWAS, COMESA and on the forum of the World Trade Organisation (WTO) determines and defines the position of individual countries and the agri-food sector on the global market to a great extent²⁰. The source of competitiveness can be the fact that specific countries belong to organisations that are able to apply effective competition instruments, including conclusion of trade and economic agreements with countries that belong to other economic organisations.

In spite of the increase in internal trade, the regional imports (outside Mercosur and the EU) are dominated by the imports from third countries, which means that the chance to place agri-food products on the global market has not

²⁰ K. Pawlak, W. Poczta, *Międzynarodowy handel rolny...*, op. cit.; *Global Economic Prospects. Trade, Regionalism and Development*, The World Bank, Washington D.C. 2005.

decreased due to that fact. In the EU, the external imports of agricultural and food products is least important, and it constituted 31% of total imports in 2011, compared to 34% in 1995²¹.

The EU is more of the more active integration groups with regard to concluding trade agreements with third countries. However, products that are deemed “sensitive” are protected under agreements with individual countries or regional organisations. In general, concessions regarding such products are made under preferential quota.

In the perspective of the access to the global market, the course towards the liberalisation of global trade is more important. Mutual and multilateral liberalisation of global trade takes place on the forum of World Trade Organisation. The ninth round of negotiation, whose aim is to reduce custom tariffs and other instruments that limit global trade, is currently taking place. The reduction in custom tariffs can result in the increased share of countries with relatively low production costs, mainly developing countries, in the global trade. Thus, the significance of production cost level as an important factor among the instruments for competing on the global market, primarily with regard to agricultural raw materials and semi-processed products, is growing.

1.5. Summary

The challenges that result from the functioning of the contemporary economy and with regard to the specific nature of the agricultural sector have been included in Strategy 2020 and the principles of the EU Common Agricultural Policy for 2014-2020. The priority is to overcome the barrier of supply scale in agriculture by supporting the establishment and functioning of producer groups, particular emphasis on the improvement in the quality of “human capital” by increasing investment in research and development with regard to the sector as well as the access to the Internet. What is more, another priority in Strategy 2020 is support for project related to the cooperation between agricultural and processing entities and research units primarily in order to introduce innovative solutions that take account of the necessity to protect the environment to agriculture.

The role of government administration boils down mainly to the implementation of the assumption of Strategy 2020 whose aim is to increase the competitiveness of the EU agriculture on the global market, and, as a consequence, increase the internal and external competitiveness of the sector in individual member states. Taking account of the structural differences

²¹ B. Nosecka, K. Pawlak, W. Poczta, *Wybrane aspekty konkurencyjności...*, op. cit.

between the Polish agriculture and agriculture in most EU countries, the most important issue is to support self-organisation of producers, mainly by providing them the maximum support from national funds allowed by the EU legislation, and create favourable financial (taxes, loans) and legislative environment for the functioning of the groups.

Taking account of the current differences in education of people employed in Polish and EU agriculture and the differences in the development of the so-called information society, the increase in spendings on those aims in Poland has to be greater than in other EU countries. The maximum use of EU support and increase of support from the national budget is necessary.

Poland's distant position in EU and global rankings with regard to the development of knowledge-based economy, including implementation of innovative solutions in agriculture, makes it crucial to treat projects concerning innovative solutions for production, especially those that are submitted jointly by participants in their market and its environment (producers, processing companies, research units) and lead to the increase in land productivity while following the rules of environmental protection as a priority (it is advisable and reasonable to support projects regarding increase in land productivity through moderate intensification of production and increase in soil quality). This particularly concerns soil liming and enriching soil with organic substances, but also adjustment of cropping patterns to the structure and quality of soil in specific regions.

The instruments for competing at the macro level include supporting and conducting marketing activity both on the domestic and the foreign markets. Marketing and advertising should regard primarily food products with a higher degree of processing, but also certain unprocessed products (mainly from the horticultural sector). Semi-processed products do not require marketing and advertising, as the main competitiveness factor is their price.

The role of government administration with regard to Strategy 2020 as EU Common Agricultural Policy for 2014-2020 boils down primarily to the most proper and complete implementation of goals and assumptions defined in the EU policy with compliance with delegation for individual member states defined in the EU legislation. The role of states functioning as part of specific economic groups consists in actively influencing the shape of common solutions with regard to shaping the competitiveness of agriculture and the system of economic and trade ties with third countries and their groups.

Changes to proportions of production factors and the necessity to improve the area structure of farms in Poland that conditions them belong to systemic solutions that transcend the activity with regard to agriculture itself (provision of jobs outside the sector).

The role of agricultural producers in the process of building competitiveness of entities and products boils down to active acquisition of all possible means of EU and national support that make it possible to increase land and labour productivity using sustainable production methods, and primarily self-organisation of producers. What should be very helpful in obtaining and using support funds effectively should be institutions that function in the environment of agriculture – agricultural counselling centres, producer groups, research centres, but also processing plants.

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2. Impact of situation on external markets on the Polish agri-food sector

2.1. Global agri-food products market

The market is an economic category describing the process leading to the fact that decisions of purchasers of goods, decisions of enterprises on the production, as well as decisions of employees on how much and for whom to work are mutually agreed through prices¹. The market is a complex concept, as it may be considered in the following aspects: subjective, objective and spatial². In the economy, the market mechanism performs the basic functions: balancing, income-generating, performance improvement and information. The balancing function is the ability to automatically restore the demand-supply balance by means of prices. Depending on the structure and spatial coverage of the market, the impact on the balance may be made by many stabilising and destabilising factors (e.g. intervention policy). On the basis of the information about the results of market rules, economic entities make decisions on their activity as well as those on investments which will enable the efficient and competitive operation. The information and efficient reading of market signals is an element of building competitive advantages. The market is treated as an instrument to increase income. Efficient and competitive market entities win the competition and take over the economic surplus. The market competition forces the management efficiency verified by the market mechanism.

In the 20th century, the globalisation processes became stronger in the socio-economic life. The globalisation is a complex process which covers many areas of life and raises many controversies. The largest range of the globalisation processes is attributed to the economic sphere³. The result is the progressive integration between national economies through foreign trade and foreign direct investment⁴. The economic globalisation is a process of elimination of border barriers to the operation of the market and, consequently,

¹ W. Rembisz, A. Kowalski, *Agricultural market in the functional terms*, University of Finance and Management, Warsaw 2007.

² A. Jasiński, *Outline of the market analysis*, PWN, Warsaw 1997.

³ A. Zorska, *Towards globalisation? Transformations in transnational corporations and world economy*, PWN, Warsaw 2000.

⁴ D. Levi, *International Production and Sourcing: Trends and Issues*, „STI Review” 1993, no. 13.

there is the process of integration of the world economy. The globalisation processes contribute to the liquidation of administrative border barriers to the market which operates across borders. The free flow of factors of production, goods, services and information creates a new basis for limiting the sovereignty of the economic and social policy and puts market participants to the tough competition⁵. The integration of local markets into the global market changes the spatial aspect of market analysis, including the determination of the geographical boundaries of markets⁶. The regional integration is both a step in reaching the globalisation, and a form of strengthening internal forces so as to deal with the global competition.

The globalisation and regional integration have a decisive impact on the development processes of the agri-food sector⁷, also in Poland. The national agri-food sector is linked to external markets. The objective of the studies under the topic entitled “Monitoring of agri-food markets under changing economic conditions” in the Multi-Annual Programme 2011-2014 was to assess the impact of the economic situation in external markets on the situation in the internal market. The studies covered the assessment of the situation in the national, EU and world market, processes in the national food industry and its international competitiveness.

In the years 2004-2005 the world market of agri-food products saw the rise in prices which for 25 years remained at a low level and showed little variability⁸. In the following years, an upward trend in prices became stronger. High prices of agricultural raw materials resulted in a significant rise in prices of food and, consequently, its availability decreased. The economic barrier to access to food restricts food security of the regions, which are characterised by food shortages and low income of consumers⁹. The comparison of indices of global food prices and buying-in prices of agricultural products indicates that the analysed prices showed similar trends of changes. The economic situation in the world market had a visible impact on the situation in the domestic market, and this was determined by the growing importance of foreign trade in the Polish agri-food sector (see fig. 2.1).

⁵ W. Szymański, *Globalisation – challenges and threats*, Difin, Warsaw 2002, p. 12.

⁶ M. Pietrzak, *Problem of the geographical scope of markets/sectors in the age of globalisation and regionalisation*, „Problems of Agricultural Economics” 2014, no. 1, pp. 5-21.

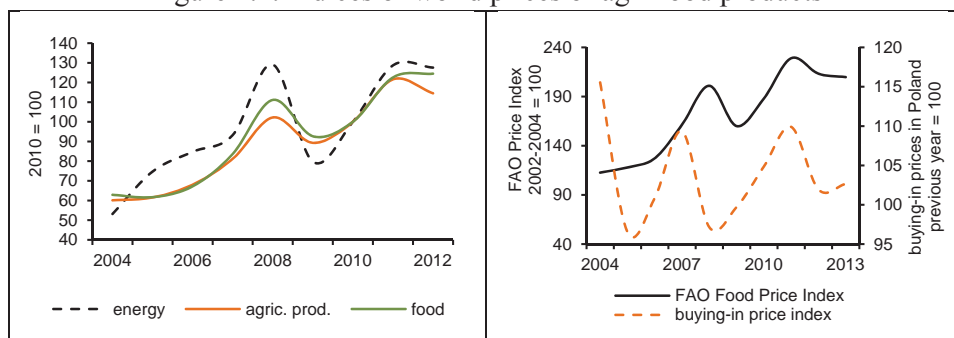
⁷ G. Dybowski, *Impact of the globalisation process on the development of agriculture in the world*, Multi-Annual Programme 2005-2009, no. 17, IAFE-NRI, Warszawa 2005.

⁸ S. Figiel, M. Hamulczuk, C. Klimkowski, *Methodical aspects of the price variability analysis and risk measurement in agricultural commodity market*, Komunikaty Raporty Ekspertyzy, no. 559, IAFE-NRI, Warsaw 2012.

⁹ A. Parkash, *Safeguarding Food Security in Volatile Global Markets*, FAO, Rome 2011.

There is no single reason for high prices in the market for agri-food products. The price rise resulted from a cumulative impact of many factors: demographic, economic and natural. In the market economy, the major price determinants are supply and demand relations. The growing demand under the conditions of the low agricultural production flexibility (in the short term) was a major price rise determinant. The increase in the demand resulted from the dynamically growing population and improving income situation in the economically developing countries. In the years 2000-2013, the world population increased from 6.1 billion people to 7.2 billion people¹⁰. The population growth occurred in most continents: North America – 27%, Africa – 26%, Oceania – 23%, South America – 18% and Asia – 13%. In the various regions, the population growth resulted from various factors. In North America and Oceania, of key importance was immigration and in Africa and Asia – rate of natural increase. The exceptional situation occurred in Europe, where the population decreased by 0.4%.

Figure 2.1. Indices of world prices of agri-food products



Source: own calculations based on the data from CSO, FAO, World Bank.

The population growth was accompanied by the economic development of the developing countries. As a result of the globalisation and foreign direct investment in the developing countries, the development of the industry and urbanisation processes took place. A consequence was an increase in available income, which made it possible to increase and change the structure and pattern of food consumption (westernisation of diets)¹¹.

The agricultural production is dependent on weather conditions. Global climate change leads to the more frequent occurrence of weather anomalies (droughts, floods, etc.) which negatively affect the harvest and supply.

¹⁰ *Demographic Overview - World - Total For Selected Region*, United States Census Bureau, www.bureau.com, 31.10.2014.

¹¹ P. Pingali, *Westernization of Asian diets and the transformation of food systems: Implications for research and policy*, Agricultural and Development Economics Division, FAO, Rome 2007.

A large decline in the supply in exporters results in the price rise in the international market.

Energy prices are translated into prices of agricultural products and food by means of inputs (e.g., mineral fertilisers, transportation). Recently, the factor strengthening the above-mentioned correlation has been the growing consumption of agricultural raw materials for the production of biofuels. A stimulus in this process was the energy policy of the United States, Brazil and the EU.

The progress of information and communication technologies was a reason for which capital became the most mobile productive factor. Capital resources may quickly move among the outermost regions in the world and in search of high rates of return. High food prices were an opportunity for large capital resources to join the game in the international commodity exchanges¹².

2.2. Economic situation on the domestic market

The current assessments of the supply-demand situation are carried out in basic industry markets¹³, as well as in the market of means of production and in retail. The whole is completed by the assessment of the economic situation, which is illustrated by the synthetic indicator of agricultural situation SIAS¹⁴.

From the macro-economic studies of the agricultural situation using the synthetic indicator of agricultural situation (SIAS 1) it results that for the situation of agriculture and its development possibilities of fundamental

¹² *Handel zagraniczny i międzynarodowa konkurencyjność polskiego sektora rolno-spożywczego*, [in:] A. Kowalski (ed.), *Analiza produkcyjno-ekonomicznej sytuacji rolnictwa i gospodarki żywnościowej w 2011 roku*, IAFE-NRI, Warszawa 2012, pp. 238-268.

¹³ Market of cereals and concentrated feed, rapeseed and vegetable oils, sugar, potatoes, milk, pork, beef, mutton, poultry, eggs, fish, fruit and vegetables.

¹⁴ The synthetic indicator of agricultural situation is a quantitative indicator, which synthetically illustrates changes in market conditions of agricultural production. It is calculated as the arithmetic mean of the price scissors index and of the potential demand index. The price scissors index is a relationship between the adjusted index of changes in prices of the buying-in basket of agricultural products and the index of means of production prices. The adjusted potential demand index is the product of indices of changes in food prices against a background of the index of changes in prices and consumer goods as well as the index of changes in salaries in the enterprise sector, index of changes in the food industry sales value and the index of changes in foreign trade in agri-food goods. Monitoring of market changes in the conditions of the operation of agriculture and using the SIAS as a barometer signalling fluctuations in the agricultural situation (SIAS 1) were innovative studies by A. Woś. The SIAS 1 was based on five elements: changes in the GDP of agriculture, agricultural investment rate, price scissors index, *terms of trade* for the export and import of agri-food goods and agricultural income parity. Due to the difficulties in estimating some indices and difficult access to information, the number of indices used in evaluating the SIAS 1 was limited to: changes in the global production of agriculture, price scissors index and agricultural income parity.

importance are the scissors of prices received and paid by farmers, which are an indicator of production profitability. The comparison of the correlation indicators between the SIAS and price scissors and changes in the global production indicates that the impact of fluctuations in the price scissors is much larger ($R = 0.81$) than that of the variability of production ($R = 0.22$)¹⁵. Monitoring of market conditions and providing up-to-date information enables the efficient use of the agricultural policy to prevent the effects of these changes.

The comparison of the periodicity of changes (after cleaning the stochastic process of trend, seasonal and random fluctuations) in the SIAS indicator and the general indicator of economic situation (GIES)¹⁶ shows that the periodical fluctuations of these indicators were synchronised. The SIAS indicator informs about changes in the conditions of agricultural production earlier, as it was ahead of the GIES cycle by one quarter¹⁷.

The period of 2010-2014 was beneficial for agriculture, but the market conditions were subject to periodical fluctuations. From December 2009 till October 2014, the buying-in prices of agricultural products rose by 26.6%, and retail prices of means of production by 14.2%. The price scissors index for that period of 5 years amounted to 110.9 points (fig. 2.2). In the previous 5 years, the buying-in prices rose by 11.1%, prices of means of production by 30.7%, and the price scissors index amounted to 85.0 points. In the years 2010-2014, the buying-in prices of most basic agricultural products rose, an exception were only potatoes and live calves (tab. 2.1).

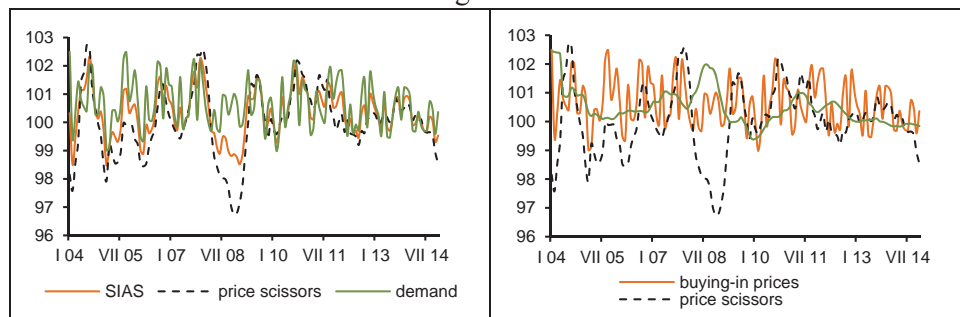
Among means of production, the lowest rise of only 8% was recorded for prices of mineral fertilisers, when compared to 81% in previous 5 years. Yield means fell in price in real terms: mineral fertilisers by 2.7% and pesticides by 0.8%. Direct energy sources and agricultural machinery rose in price by 21.8% and 20.3%, and in real terms by 8.5-9.9%.

¹⁵ This is also confirmed by the microeconomic studies conducted at the Agricultural Accountancy Department of IAFE-NRI by dr A. Skarżyńska, from which it results that the profitability of production of basic crops is more dependent on the price change index than on the crop fluctuations.

¹⁶ Qualitative studies of the agricultural situation using the economic situation test since 1992 have been conducted on a quarterly basis at the Institute of Economic Development of the Warsaw School of Economics, according to the methodology developed by Prof. E. Gorzelak. The results of the studies are published in the bulletins, cf. P. Szajner, K. Walczyk, „Economic situation in agriculture” 2014, IED WSE, Warszawa.

¹⁷ A. Grzelak, J. Seremak-Bulge, *Porównanie wybranych metod badania koniunktury w rolnictwie w Polsce*, Problems of Agricultural Economics 2014, no. 4, pp. 117-130.

Figure 2.2. Indices of market changes in the conditions of the operation of agriculture



Source: own calculations based on the data from CSO.

The rise in the buying-in prices of agricultural products was ahead of the nominal rise in food prices (11.1%), which in real terms did not change almost at all (0.2%). The nominal salary growth in the sector of enterprises (by 20%) created the growth conditions for the domestic demand. However, this put food processors in a difficult situation as they had little opportunities to transfer growing raw materials costs to trade.

In the period 2010-2014, there were 7 out of 17 quarters of the business cycle, which started in the 3rd quarter of 2008 with a significant improvement in the price scissors index, after the crisis caused by a rapid decline in world prices of agricultural raw materials and the rapid rise in prices of means of production in the second half of 2007 and in the first half of 2008. Mainly the price scissors index improved. As a consequence, the SIAS exceeded the value of 100 points. The growth rate of the buying-in prices was higher than that of the prices of means of production, and increasing income of consumers and export stimulated the potential demand, despite the fact that food rose in price relatively faster than consumer goods and services. That cycle ended in the 3rd quarter of 2012, with the further declines in the buying-in prices, but they lasted briefly and were smaller than in 2008. In the 3rd quarter of 2012, another cycle began, which reached its peak in the 1st quarter of 2014, but it was lower than in the years 2010-2011. In the following months, the prices of agricultural products started decreasing and as it may be presumed, the downward trend of the price scissors will continue by the end of 2014. The low prices of means of production mitigate the consequences of the decrease in the buying-in prices. It is worth adding that the impact of changes in the buying-in prices on the price scissors is much larger ($R = 0.92$) than that of changes in the prices of means of production ($R = -0.60$).

Table 2.1. Price and salary indices in the Polish economy in the years 2010-2014

Specification	2010	2011	2012	2013	I-X 2014	2010 – X 2014	
	December of the previous year = 100					XII 2009 = 100	index of real prices
Salaries	105.4	104.1	102.5	102.7	104.0	120.2	108.3
Consumer goods and services	103.1	104.7	102.4	100.7	99.6	110.9	100.0
Food	103.9	104.6	103.8	101.5	97.0	111.1	100.2
Means of production	103.8	108.4	103.0	99.7	98.8	114.2	102.9
mineral fertilisers	98.0	118.6	104.9	94.6	93.6	108.0	97.3
pesticides	102.8	100.1	103.0	102.2	101.6	110.1	99.2
direct energy sources	111.8	112.0	100.9	98.6	97.8	121.8	109.9
machinery	103.6	105.4	105.0	103.5	101.4	120.3	108.5
construction materials	103.2	106.4	101.3	99.7	99.6	110.5	99.6
Price scissors of buying-in basket	111.5	108.7	96.6	104.8	90.4	110.9	.
Buying-in basket	115.7	117.8	99.5	104.5	89.3	126.6	114.1
wheat	165.4	97.4	133.9	74.8	81.9	132.1	119.2
rye	205.3	129.2	93.5	76.0	90.3	170.2	153.5
barley	167.8	116.7	114.2	88.8	81.0	160.9	145.0
corn	151.5	100.8	118.4	79.2	73.1	104.7	94.4
potatoes	102.8	91.9	122.3	125.6	54.6	79.2	71.4
cattle	111.2	123.1	103.6	92.7	92.1	121.1	109.2
pigs	100.3	143.3	96.1	98.5	87.3	118.8	107.1
poultry	103.7	127.9	93.6	98.3	103.0	125.7	113.3
calves	78.5	132.6	108.5	89.7	97.4	98.7	89.0
milk	112.8	109.3	97.2	122.4	80.8	118.5	106.9

Source: own calculations based on the data from CSO.

In 2014, all indicators characterising the market conditions of agricultural production will fall below 100 points. In December 2014, the price scissors may be below 90 points, although the prices of means of production will be lower than in December 2013 by 1.5%. The indicator of changes in the buying-in prices in this period will be 96.5 points. The potential demand indicator will reach the lowest level since 2004, despite the decline in retail prices. As a result, the SIAS value will decrease below 100 points, but will be higher than in the year 2008 which was the worst in that regard.

2.3. Selected changes in the Polish food industry

In the recent years, the food market in Poland has been characterised by a decrease in the domestic demand for food, beverages and tobacco products. In 2013, the value of consumption of food and stimulants at constant prices was by almost 5% lower than the highest level of 2008. It was a big change in one of the major factors for the food economy development, as in the last 15 years, the consumption increased by 2.8% a year.

One of the reasons for the declining domestic demand was a slowdown in the economic development. In 2013, GDP was by 14.4% higher than in 2008, and the average annual growth rate amounted to 2.7%. Income of the population increased (real salaries by 8%), and the individual consumption increased by 10% in total. The decrease in the demand for foodstuffs may be explained by quickly rising food prices and changes in the structure of household expenses. In 2013, the prices of food and non-alcoholic beverages were by 20% higher than in 2008, and those of alcoholic beverages and tobacco by 28%, with inflation of about 16%. The results of the declining domestic demand were compensated by the export, which increased by 12% a year.

In the recent years, the food industry has not encountered any limitations in terms of raw materials, since the commodity production of agriculture (at constant prices) increased by 12.5%, but with the high variability. The import of raw materials (products of agriculture and semi-finished products) increased much faster, in the same period it increased by more than 50%.

The recent years have been a period of high prices of agricultural products and food. World food prices, after a transitional decrease in 2009, returned to the high level of the years 2007-2008. In Poland, agricultural products and food also rose in price. In 2013, the buying-in prices were by 30% higher than in 2008, and the retail prices of food, beverages and tobacco rose by 22%. The lower growth rate was characteristic of the selling prices in the food industry (17%). Food rose in price in the entire marketing chain, but most in agriculture. Processing margins decreased, which was a barrier to generating the economic surplus and the development of food processing.

In the recent years, there has been a slowdown in the development of the food industry. The average growth rate of production amounted to 3.3% a year and was lower than in the years 2003-2007 (5.9%). Another characteristic was the large diversification in the scale of changes in production (1.0-6.2%). A major factor of the production growth was the export, whose share in the increased value of production sold amounted to 60%, on average. The fastest development was observed in processing for non-food purposes (6% a year), including mainly the production of biofuels and feedstuffs. The relatively high growth rate of primary processing of agricultural products (4.4% a year) was maintained. Secondary processing increased by 4% a year when compared to 7.2% a year in the years 2003-2007. The great slowdown took place in the production of stimulants (to 1.8% a year from nearly 6%).

In the years 2008-2013, there was a slow decline in employment and a faster rise in the value of fixed assets. The capital-labour ratio increased by 46%. The increase in assets and resources in total was similar to the increase in

production (at current prices) and, therefore, indicators of capital intensity of production and the ratio of resources to production value have not changed. The value of investments in the sector, after a significant decline in 2009, systematically increased, reaching in 2013 the level slightly higher than before the global economic crisis. There was a continuation of the upward trend in the growth of labour productivity, which in 2013 was at constant prices by 27% higher than in 2008. The growth of labour productivity was paid by the growth in average salaries (by 48.6%).

The food industry maintains the ability to generate profits. In 2013, the profit exceeded PLN 8 billion and was by 40% higher than the average of the years 2007-2009, and the sales profitability is about 4% of the value of the net turnover. The return on equity is 12-15%. Profitable companies manufacture about 90% of production. The best financial results are achieved by producers of stimulants (7.6% of the turnover and 18.5% of equity), and the lowest sales profitability is achieved by processors of animal products. The number of food industry enterprises is stabilised and amounts to 15-16 thousand, including about 6 thousand industrial companies (> 9 employees), of which 280 are large (> 249 employees), less than 1,200 medium-sized (49-249 employees) and about 14 thousand micro- and small companies.

The Polish food industry has the increasing share in the EU, because it is the sixth producer of food industry products with the share of 9% when compared to 6.8% in 2003. In 3-4 years, Poland may be the fifth food producer in the EU. The production of the sector *per capita* is now higher than the EU-15 average and similar to the level of France, Germany and Spain, but, on average, by 1/3 lower than in the countries such as the Netherlands, Ireland, Denmark or Belgium.

2.4. International competitiveness of the Polish agri-food sector

The recent intensification of the studies on the international competitiveness is related to the integration and globalisation processes in the world. These processes have an impact on the functioning of and prospects for the development of enterprises and sectors they create. Under these conditions, building, strengthening and maintaining the international competitiveness have become a particular challenge. From the OECD definition it results that the competitiveness means both the ability of companies, industries, regions, nations or supranational groupings to meet the international competition and the ability to provide a high rate of return from the factors of production used and the

relatively high level of employment on sound bases¹⁸. In most analyses, the international competitiveness at the meso level is assessed in terms of foreign trade of individual sectors¹⁹.

One of the most important signs of the evolution of the competitiveness of Polish food producers were the foreign trade results. For the purposes of assessing the competitiveness, the following analyses are regularly carried out: of Polish agri-food trade results, of selected competitiveness indicators and of revealed comparative advantages in exports. In the studies conducted by the IAFE-NRI since 2005²⁰ it is stressed that national food producers should be competitive both to companies operating in the international market and to foreign companies in the internal market. Such an approach is consistent with the OECD definition and resulted in adopting, for the purposes of the studies, the definition of the competitiveness, as the ability of national food producers to place their products on foreign markets – both on the EU market and on third country markets – and the ability to develop the export.

After the Polish accession to the EU, there has been the rapid development of foreign trade in agri-food products. In the years 2003-2013, the export value rose fivefold to EUR 20.4 billion, and the positive balance showed the greater growth rate to about EUR 6.1 billion. The EU remained the main trading partner. In 2003, about 65% of the export were sent to the EU market and the import amounted to about 61%. In 2013, the EU's share increased to 78% and in the import – to 69%. The positive trade balance increased by nearly 13 times (approx. EUR 6 billion). The large share of the EU in the geographical structure and the large positive balance evidence that national producers have a strong competitive position in the EU.

The competitive position of Poland in trade in agri-food products in the international market was assessed based on four indices: export specialisation index (SI), trade coverage index (TC), revealed comparative advantage index (RCA) and Lafay index (LFI). The total assessment of the competitive position in the years 2003-2013 shows the diversified situation of the sector in commodity terms. Poland had comparative advantages in trade in: meat and offal, dairy products, vegetables, meat and fish products, cereal and bakery

¹⁸ *Industrial Structure Statistics 1994*, OECD, Paris 1996 [after: M.J. Stankiewicz, *Enterprise competitiveness. Building the enterprise competitiveness under the globalisation conditions*, Dom Organizatora, Toruń 2005].

¹⁹ J. Misala, *International competitive potential and international competitiveness of the national economy. Theoretical grounds*, Radom University of Technology, Radom 2007; J. Misala, *International competitiveness of the national economy*, PWE, Warsaw 2011.

²⁰ I. Szczepaniak (ed.), *Monitoring i ocena konkurencyjności polskich producentów żywności* (2), Multi-Annual Programme 2011-2014, no. 40, IAFE-NRI, Warszawa 2012.

products as well as fruit and vegetable products. The competitive position of the section sugar and confectionery and tobacco and tobacco products was good as well. In many product groups, the values of individual indices improved. Thus, the total agri-food export saw an increase in the share (from 60 to 70%) of products with regard to which Poland had comparative advantages in the world market. Clear progress made in this area results, first of all, from an increase in comparative advantages in the export to the EU.

So far, competitive advantages of food producers in the EU market have been mainly cost and price advantages. In Poland, prices have been for many years lower than in the EU-15. The studies conducted at the IAFE-NRI²¹ indicate that these differences increase in the subsequent links of the food chain i.e. the greatest ones apply to retail prices, lower – to selling prices, and the lowest to buying-in prices. From the studies it appears that the price advantages gradually decrease which results from the progressive convergence of domestic products with prices of products in the EU. This phenomenon evidences the increasing integration of the Polish agri-food market with the EU market.

With every year of the Polish membership in the EU, along with the convergence of food prices in the EU, quality, innovation or information advantages become increasingly significant. The sources of competitiveness of food enterprises include also the factors which are stuck in the areas of activity supporting the production or which result from intellectual resources.

Identification the opportunities and threats in the dynamically changing external environment, including an analysis of factors of competitiveness, should be used as a basis to develop a strategy of action and method for building the competitive advantage of food sector enterprises. The assessment of the competitiveness of agri-food trade with the EU using the K. Aiginger method²², revealed that despite the multidirectional fluctuations in the importance of individual competition strategies in the agri-food export, in the years 2003-2013, there was a clear increase in the importance of the differentiation strategy, based on the successful product quality competition. It manifested itself, *inter alia*, in an increase in the share of the agri-food export resulting from the application of the effective quality competition strategies and the improved positive trade balance²³.

²¹ I. Szczepaniak (ed.), *Monitoring i ocena konkurencyjności polskich producentów żywności (3). Potencjał konkurencyjny – wybrane elementy*, Multi-Annual Programme 2011-2014, no. 73, IAFE-NRI, Warszawa 2013.

²² This method consists in examining the characteristics of trade in terms of absolute, not comparative, advantages of the country over foreign countries in various fields of economy, in particular, in the field of the industrial production.

²³ I. Szczepaniak (ed.), *Monitoring i ocena konkurencyjności polskich producentów żywności (5). Synteza*, Multi-Annual Programme 2011-2014, no. 115, IAFE-NRI, Warszawa 2014.

Under the conditions of the European integration and globalisation, we observe the growing competition with non-price factors (e.g. quality). This is a basic condition which domestic food manufacturers should consider in search of determinants of the future competitiveness.

2.5. Summary

The globalisation processes and regional integration are a reason for which the domestic markets merge into one large and integrated market. The consequence of this process is the fact that the economic situation in the world market has a growing impact on the supply-demand situation in the domestic markets. The studies on the situation in the world market of agri-food products and its impact on the Polish agri-food sector confirmed the existence of strong links between the markets in question.

The impact of the economic situation in the world market on the domestic markets was visible in all analysed branches of the Polish agri-food sector. It was particularly visible in the branches which are involved in intense trade with foreign countries. An example is fish processing, which imports large quantities of raw materials and re-exports fish products. In the recent years, a similar situation has occurred in the domestic market of pigs, due to the import of large numbers of piglets and weaners which are fattened and slaughtered in Poland. The export was a very important factor determining the development of the dairy and poultry sectors and plays an important role in the beef sector.

The Polish food industry, operating under the conditions of risks resulting from various world crises, was under strong pressure of the decreasing domestic demand for food and of the high and rising prices of agri-food products. In this situation, the major factor for the development of the food industry was the export, which increased at a rate of about 10% a year, which created a possibility of an increase in the production of this industry at a speed close to that of the national economic growth (GDP).

The increase in the sector's production took place under the conditions of gradually declining employment with a relatively high level of investment, which resulted in a fairly rapid increase in the capital-labour ratio and labour productivity. The high technical standard of the sector's productive potential has been maintained. The diminishing processing margin made it necessary to manage rationally live and objectified labour resources and other means of production. This is evidenced not only by an increase in the labour productivity, but also by the maintenance of the previously achieved level of productivity and efficiency of the pursued activity, especially on a micro-scale, and the fairly stable

ability to generate profits and the safe financial status of enterprises. As a result, the Polish food industry has strengthened its position in the European Union, increased links with foreign markets and its competitive position in these markets.

The increase in the international competitive position of Polish food producers resulted primarily from such external conditions such as freedom of Poland's trade with other EU countries and the development of the global market. However, it would not be certainly so significant but for the impact of the EU CAP and various competitive advantages of Polish food producers. Low product price was the instrument being a basis for building competitive advantages in the food sector. Despite the gradual declining of the price advantages, the price factor still remains an important determinant of the international competitiveness of this sector. Also, an extremely important and increasingly significant competition instrument proved to be the improved level of quality and health safety of food produced in our country, determined by the implementation and application in food industry enterprises of mandatory and non-mandatory quality management systems.

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3. Analysis of the effects of selected instruments of public policy on the structural changes in agriculture and rural areas

3.1. Introduction

Comprehensiveness and complementarity of public policies is a prerequisite of efficient impact on the improvement in competitiveness of the food sector and rural development. From the perspective of a producer and an entrepreneur, their long-term predictability and stability are very important. Rural areas, including agriculture, are characterised by a defined development potential and simultaneous presence of stagnation factors. The state can stimulate that potential through instruments of agricultural policy, coherence policy, or other measures. Rural development is determined by endogenous conditions, which constitute the internal development potential, and exogenous conditions, which are derived from the growth rate of the national economy, and the economic policy. Those conditions result in the diversification of activity in rural areas. Some economic entities follow the tradition and remain agriculturally-oriented, while other focus on activity outside the agricultural sector. Thus, the stimulation of changes to agriculture and rural areas requires specific tools, methods, and instruments¹. They certainly include the tools of Common Agricultural Policy and rural development policy.

The agricultural policy in Poland in 2002-2014 is characterised by continuity with regard to its instruments². Since the accession to the EU, agricultural policy has become stable and predictable. Market activities have contributed to stabilisation of prices on many markets. Direct payments have greatly advanced the increase in farmers' income and the investment capability. Structural measures have supported modernisation of the agri-food sector, environmental protection, and multi-functional rural development. As assumed, most actions were mutually complementary, though goals set for individual

¹ P. Chechelski, R. Grochowska, M. Wigier (ed.), *Wsparcie publiczne i konkurencyjność polskiej gospodarki żywnościowej*, Multi-Annual Programme 2011-2014, no. 129, IAFE-NRI, Warszawa 2014, p. 136.

² M. Wigier, *Polityka rolna i zmiany strukturalne w rolnictwie polskim po akcesji do UE*, Prace Naukowe Uniwersytetu Ekonomicznego we Wrocławiu 2014, No. 361.

measures were sometimes contradictory³. Effectiveness and efficiency of many public interventions were also disputable.

Visible improvement in agricultural income and structure that occurred within the food sector and in the rural areas is a result of the beneficial impact of CAP mechanisms. The aim of this study is to present and evaluate the effects of selected agricultural policy instruments implemented in Poland in 2004-2014 based on funds from the EU, co-financed from the national budget, and public policy beneficiaries' own funds.

3.2. Data source and research methods

The defined task has been performed by analysing statistical data:

- Polish 2004-2012 FADN with regard to production resources and investment,
- The 2011 survey by the IAFE-NRI, which provided information on the impact of CAP on production decisions in farmers' opinion,
- The 2004-2013 Local Data Base of the Central Statistical Office of Poland concerning 1,529 rural communes, which provided information on communes' own income.

The FADN data analysis concerned two subperiods: 2004-2007 and 2008-2012. In order to eliminate changes resulting from short-term economic fluctuations on agricultural markets in the said periods, mean values of the variables used for analysis have been calculated. Based on the review of literature and the analysis of the observed relationships between the provided aid and the actual changes, the connections between farmers' investment and production decisions and CAP instruments have been identified. The analytical work focused on identification of relationships between the amount of the aid addressed to farms and income, changes in production, and investment. Some analyses have been conducted using the division into economic classes, production types, and FADN regions. The groups that have been distinguished include: division of farms into economic classes: very small (BM) – up to 4 ESU, small (M) – 3-8 ESU, medium-small (ŚR-M) – 8-16 ESU, medium-large (ŚR-D) – 16-40 ESU, large (D) – 40-100 ESU, very large (BD) – over 100 ESU; division of farms according to production types: field crops (UP), horticultural crops (UO), permanent crops (UT), milk production (KML), grazing animals (ZTR), grain-fed animals (ZZI), mixed production (MIE), farms that do not

³ It can be illustrated by the aim of improving the environment quality through investment, e.g. construction of manure pads and typically economic goals related to e.g. reduction in production costs.

invest, farms that invest on the basis of own assets, commercial loans, and public aid. The analysis used descriptive statistics methods.

The survey by the IAFE-NRI entitled “Farming Family”, also referred to as the “The great survey”, was conducted in 76 villages. The collected information concerned all private farms with more than 1 hectare of agricultural land at the disposal of natural persons. The selection of villages was purposive so that the area structure of the studied farms reflect the real size of all private farms, both in the country, and the spatial structure. Yet, in the case of private farms, the area of a farm was closely related to the presence of other production assets components, social and demographic features of farms, and the primary aims of agricultural activity. For those reasons, it can be deemed that the selected group reflected social and economic structure of Polish private farms. The studied entities every time constituted about 2.0% of the actual number of private farms in the country, and their number amounted to 3.3 thousand in the 2011 study.

The research on the development of entrepreneurship in rural areas focused on EU financial instruments that directly or indirectly affected the development of non-agricultural economic activity in 2007-2013. For that purpose, the evaluation of public aid efficiency used the purposive approach and a multi-criterion approach⁴. The former made it possible to determine the degree of convergence, while the latter made it possible to evaluate technical efficiency of the transferred support. Due to the multiplicity of public support mechanisms and multi-level relationships, only a partial evaluation of efficiency of the selected instruments was possible.

Evaluation of efficiency of the policy that aimed at convergence of rural areas and efficiency of financial instruments for supporting the development of entrepreneurship was made based on a meso-economic analysis, i.e. at the commune level. The basic research methods were descriptive and comparative analyses. In the case of evaluation of efficiency, i.e. impact on the convergence process, the analyses concerned the condition and change of own income of communes depending on the level of use of entrepreneurship development support instruments funded from the EU budget under the Human Capital Operational Programme, the Innovative Economy Operational Programme, the Regional Operational Programme, and the Eastern Poland Development Programme per a single resident in productive age. The evaluation of

⁴ G. Pawłowski, *Wykorzystanie analizy efektywności funkcjonowania instytucji publicznych w aspekcie konkurencyjności regionów*, Polityka Gospodarcza 2000, No. 3, pp. 65-71.

convergence uses also the econometric absolute beta convergence model⁵. The amount of support also constituted input in the evaluation of local efficiency. In this case, the measurement of effects used indices and indicators of the number of and change to the number of economic entities and micro-businesses, workers, or unemployed⁶. Apart from descriptive and comparative analysis, the applied methods include also simple regression analysis, and the stochastic frontier analysis (SFA).

3.3. CAP at the time of Polish membership in the EU

The legal and institutional framework for shaping and implementing agricultural policy with regard to agriculture, food industry and rural development sector in 2004-2014 in Poland was shaped directly by the Common Agricultural Policy and indirectly by regional, trade and competition policy. According to the adopted solutions related to CAP, the Polish agricultural policy was based on the complementarity of two pillars thereof, i.e. the market and structural policy. The task of the former pillar is to ensure income support for farms that produce goods according to the market demand, and the task of the latter is to support structural transformation in food economy, support for rural development, and environmental protection. The most important programmes co-financed from the EU budget that support the said transformation include:

- direct payments – paid in the form of basic, complementary and special payments separated from the structure and volume of agricultural production;
- SAPARD – Special Accession Programme for Agriculture and Rural Development;
- SOP “Agriculture” – Sector Operational Programme (SOP) Restructuring and Modernisation of the Food Sector and Rural Development 2004-2006;
- PROW 2004-2006 – Rural Development Plan for 2004-2006;
- PROW 2007-2013 – Rural Development Plan for 2007-2013 in the final implementation phase;

⁵ B. Bal-Domańska, *Ekonometryczna identyfikacja β konwergencji regionów szczebla NUTS-2 państw Unii Europejskiej*, Acta Universitatis Lodziensis, Folia Oeconomica 2011, No. 253, pp. 9-21; M. Próchniak, R. Rapacki, *Konwergencja typu beta (β) i sigma (σ) w krajach transformacji w latach 1990-2005*, pp. 146-151, [in:] R. Rapacki (ed.), *Wzrost gospodarczy w krajach transformacji*, PWE, Warszawa 2009, p. 304; M. Kokocińska (ed.), *Etapy konwergencji w rozwiniętych krajach Unii Europejskiej*, Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu, Poznań 2012, pp. 44-48.

⁶ J. Pawłowski, *Wybrane metody oceny efektywności finansowej przedsięwzięć gospodarczych*, Wydawnictwo Uniwersytetu Łódzkiego, Łódź 2007, pp. 32, 33, 36, 37.

- other market assistance programmes related to: production quotas, subsidising production, export and national consumption, production standards, etc.

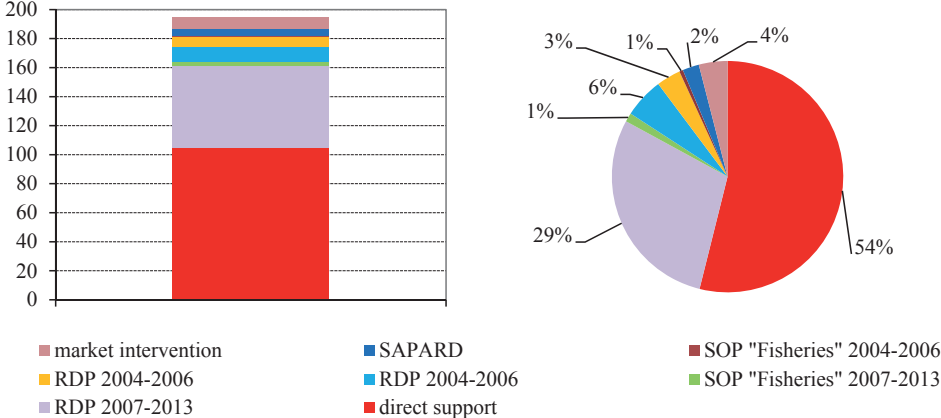
Inclusion of Poland in CAP and trade policy and provision of structural funds for rural areas affected economic conditions for the entire food and rural economy. By mid-2014, the subsidy rate in the field of rural areas, agriculture and food industry increased significantly. The cumulated value of financial support for the agri-food sector and rural areas reached nearly PLN 195 billion (Fig. 3.1). It comprised: direct payments (PLN 104.8 billion), PROW 2007-2013 (PLN 56.5 billion), PROW 2004-2006 (PLN 10.9 billion), SOP Restructuring payments (PLN 6.6 billion), spendings on the implementation of CAP mechanisms on particular agricultural markets (PLN 7.8 billion), SAPARD (PLN 4.5 billion), SOP “Fisheries” 2007-2013 (PLN 2.4 billion), and SOP “Fisheries” 2004-2006 (PLN 1.0 billion). The results of such high public spendings, combined with EU regulations concerning market and structural policy, included the following:

- acceleration of food economy modernisation, improvement in its competitiveness, both on the internal market and international markets, improvement in food production quality and security, and acceleration of social and economic development of rural areas;
- increase in the capability to sell agri-food products on the common market, and the increase in the capability to export them to third countries’ markets using export subsidies;
- long-term stabilisation of prices on agri-food markets subject to CAP regulations;
- significant income support, primarily due to the introduction of direct and LFA payments.

Ongoing structural transformation in Polish agriculture results from numerous factors, related to business cycles, geopolitics and generational changes. The causes include both macroeconomic conditions due to the EU membership and inclusion in the single market, and public aid programmes addressed to the agri-food sector under CAP. The concentration of production and land takes place primarily due to market trade in agricultural land. These changes are a result of transferring farms to successors who are family members to a much lesser extent because in this case land is not treated as a means of production, but rather an asset that is transferred from one generation to another. A significant stimulus for initiating structural changes, and as a result, improvement in management efficiency and competitiveness of agriculture was the influx of EU funds into Polish rural areas. The current public policy instruments that were

supposed to facilitate convergence of region, however, are not capable of stopping their polarisation. It is even possible to observe increasing economic and spatial polarisation. Economic disparities between industrial farms that are strongly linked to the market and farms whose main purpose is self-subsistence are growing. The difference is in the development between rich or developing areas and poor ones. Rich areas are developing due to the use of their potential and economic prosperity, and poverty zones are not developing.

Figure 3.1. Spendings on the implementation of CAP between May 2004 and July 2014 (PLN billion and per cent).



Source: calculation by M. Wigier based on the data from the Agency for Restructuring and Modernisation of Agriculture and the Agricultural Market Agency.

3.4. Impact of the CAP on production decisions of farmers

Polish accession to the EU contributed to significant improvement in income situation in the agricultural sector. In the first year following the accession, income grew nearly twofold due to the fact that Polish agriculture was included in the support system under CAP. In 2008-2012, the average income per farm in the FADN sample amounted to PLN 86,000, and was over 40% higher than in the earliest years of the EU membership. Income disparity among agricultural producers resulted primarily from the size of production resources, subsidies related to operational activity and investment, prosperity on the specific agricultural market, and cost of production factors involved.

During Poland’s EU membership, an increasing dependence of farm income on support from outside the market was observed. The most dependent farms were those whose production was based on land resources that entitled their owners to supplementary payments. It particularly regarded three

production types of farms: mixed production farms, farms that focused on field crops, and farms that kept grazing animals. Payments determined the income level to a smaller extent in the case of farms specialising in horticultural production and animal production, where operational activity was not related to the use of land as the primary factor of production⁷. Those entities were able to earn higher income compared to other farm types, e.g. due to more efficient and intense production and higher being more market-oriented.

The share of payments in the farm income was observed in all economic size groups of farms. The process was fastest among the largest entities with the largest area of agricultural land, and it was slowest among farms with medium economic power and medium land resources. However, compared to other classes, the share of payments in income was highest throughout the analysed period in the case of the smallest, large and very large farms. In other groups, the share of payments in producers' income decreased as the economic size increased.

FADN data shows that the average area of agricultural land clearly grew in 2004–2012, with increasing area of leased land. The area of most crops grew, and the area of permanent (orchards) and feed crops increased the most. The area of the above crops was enlarged to the highest extent by the largest farms. On the other hand, the area of vegetables, flowers, cereals and other field crops grew fastest in small and medium farms. The total area of agricultural land excluded from production also increased, which resulted from its growth in the largest farms (tab. 3.1).

As far as the division into production types is concerned, the biggest changes to crop area was observed among farms keeping grazing animals (beef cattle), milk cattle, orchards, and with mixed production. They included the increase in agricultural land area, leased land, permanent plantations (orchards), forests, and cereals. The area of land excluded from production increased only in orchards (tab. 3.2).

Following the accession to the EU, farmers were interested in enlarging crop area due to various reasons, and the most important one turned out to be area payments. An important role was also played by market factors, which resulted in greater development of production in some farm groups than others (including farms specialising in milk and beef cattle production), which required additional area for crops⁸.

⁷A. Judzińska, W. Łopaciuk (ed.), *Wpływ WPR na rolnictwo w latach 2004-2012*, Multi-Annual Programme 2011-2014, no. 118, IAFE-NRI, Warszawa 2014, p. 96.

⁸ W. Łopaciuk, *Zmiany w polskim rolnictwie a WPR w opinii rolników*, [in:] A. Kowalski, P. Chmieleński, M. Wigier (ed.), *Ekonomiczne, społeczne i instytucjonalne czynniki wzrostu*

Table 3.1. Changes to the area of agricultural land and selected crops according to FADN data, according to economic classes
(mean 2008-2012 value to mean 2004-2007 value, %)

Specification	Average	BM	M	ŚR-M	ŚR-D	D	BD
UAA	16.9	18.0	15.2	16.2	12.1	20.8	16.7
Rented land	15.4	24.2	22.5	24.9	9.9	11.6	15.7
Cereals	7.3	23.9	17.9	13.9	3.6	15.7	5.7
Other field crops	9.9	19.0	26.5	36.4	23.0	32.1	6.7
Vegetables and flowers	7.3	-42.2	-25.5	-19.1	3.0	-4.1	31.3
Permanent crops	103.5	-7.2	21.9	13.2	18.2	124.8	179.5
incl.: orchards	116.7	-7.6	21.7	11.3	18.7	161.2	215.4
other	-10.5	248.9	144.9	209.3	8.4	4.7	-21.8
Feed crops	78.4	29.7	12.2	18.3	36.7	32.4	95.7
UAA excl. from production	7.4	-6.0	-34.8	-44.4	-31.6	-18.4	16.7
Forests	22.0	10.4	8.2	12.3	24.4	45.2	21.6

BM – very small, M – small, ŚR-M – medium-small, ŚR-D – medium-large, D – large, BD – very large

Source: calculation by W. Łopaciuk based on FADN data.

Table 3.2. Changes to the area of agricultural land and selected crops according to FADN data, according to production types
(mean 2008-2012 value to mean 2004-2007 value, %)

Specification	Average	AB	C	E	F	G	H	I
UAA	17.3	6.1	5.6	20.4	16.9	46.1	7.5	33.7
Rented land	17.8	-7.3	26.6	61.5	32.2	99.2	-14.7	63.0
Cereals	12.7	5.9	4.4	4.6	17.7	36.8	5.3	28.9
Other field crops	21.1	12.6	-6.5	40.0	41.0	74.1	27.3	40.8
Vegetables and flowers	-17.3	-36.5	36.1	-29.7	-37.8	30.8	-19.3	-8.0
Permanent crops	20.7	-19.5	-9.5	22.5	115.2	164.2	45.2	43.4
incl.: orchards	21.6	-23.0	3.8	22.1	115.2	162.4	45.2	36.8
other	-8.9	98.3	-27.7	458.8
Feed crops	34.9	6.1	23.1	26.5	19.4	56.5	5.4	50.3
UAA excl. from production	-27.9	-17.2	-26.6	91.1	-74.5	-64.4	5.4	-5.2
Forests	37.7	41.4	39.6	33.1	33.1	60.6	42.1	14.3

AB – field crops, C – horticultural crops, E – permanent crops, F – dairy cows, G – grass-feeding animals, H – grain-fed animals, I – mixed

Source: calculation by W. Łopaciuk based on FADN data.

Market factors contributed also to high variability in cereal crop area. In 2004-2007, it was particularly visible in the case of farms specialising in plant production, where the interest in other field crops (primarily rapeseed) and the

farms with animal production that increased the feed crop area in order to secure the production of own fodder. In the period of prosperity, the tendency was clearly visible primarily among smaller farms, which are more sensitive to short-term changes to market situation. Increase of farmers' interest in establishing permanent plantations, particularly in the case of farms not specialising in such activity, results from adjustment of area with regard to payments under CAP, just as reduction of the area excluded from production for the purpose of increasing the area subject to direct payments.

After the accession to the EU, most of animal production regressed. In the case of farms in the FADN sample, the number of animals dropped by more than 14% in 2004-2012. It resulted primarily from the reduction in the number of swine, and to some extent, poultry. The stock of cattle, sheep, and goats increased greatly. Reduction in total livestock numbers occurred primarily on large farms. In the case of smaller farms, the number of beef cattle, sheep and goats increased. On the other hand, the smallest farms increased their poultry stock (tab. 3.3).

Table 3.3. Changes in livestock* according to FADN data, according to economic classes
(mean 2008-2012 value compared to mean 2004-2007 value, %)

Specification	Average	BM	M	ŚR-M	ŚR-D	D	BD
Total livestock	-14.1	-0.7	-7.2	-4.4	-0.8	-9.8	-16.0
Milk cows	75.7	-21.3	-14.8	2.3	29.2	21.3	103.8
Other cattle	76.8	49.5	30.4	30.6	49.0	33.0	90.4
Sheep and goats	97.3	8.5	-17.2	144.2	-35.9	-20.5	159.2
Swine	-36.2	-9.2	-20.3	-24.1	-18.2	-8.1	-41.5
Poultry	-38.7	19.1	28.5	-17.0	-36.0	-41.2	-38.4

* converted to livestock units

BM – very small, M – small, ŚR-M – medium-small, ŚR-D – medium-large, D – large, BD – very large

Source: calculation by W. Łopaciuk based on FADN data.

Changes to livestock numbers were related to the processes of specialisation and concentration, which took place particularly on large farms. Many of them abandoned animal production (particularly swine farms), and those that continued and developed it specialised in particular types of production, such as beef and dairy cattle. Thus, the changes were structural in nature, and they were strongly related to market processes. Large farms with relatively smaller labour resources limited their interest in labour-intensive activities, i.e. animal production. High prices of cereals and fodders, which are the basis for breeding of grain-fed animals (swine and poultry) resulted in the

decrease in interest in those activities. On the other hand, increase in milk production can be explained by high milk prices despite intense fluctuations, particularly in 2009-2012.

In 2004-2012, livestock numbers dropped particularly on farms specialising in swine breeding and farms without clear specialisation. On the other hand, the greatest increase in livestock numbers occurred on farms where animal keeping is an insignificant activity (horticultural farms and orchards). Dairy cattle numbers grew most on horticultural farms, and, to a lesser extent, on dairy farms, while it decreased in other types of farms. The number of other types of cattle (beef cattle) grew similarly, but the increase could be observed on all types of farms. Most farm types reduced their numbers of swine (tab. 3.4).

Table 3.4. Changes to livestock numbers* according to FADN data, according to production types
(mean 2008-2012 value compared to mean 2004-2007 value, %).

Specification	Average	AB	C	E	F	G	H	M
Total livestock	6.7	-28.6	11.4	43.1	21.4	33.6	-3.8	18.1
Milk cows	15.2	-39.2	14.6	9.1	18.7	14.4	-38.2	16.2
Other cattle	47.8	-7.5	42.8	136.6	35.9	63.6	36.8	56.5
Sheep and goats	-26.9	-29.2	-92.4	.	.	-27.9	-34.8	30.7
Swine	-2.7	-35.1	-3.8	61.8	-44.0	-45.0	-0.4	4.9
Poultry	-18.9	-48.7	146.3	-30.6	-48.5	-56.6	-18.6	30.6

*converted to livestock units

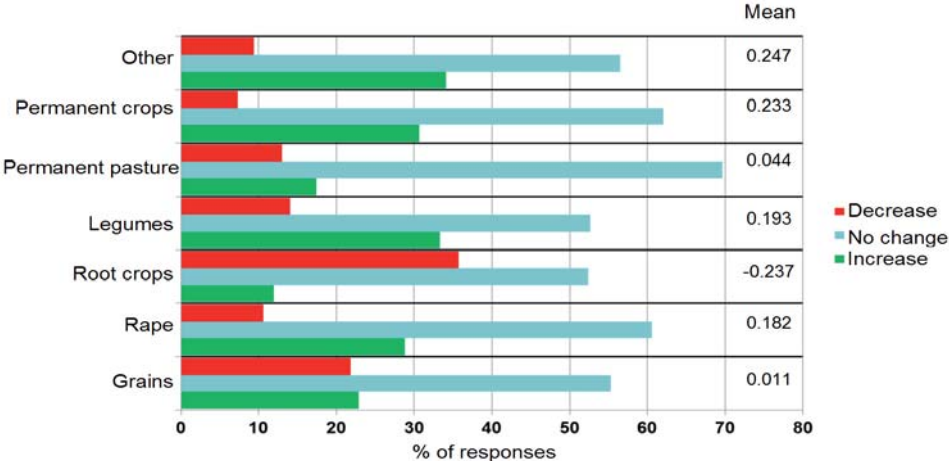
AB – field crops, C – horticultural crops, E – permanent crops, F – dairy cows, G – grass-feeding animals, H – grain-fed animals, M – mixed

Source: calculation by W. Lopaciuk based on FADN data.

The analysis of changes to livestock numbers leads to the conclusion that most farm types where a primary activity can be distinguished shifted and are shifting towards specialisation. At the same time, many farmers diversify their economic activity and increase the scope of the so-called secondary activity. Scale of change to livestock number in individual production types was similar to changes to livestock numbers observed in the division into economic classes. A large drop in swine numbers in mixed production farms and other farms not specialising in such activity indicated the impact of market factors. As a result of increasing productions costs (growing prices of cereals and industrial fodder), farmers whose production cost was higher who could not lower that cost reduced their swine numbers or ceased that activity. In this approach, the impact of CAP could also be seen in the increase of beef cattle numbers, which received support in the form of payments for suckler cow breeding.

The changes that took place in Polish agriculture after the accession to the EU observed on the basis of FADN data analysis are to large extent confirmed by the findings of the survey by the IAFE-NRI covering nearly 3.3 thousand farms. In order to determine the change to crop area after the accession to the EU, the 2011 values have been compared to the 2003 values (year before the Polish accession to the EU). The direction of change was determined using the arithmetic mean ranging from -1 to 1 (-1 – drop, 0 – no change, 1 – increase). Negative value of the indicator has been observed only with regard to root crops (-0.237), which seems to indicate that farms tended to reduce the area of those crops more often in the analysed period. As far as other plant groups are concerned, the situation was the opposite – increase in crop area was more frequent. The mean values, both negative and positive, were relatively near zero, which means that the frequency of such changes in a specific group was low (fig. 3.2).

Figure 3.2. Change to area of crops on studied farms following the Polish accession to the EU.



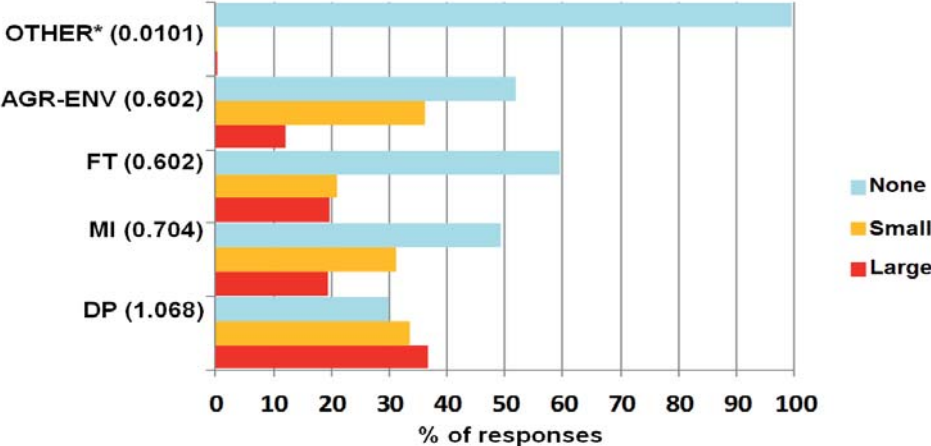
Source: calculation by W. Łopaciuk based on Annex 2 to the “Farming Family” questionnaire by the IAFE-NRI.

More than a half of respondents did not report permanent changes to crop areas. Nearly 30% of studied farms increased the area of other crops, legumes, permanent plantations, and rapeseed. On the other hand, the type of crops whose area was reduced most often were root crops (about 35%) and cereals (over 20%). The most frequently reported reason for the above changes was the will to change farm area, with nearly 27% of respondents intending to increase its size, and 17% planning a reduction. Another important group of factors were changes to profitability – 25% of farmers declared its decrease, and 12% decreased its

increase. The remaining factors indicated by farmers were much less significant. They include the change to activity profile or abandonment of agricultural production.

Following the accession to the EU, three fourths of farmer groups did not show any change to use of means of production. Increase in their use was reported by nearly 15% of respondents, and the decrease was declared by about 10%. The reasons for change to use of means of production most frequently listed by farmers taking part in the survey included change to crop area (nearly 30%), intensification of production (19%), and defined quality of products (18%), and changes to profitability (14%). Much less frequently selected answers (1.5% to 9%) included change to production profile, abandonment of production, or shift to ecological farming.

Figure 3.3. Impact of CAP on changes to Polish agriculture



* mean value in parenthesis
 DP – direct payments, MI – market intervention, FT – foreign trade regulations, AGR-ENV – agri-environmental payments, OTHER – other regulations.
 Source: own calculations based on Annex 2 to the “Farming Family” survey by the IAFE-NRI.

Farmers evaluated the impact of specific CAP regulation groups on agriculture by providing one of the following answers: 0 – no impact, 1 – small impact, 2 – large impact. It was determined using the arithmetic mean ranging from 0 to 2. The analysis of the mean values indicated that the impact of CAP regulations on agriculture was rather small. The predominance of answers referring to large impact was seen only with regard to direct payments. More than 1/3 of respondents indicated their large impact, 1/3 – small, and only 1/4 stated that they had no impact. Values equal to or approximating one, which

showed small impact of CAP regulations, were observed in relation to market intervention and the foreign trade regulation system. Thus, the latter was considered nearly as significant as trade regulations. Individual evaluations of those groups, however, show large disparities. In the case of market intervention, more respondents claimed the impact was small than in the case of trade regulations, while large or no impact was reported much less frequently. At the same time, mean values for agri-environmental programmes and other regulation groups were clearly different from the above ones (fig. 3.3). Most probably, it resulted from small popularity of those programmes among farmers in the earliest years after the accession to the EU and the conviction that those payments are not directly related to agricultural production.

3.5. Impact of CAP on investment decisions of farmers

As far as the effects of selected investments after a decade of Poland's EU membership is concerned, it is worth paying attention to measures that directly contributed to the improvement in competitiveness and structural transformation in food economy and rural areas. They were included both in the 2004-2006 financial perspective programmes and the 2007-2013 programming period. Selected measures under the programmes: SAPARD - Measure 2 "Investment in Farms", SOP "Agriculture" – Measure 1.1. "Investment in Farms", PROW 2004-2006 – Measure 6 "Adjustment of Farms to EU Standards", PROW 2007-2014 – Measure 121 "Modernisation of Farms" concerned investment in farms. The scope of investments approved for reimbursement from public funds for the above measures included:

- construction, reconstruction and modernisation of buildings used for agricultural production, storage and preparation for sales or direct sales, including purchase and installation of technical infrastructure and equipment;
- purchase or installation of machines, devices and equipment for agricultural production, storage, drying, warehousing, preparation for sales and direct sales;
- planting and equipping of orchards or perennial plantations; equipping of pastures and ranges for animals;
- supplying farms with water;
- construction of buildings, purchase and installation of machines and devices for environmental protection or improving animal breeding conditions or production hygiene;
- purchase and installation of other elements of technical infrastructure that directly affects conditions of agricultural production;

- purchase of computer hardware and software; covering instalments due to performance of leasing agreement;
- covering general costs directly related to the preparation for and implementation of investment, patent or licence fees, or project supervision by investor.

Measure 1.1 under SOP “Restructuring...” covered more than 28.2 thousand projects on farms with the total value of about PLN 2,412 million. Important measures included also: improvement in processing conditions in the food industry – 1.2 thousand projects with the total value of about PLN 1,622 million were implemented, and help for young farmers who started their activity – 14.2 thousand projects with the total value of about PLN 707 million were implemented.

The PROW 2004-2006 programme was basically a social programme, though some of its measures contributed to environmental protection, and directly to improvement in competitiveness and efficiency of farms. For the financial perspective, the most important measures included adjustment of farms to EU standards – 73 thousand projects with the total value of about PLN 2,437 million, the structural pensions programme – due to its implementation, over 53 thousand farms were ceded to successors, and the value of paid pensions exceeded PLN 2,083 million, support for semi-subsistence farms – 172 thousand farms received help whose value exceeded PLN 1,316 billion, the programme for supporting economic activity in areas where natural conditions are not favourable for the development of agriculture – LFA (in 2004-2006, 628-718 thousand applications for PLN 1,145-1,295 million were filed) and the agri-environmental programme – it concerned 79 thousand project with the total value of about PLN 815 million.

From the perspective of improvement in competitiveness of the agricultural sector and the improvement in the efficiency of farms, were the measures under the PROW 2007-2013 programme⁹. This results primarily from the comprehensive nature of the programme, and consequently, the budget allocated to subsidies for agriculture and rural areas. The measures that are particularly important for the long-term objectives and are worth paying attention to are primarily those related to modernisation of farms – by the end of December 2013, 96.3 thousand applications under this measure for the total amount of PLN 13.96 billion were filed, 60.2 thousand agreements with the total value of PLN 8.49 billion were concluded, and subsidies for 46.4 beneficiaries

⁹ W. Czubak, A. Sadowski, M. Wigier, A. Mrówczyńska-Kamińska, *Inwestycje w rolnictwie polskim po integracji z Unią Europejską*, Wydawnictwo Uniwersytetu Przyrodniczego w Poznaniu, Poznań 2014, p. 136.

with the total value of PLN 7.45 billion were paid. The majority (91%) of the investments concerned equipment, including mobile equipment, related to agricultural activity, and other funds were allocated to construction or maintenance of production facilities (4%), or improvement in soil quality (1%).

Another programme important for the improvement in competitiveness was the investment support programme for young farmers who start to manage their own farms independently for the first time. Public aid took the form of a single benefit. Until the end of 2013, 29.2 thousand applications for the total PLN 2.0 billion worth of aid were submitted, 23.2 thousand decisions with the total value of PLN 1.6 billion were issued. The dominant group of beneficiaries were men (83%) with secondary education in agriculture (40%), aged 18-25 (67.5%). Over 56% of farms run by young farmers who received the grant had very small economic potential – up to 6 ESU (including 34.8% up to 4 ESU), and the farms above 12 ESU constituted only 20% of beneficiaries. The structural pension programme was implemented simultaneously with the programme for supporting young farmers. Its assumed aim was to improve the agrarian structure, profitability and competitiveness of farms, and accelerate generational change on farms. From the launch of the 2007-2013 programme to the end of December 2013, 28.5 thousand applications were filed, 19.9 thousand decisions to grant structural pensions were issued. In total, 73.4 thousand beneficiaries started receiving structural pensions under PROW 2004-2006 and PROW 2007--2013 (including 20.1 thousand beneficiaries under 2007-2013 obligations), and the benefits amounted to PLN 8.4 billion (including PLN 1.35 billion under 2007-2010 recruitment).

The improvement in competitiveness was also the aim of the semi-subsistence farm support programme. In 2007-2013, its implementation was continued due to PROW 2004-2006 obligations. Financial aid was addressed to farms with relatively small economic potential. The farmer could use the money for an initiative related to agricultural production or non-agricultural economic activity. The financial aid allocated to a single farm was the equivalent of EUR 1,250, and it was paid annually for five successive years. From the launch of the measure on, investments were done by 152.9 thousand farmers, and the Agency for Restructuring and Modernisation of Agriculture paid PLN 2.1 billion from the PROW 2007-2013 budget.

As far as subsidies for investment projects in the field of processing and marketing of agricultural products are concerned, 3.5 thousand application for PLN 10.6 billion worth of aid were submitted until the end of 2013, 1.5 thousand agreements with the total value of PLN 2.99 billion were concluded, and 948 beneficiaries were paid PLN 2.0 billion. 67% of the aid was allocated to

investments related to food processing, 23% to investments related to agri-food product wholesale, and 10% to processing for purposes other than consumption. 90% of the beneficiaries were SMEs (including: 34% – small enterprises, 22% – micro enterprises).

Measures with regard to diversification of agricultural activity and creation of non-agricultural sources of income in rural areas resulted in the acceptance of 29 thousand application for the total amount of PLN 2.6 billion by the end of 2013, and execution of 15.4 thousand agreements with the total value of PLN 1.36 billion. 69% of the implemented investments concerned the development of various types of services for farms and tree farms. Other types of services included basic personal services (10.6% of the implemented investments), tourist and recreational services (7% of applications), as well as construction and installation services (6.7% of submissions). The measure was complemented by support for the establishment of micro businesses, which contributed to the increase in economic competitiveness of rural areas, development of entrepreneurship and labour market. The initiation of the public support programme resulted in the submission of 45.5 thousand applications for the PLN 8.9 billion worth of aid in total, and 12.4 thousand agreements with the total value of PLN 2.3 billion were concluded. The dominant directions of the economic activity in rural areas were the development of micro businesses providing personal services (28.3% of implemented investments), construction and installation services (24.1%), and services for farms and tree farms (17.8%).

3.6. Regional and structural policy instruments supporting the development of entrepreneurship in the rural areas

In 2007-2013, 1,529 studied rural communes received about PLN 13.1 billion worth of public aid via various operational programmes, Operational Programme Human Capital, Operational Programme Innovative Economy¹⁰. Nearly 63% of total funds from the EU budget for the studied rural areas were received via regional operational programmes, which included both direct support for the development of economic activity and direct support via infrastructural projects.

The impact of regional and structural policy on equalisation of communes with regard to economic development is shown by the findings from the unconditional beta-convergence for commune groups that differ in terms of

¹⁰ A. Wasilewski (ed.), *Efektywność instrumentów polityki regionalnej i strukturalnej wspierających rozwój pozarolniczej działalności gospodarczej na obszarach wiejskich*, Multi-Annual Programme 2011-2014, no. 108, IAFE-NRI, Warszawa 2014, p. 126.

absorption of various EU funds oriented towards the development of entrepreneurship (tab. 3.5). The analysis shows that the convergence took place regardless of the level of funds from the EU budget.¹¹ The convergence rate of communes with high absorption level amounted to nearly 5% per annum, which was 1% higher than in the case of communes with low use of those funds. What is more, in this group, the period of reduction of the distance to long-term equilibrium with regard to own income growth per resident in productive age rate by a half was about 14 years, and was 3.5 years shorter than in the case of communes with low absorption levels. This means that a higher financial support level under existing policies has significant impact on the beta-convergence rate if the disparity in absolute income grows.

Table 3.5. Unconditional β convergence rate and half-life of disparity in own income in 2004-2011 in groups that differ in the use of EU funds under operational programmes providing support for the development of entrepreneurship per resident in productive age

Specification	β -convergence coefficient	Half-life
Communes with the low level of usage of Operational Programmes	0.0394	17.6
Communes with the high level of usage of Operational Programmes	0.0497	13.9

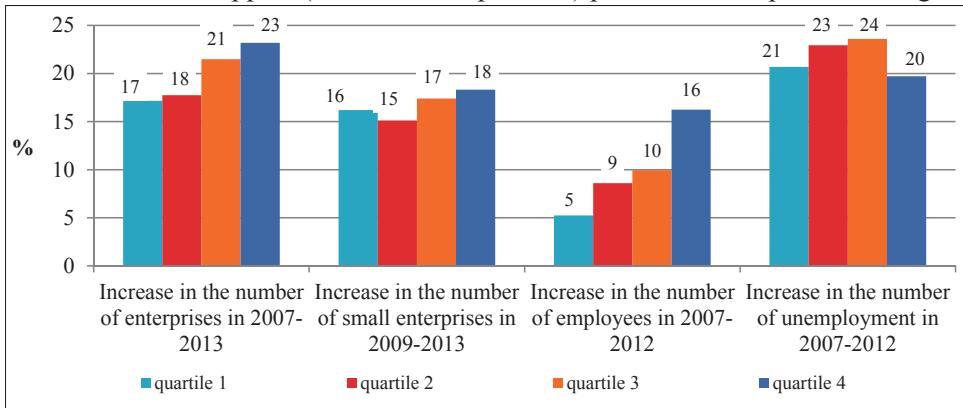
Source: own elaboration based on calculations by M. Gospodarowicz according to the Local Data Base of the Central Statistical Office of Poland.

When we analyse the increase in the absolute number of economic entities in the commune groups divided according to the financial support scale (fig. 3.4), thus excluding the negative impact of the growth in the number of persons in productive age, we can state that the relative financial transfers from the EU budget per capita played an important role in the initiation of business activity by natural persons. In 2007-2012, i.e. in the period when the studied financial instruments were applied, a higher increase in the number of entities was observed in commune groups with higher support level. What was particularly visible was the difference between the first and the fourth quartile, where the increase in the number of those entities throughout the period when the support had impact was 6 percentage points higher. It should be stressed that the higher increase in the number of economic entities was achieved in commune groups where their number was higher at the initial point. In the context of the

¹¹ A. Wasilewski (ed.), *Skuteczność instrumentów polityki regionalnej i strukturalnej oddziałujących na rozwój przedsiębiorczości*, Multi-Annual Programme 2011-2014, no. 77, IAFE-NRI, Warszawa 2013, p. 124.

increase in the number of business entities run by natural persons, the financial support from the EU can be deemed a quite efficient instrument. The comparative analysis (fig. 3.4) confirms also the positive impact of the scale of support for the development of micro enterprises and the increase in the number of employed persons. What can also be observed is the decelerating impact on the number of unemployed, but this regards only the highest support scale.

Figure 3.4. Economic changes in commune groups divided according to the amount of EU support (division into quartiles) per resident in productive age



Source: own calculations based on the Local Data Base of the Central Statistical Office of Poland.

The stochastic frontier analysis (SFA)¹² with transfer of funds under ROP, Operational Programme Innovative Economy and Operational Programme Human Capital as inputs and new businesses launched by natural persons as outputs shows that technical efficiency of support was quite low (tab. 3.6). The transfer of funds resulted in emergence of less than 37% of entities that could theoretically be created with that transfer scale. The technical efficiency could be improved by quite a significant increase in the scale of support. Scale efficiency is slightly higher than 63%. Nonetheless, financial support from the EU budget significantly contributes to the establishment of new entities. The efficiency of its use for that purpose differs strongly among communes. The technical efficiency variability coefficient amounts to nearly 68%.

¹² Stochastic frontier analysis is a parametric method used for evaluating general activity by defining various relationships between inputs and outputs taking account of the presence of two data components: a random factor and inefficiency. It is based on the assumption that all entities should be capable to act at a certain effectivity level. It makes it possible to separate measurement errors from the component corresponding to inefficiency.

Table 3.6. Descriptive statistics of technical efficiency gauges and scale of support from the EU budget

Variable	Mean	Standard deviation	Max	Min	Median	1 quartile	3 quartile
Measure of technical effectiveness	0.367	0.249	0.996	0.081	0.268	0.190	0.445
Measure of scale effectiveness	0.631	0.175	1.000	0.280	0.604	0.504	0.752

Source: own elaboration based on calculations by M. Gospodarowicz according to the Local Data Base of the Central Statistical Office of Poland.

3.7. Summary

Poland's EU membership positively influenced both the macroeconomic environment of agriculture and agriculture, food industry, and rural areas. The most important effects include the drop in the number of farms with the increase in the proportion of the largest farms, drop in the number of people employed in agriculture, as well as increasing concentration and specialisation of agricultural production, improvement in efficiency and competitiveness of food industry, and multifunctional development of rural areas.

The transformation of Polish agriculture and rural areas was financed from farm's own funds and the state budget until the accession. After Poland joined the EU, the European funds contribute significantly to their development. The access to the EU funds meant not only a chance for accelerating the development of agricultural sector, but also a big challenge related to the necessity to take measures with the aim of maximising the use of various instruments applied in the EU as efficiently as possible.

The impact of individual CAP instruments on food economy and rural areas differs. The impact of direct payments, investment programmes and programmes related to multifunctional development of rural areas is the greatest, and the influence of typical social programmes, e.g. support for semi-subsistence farms, is slight. Direct payments are currently the primary support instrument for the agricultural sector in the EU. As they are separated from production (farmer's production decisions do not depend on the aid they receive or a large portion thereof does not depend on production decisions), the market orientation of agriculture and its competitiveness are improving. Direct payments also play a role in supporting agricultural income, and in long-term they are used to co-finance investment in agriculture. At the same time, they lead to growth in agricultural land prices, which makes increasing farm area

and agricultural transformation more difficult, due to limited land resources (particularly with regard to good quality land).

The impact of EU support varies in specific economic classes, production type categories, and regions. The biggest structural changes took place on farms where the proportion of direct payments in income exceeded the national average (large and the smallest farms). In the spatial approach, they were particularly visible in the northern and western part of Poland. In the case of the largest farms, changes in the earliest years of Poland's EU membership consisted primarily in the increase of production area, mainly through lease and reduction in land excluded from use (fallow or idle land). Methods of production have also changes – the increase in cost is a proof of identification. Animal production was also reduced and underwent specialisation. The tendency to adjust production in order to maximise income due to direct payments was also visible, particularly on farms where the level of support was lower (horticultural farms, permanent plantations).

The ongoing changes to agriculture, however, lead to strong polarisation in agrarian structure. The group of market-oriented farms that are economically strong and able to compete across the EU has emerged with the group of self-subsistence farm with social purpose as the opposite. The implementation of investment measures in agriculture contributed to modernisation of the technical production structure of the Polish agricultural sector. Farmers used the support they received primarily to purchase machines and devices, as their machine part was obsolete, and the settlement was easier than settlement of investment in construction. Support for investment was used primarily by large, viable and developing farms. The barrier that stopped many farms, particularly smaller ones, was the necessity of own financial contribution. Investment measures implemented on the basis of public aid contributed to the improvement in competitiveness only in the case of 1/5 of farms across Poland. To a great extent, they also contributed to improvement in work organisation. The problem that remains despite the investments is the ongoing decapitalisation of fixed assets of farms.

Regional research shows that there is a kind of local convergence among rural communes, which is measured by the increase in communes' own income per resident in productive age. The pace of the process, on the other hand, is related to the scale of various financial instruments of agricultural and structural policy, directly or indirectly affect the development of non-agricultural business activity. The scale of financial support from the EU budget has also positive impact on the development of non-agricultural business activity in short term – it affects the growth rate of the number of business entities, employment, and,

to a small extent, it decelerated the increase in unemployment expressed using absolute numbers. The local technical efficiency of financial support, however, is quite low. It can be increased by a definite increase in the scale of support, which is virtually impossible due to EU budget constraints.

The sustainability of the effects of the studied instruments will depend on the type of entities they were allocated to – efficient or rent-seeking ones. A higher level of support, however, was reported in communes with higher economic development level. This means that efficient entities are more likely to obtain assistance. In consequence, such distribution results in increased disparities in the economic development of rural areas. This leads to the question about the model of development that will receive political aid, particularly when there are limited opportunities to support it using public funds.

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4. Competitiveness of sustainable agriculture¹

4.1. Introduction

There are many signs that indicate a growing need to change the development paradigm of the civilisation of *Homo sapiens*. Such need results from both the disadvantages of the previous development, particularly the industrial period, and new constraints and challenges. In the case of agriculture, which has been a part of development of civilisation since the beginning, the disadvantages are materialised in technologies that excessively use non-renewable fossil fuels, harmful emissions to the environment, lower product quality, and negative social impact. New constraints are primarily a result of reaching or even exceeding the limits to the use of natural environment, which is metaphorically referred to as the transition from an empty world to a full one. The basic challenge boils down to feeding growing human population whose diet requires more and more resources without increasing the pressure on the environment. That means that the further increase in agricultural production will have to be achieved by using increasing knowledge (i.e. innovation) and biomass based on the use of solar energy².

The listed resources constitute the material basis for a new paradigm of the development of agriculture – sustainable agriculture. The advisability, or even the necessity, of diverting agriculture to sustainable development is rather commonly accepted. The issue of making agriculture (as well as the entire economy) sustainable lies within the fact that the economic mechanism of free market is not

¹ A synthesis of the research on “The Competitiveness of Sustainable Agriculture” conducted under the Multi-Annual Programme “Competitiveness of Polish Food Economy in the Conditions of Globalisation and European Integration” in 2011-2014. The topic involved three tasks, namely: (1) Alternative forms of agriculture in the strategy for the development of agri-food sector and rural areas, (2) The productivity of various forms of sustainable agriculture, (3) Sustainable agriculture and safe food and health. The synthesis uses materials prepared by Dr M. Kwasek, Dr K. Prandecki, and Dr W. Wrzaszcz.

² J.St. Zegar, *Konkurencyjność rolnictwa zrównoważonego. Zarys problematyki badawczej*, [in:] J. St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (11)*, Multi-Annual Programme 2011-2014, no. 3, IAFE-NRI, Warszawa 2011, pp. 11-42; J.St. Zegar, *Uwarunkowania i czynniki rozwoju rolnictwa zrównoważonego we współczesnym świecie*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (15)*, Multi-Annual Programme 2011-2014, no. 50, IAFE-NRI, Warszawa 2012, pp. 131-189. The synthesis involves an assumption that only works in publications on the subject that include references to rich relevant literature should be referred to.

directly oriented towards food security, food quality, or being environmentally friendly (environmental protection), but towards the accumulation of capital through maximisation of economic benefit (profit). The driving force is competition, which makes the most economically effective entities winners, and the losers are eliminated. The imperative of accumulation – the imperative of growth – works ruthlessly and forces actors to continuous race according to the go or die principle. Thus, economic entities, which in this case are farms, follow the criterion of maximum return on equity, in rarer cases, the maximum work efficiency, and in even rarer cases, the maximum land efficiency (productivity). In principle, the second and the third criterion are subjected to the first one. What is more, the striving for maximum economic benefit (profit) does not take account of external effects. Omission of those effects results in a significant divergence between the microeconomic optimum and the social optimum. The former refers to microeconomic accounts, while the latter refers to macroeconomic (social) accounts. This indicates the need to initiate an institutional factor (a policy) to create such boundary conditions for the market mechanism that would make the result of microeconomic competitiveness as close to the social optimum as possible. And this will happen when market prices will include the total cost of products. The problem is that the political influence opportunities of political institution are increasingly lower at the state level and are transferred to a higher one – regional groups and the entire globe. This shows the sign of the modern times, which is the growing need to study real civilisation development processes at various levels – from a single entity to the global scale.

The outlined thematic scope was the subject of research on the topic of this synthesis. The synthesis is limited to methodological issues, namely sustainability and competitiveness, then to the results of empirical research related to the economics of various forms of farms, productivity of agriculture, food quality and security, as well as relations between the economic and environmental objectives at the level of farms. The final part of the entire work is a traditional recapitulation with conclusions and recommendations.

4.2. The issue of sustainability

Though about 40 years have passed since the term “sustainable development” was introduced, it is still the subject of disputes, which also translates to the understanding of the sustainable development of agriculture and the ways it is implemented. The concept of sustainability (sustainable development) should be considered a fuzzy concept, which is a subject of ongoing analysis and definition of specific indicators that demonstrate progress

in ensuring sustainability. The development of knowledge shifts the cognition towards the centre of the core, but at the same time the core is budding. It is understandable because the process of cognition with regard to such phenomena is infinite. At the same time, two concepts should be distinguished: sustainable agriculture and sustainable development of agriculture³. The former refers to agriculture that complies with certain requirements related to the fields of sustainability: environmental, economic, and social. Thus, it refers to a certain state, i.e. a static approach. The latter refers to change towards the desired (more sustainable) state – i.e. progress and dynamic. New limits, challenges and opportunities resulting from technological progress and accumulated knowledge should be taken into account. The measurement of sustainability of farms and agriculture causes many difficulties. A varying set of economic, environmental and social indicators need to be used⁴.

Sustainability of agriculture (a farm) in terms of environment is made possible by numerous forms, production techniques, and production methods. Some of those forms are products of the progress that has been made in recent

³ J.St. Zegar, *Uwarunkowania i czynniki rozwoju rolnictwa...*, op. cit.; S. Krasowicz, W. Oleszek, *Idea zrównoważonego rozwoju jako płaszczyzna współpracy środowisk naukowych*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa*, Multi-Annual Programme 2011-2014, no. 93, IAFE-NRI, Warszawa 2013, p. 13-27; J.St. Zegar, *Konkurencyjność celów ekologicznych i ekonomicznych w rolnictwie*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa*, Multi-Annual Programme 2011-2014, no. 93, IAFE-NRI, Warszawa 2013, pp. 28-46.

⁴ W. Wrzaszcz, *Czynniki kształtujące poziom zrównoważenia gospodarstw rolnych*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (15)*, Multi-Annual Programme 2011-2014, no. 50, IAFE-NRI, Warszawa 2012, pp. 79-130; T. Toczyński, *Charakterystyka zrównoważenia polskiego rolnictwa w latach 2000-2010*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa*, Multi-Annual Programme 2011-2014, no. 93, IAFE-NRI, Warszawa 2013, pp. 153-171; W. Wrzaszcz, J.St. Zegar, *Sprawność ekonomiczna wybranych form rolnictwa zrównoważonego środowiskowo*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (23)*, Multi-Annual Programme 2011-2014, no. 100, IAFE-NRI, Warszawa 2014, pp. 9-38; J.S. Jankowiak, E.M. Miedziejko, *Emergetyczna metoda oceny wydajności produkcji, zużycia zasobów i zrównoważenia środowiskowego na przykładzie głównych upraw w Wielkopolsce*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (23)*, Multi-Annual Programme 2011-2014, no. 100, IAFE-NRI, Warszawa 2014, pp. 107-123; J.S. Jankowiak, E.M. Miedziejko, *Efekty stosowania różnych systemów uprawy roli, mierzone według świadczonych usług środowiska*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (24)*, Multi-Annual Programme 2011-2014, no. 109, IAFE-NRI, Warszawa 2014, pp. 31-52; A. Mrówczyńska-Kamińska, *Próba wykorzystania bilansu przepływów międzygałęziowych do oceny zrównoważenia sektora rolno-żywnościowego*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (24)*, Multi-Annual Programme 2011-2014, no. 109, IAFE-NRI, Warszawa 2014, pp. 75-105.

decades (such as integrated farming, precision agriculture, ecological farming), while other date back to the former half of the 20th century (e.g. use of the Norfolk crop rotation) or even more distant past (natural farming, organic farming) To some extent, organic farming or ecological farming can be considered ecologically sustainable by definition. Such farming is often not sustainable socially or economically. If a specific form of agriculture meets the minimum threshold in terms of the three orders, it can be deemed sustainable.

The basis of recognition of the forms of farms as organisational and socio-economic units is the category of agricultural systems that differ in the dependency of agriculture on industrial means of production, mainly mineral fertilisers and pesticides, and its influence on the natural environment. This refers primarily to the preservation of the natural potential – particularly the fertility of the soil.

The majority in the Polish agriculture constitutes the conventional farms with various degrees of industrialisation and varying environmental impact. The majority of farms exert moderate pressure on the natural environment both with regard to the use of non-renewable natural resources (mainly energy from fossil fuels) and the emission of substances that contribute to the degradation of the environment. In the dynamic approach, however, increasing industrialisation of agriculture (concentration, specialisation, mechanisation) results in growing threat for the environment.

The subject of attention is a set of certain forms of agriculture that are more environmentally friendly than the average. Four of the numerous forms of agriculture have been selected to present the findings, namely: farms with positive soil organic matter balance, farms that are quasi-sustainable in terms of the environment, organic farms, and Norfolk-type farms.

Farms with positive soil organic matter balance constitute an interesting group due to the role of soil organic matter (humus) and the negative tendency to reduce it with growing grain production specialisation and abandonment of animal husbandry by a growing percentage of farms. Positive soil organic matter balance is a proof of good crop rotation, which facilitates enriching soil with humus through the decomposition of organic matter in the soil, which guarantees proper nutrition of crops throughout the entire growing season. The balance should not be negative. Several years of negative balance can result in the degradation of the soil, the loss of its fertility and productivity. The result of degradation is the release of a large amount of mineral ingredients, including carbon and nitrogen, which leads to ground and surface water pollution⁵.

⁵ J. Kuś, J. Kopiński, *Gospodarowanie glebową materią organiczną w kontekście zmian zachodzących w polskim rolnictwie*, [in:] J. St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (11)*, Multi-Annual Programme 2011-2014, no. 3, IAFE-

Quasi-sustainable farms meet the accepted criteria of environmental friendliness which result from the principles of rational farming and legal standards. Agricultural production that respects the natural resources is made possible by skilful crop rotation (multi-species crop rotation) and fertilisation adjusted to soil richness and type. The following environmental sustainability (environmental friendliness) criteria have been adopted with regard to farms: percentage of cereals in cropping patterns on arable land (up to 66%), number of crops growing on arable land (at least three), coverage of arable land with vegetation for winter (at least 33%), livestock density (up to two large animals per hectare of agricultural land)⁶.

Organic farms apply environmentally friendly methods of agricultural productions that are certified by an authorised body or are switching to such a production system under its control. The main principle of ecological farming is cultivation of crops according to the good agriculture standards with due care for phytosanitary condition of plants and soil protection, as well as preservation of permanent grassland and landscape elements that are not used for agriculture. Such farms function on the basis of specific Polish and EU legal regulations⁷.

Norfolk-type farms are characterised by rich field cropping patterns, which positively influence soil fertility and makes it possible to use the so-called four-field crop rotation. Cropping patterns in the Norfolk system – 50% cereals, 25% soil-enriching crops (legumes, fodder crops), and 25% root crops – is the most desired ones because it guarantees cereal cultivation following good forerunner crop, i.e. non-cereal. Application of diverse crop rotation including legumes and aftercrops is necessary to maintain desired soil properties

-NRI, Warszawa 2011, pp. 43-68; W. Wrzaszcz, *Czynniki kształtujące poziom zrównoważenia gospodarstw rolnych...*, op. cit.; A. Harasim, *Kierunki zmian w organizacji i technologii produkcji rolniczej a zrównoważony rozwój gospodarstw*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa*, Multi-Annual Programme 2011-2014, no. 93, IAFE-NRI 2013, pp. 71-88; J. Kuś, *Specjalizacja gospodarstw rolnych a zrównoważony rozwój rolnictwa*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (19)*, Multi-Annual Programme 2011-2014, no. 68, IAFE-NRI, Warsaw 2011, pp. 68-127; W. Wrzaszcz, J.St. Zegar, *Sprawność ekonomiczna wybranych form rolnictwa...*, op. cit.

⁶ W. Wrzaszcz, *Czynniki kształtujące poziom zrównoważenia gospodarstw rolnych*, op. cit.

⁷ H. Runowski, *Rolnictwo ekologiczne w Polsce – stan i perspektywa*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (15)*, Multi-Annual Programme 2011-2014, no. 50, IAFE-NRI, Warszawa 2012, pp. 38-78; W. Wrzaszcz, *Czynniki kształtujące poziom zrównoważenia gospodarstw rolnych*, op. cit.; W. Wrzaszcz, J.St. Zegar, *Sprawność ekonomiczna wybranych form rolnictwa...*, op. cit.

– ensuring lasting soil fertility, which is one of the basic requirements of sustainable agricultural activity at the farm level⁸.

4.3. Competition

The term competition has recently grown nearly to the level of a paradigm – a categorical imperative. Competition is often considered a remedy for all kinds of problems. It is important to distinguish economic (market) competition and social competition⁹. The former omits external impact related to the production of market goods that are important for welfare of the society. In principle, it is microeconomic in nature and concerns economic entities. Such competition in an ideal market economy allows efficient economic entities to maximise their economic benefit, and at the same time it limits production and even eliminates less efficient (non-competitive) entities. The final consequence of competition may turn out negative from the social perspective due to omission of external impact. The latter, social competition, takes account of external impact, at least to some extent, and is macroeconomic in nature. The appraisal of the impact is a serious problem which is far from being solved¹⁰.

Competition takes place at various levels, which may be classified into three kinds for the sake of simplicity: microeconomic (a farm), macroeconomic (national agriculture), and planetary (Table 4.1). In each case, the entities participating in the competition vary, different competitiveness criteria and kinds of rationality are used¹¹.

⁸ J. Kuś, J. Kopiński, *Gospodarowanie glebową materią organiczną...*, op. cit.; W. Wrzaszcz, *Czynniki kształtujące poziom zrównoważenia gospodarstw rolnych*, op. cit.

⁹ J.St. Zegar, *Konkurencyjność rolnictwa zrównoważonego. Zarys problematyki badawczej*, op. cit.; J.St. Zegar, *Konkurencyjność celów ekologicznych i ekonomicznych w rolnictwie*, op. cit.

¹⁰ A. Graczyk, K. Kociszewski, *Teoretyczne i aplikacyjne aspekty wyceny środowiskowych efektów zewnętrznych w rolnictwie*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (19)*, Multi-Annual Programme 2011-2014, no. 68, IAFE-NRI, Warszawa 2013, pp. 43-94; R. Baum, *Metodyka wyceny efektów zewnętrznych w rolnictwie*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (23)*, Multi-Annual Programme 2011-2014, no. 100, IAFE-NRI, Warszawa 2014, pp. 73-106.

¹¹ J.St. Zegar, *Konkurencyjność rolnictwa zrównoważonego. Zarys problematyki badawczej*, op. cit.; W. Szymański, *Racjonalność globalna a konkurencyjność ekonomiczno-społeczna rolnictwa*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (19)*, Multi-Annual Programme 2011-2014, no. 68, IAFE-NRI, Warszawa 2013, pp. 9-42; K. Prandecki, *Racjonalność planetarna w rolnictwie i gospodarce żywnościowej*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (24)*, Multi-Annual Programme 2011-2014, no. 109, IAFE-NRI, Warszawa 2014, pp. 53-74.

Table 4.1. Features of competition at the basic level

Level	Entity	Competitiveness criterion	Kind of rationality
Microeconomic	Economic entity: producer, consumer	Economic benefit	Private
Macroeconomic	State	Social benefit	Social
Planetary	International organisations NGO networks	Existential benefit	Planetary

Source: Zegar J.St., *Konkurencyjność celów ekologicznych i ekonomicznych w rolnictwie*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa, Multi-Annual Programme 2011-2014, no. 93, IAFE-NRI, Warszawa 2013, pp. 28-46.*

Competition on the product market, when resources are limited and/or their quality vary, is simultaneously competition for resources. In the case of agriculture, the following resources are particularly important: land, water, fossil fuels, and biodiversity. Competition between economic and non-economic sectors (including nature – ecosystems) for those resources is increasing – particularly at the planetary level¹². On the other hand, the result of the competition on the agri-food market is important for food security (supply), economic welfare, particularly reducing poverty (price), and health (quality).

In general, two conclusions related to competitiveness are particularly important. The former is that the mechanism of competitiveness usually results in a surplus of negative effects and insufficient positive effects (public commodities) due to known deficiencies of the market. The latter is that economic competition results in privatisation of benefits and socialisation of losses¹³.

4.4. Economics

Polish agriculture has preserved its family nature, avoided soil pollution that would result from excessive use of mineral fertilisers and application of chemical plant protection products and avoided excessive concentration of animal production, the disparity in income has dropped, the education level of farm users has significantly increased, and the technical infrastructure in rural areas has improved greatly. Alarming tendencies include excessive loss of agricultural land, abandonment of animal husbandry (about 40% of farms above 1 hectare of agricultural land do not keep farm animals), negative soil organic matter balance

¹² J.St. Zegar, *Uwarunkowania i czynniki rozwoju rolnictwa zrównoważonego...*, op. cit.

¹³ J.St. Zegar, *Konkurencyjność celów ekologicznych i ekonomicznych w rolnictwie*, op. cit.

in more than a half of farms, as well as increasing use of chemical fertilisers and plant protection products following a significant drop during the transition period, and excessive percentage of cereals in cropping patterns¹⁴.

Farms where renewal of soil organic matter has been ensured are a most numerous group among the selected forms of sustainable agriculture (40% of private farms with at least 1 hectare of agricultural land), while other groups under analysis (4% – quasi-sustainable farms, 3% Norfolk-type farms, 1% ecological farms). Such distribution of farms was significantly different from the state desired in the context of sustainable development of agriculture. The reasons for such state of affairs can be seen in insufficient support for such forms of agriculture, both with regard to finance and marketing, as well as – probably primarily – their weaker competitive position on the market.

The average picture of the selected forms of farms is shown by table 4.2. The comparison of the presented data clearly shows that an average ecological farm had the greatest production potential: it had 3.7 times more agricultural land compared to an average farm in the studied group, had 1.5 times more livestock, and the number of people worked there was higher by a fifth. Similar relations with regard to crop and animal production have also been noted in quasi-sustainable farms.

The studied forms of sustainable agriculture had bigger area than average farms, which particularly concerns ecological and quasi-sustainable farms (the average area of a private farm was 9 hectares, an organic farm had 32 hectares, a sustainable farm – 20 hectares, a Norfolk-type farm and a farm with positive soil organic matter balance had more than 10 hectares). It indicates the importance of the area of a farm for the possibility to use pro-environmental agricultural practices. Each of the studied alternative forms of sustainable agriculture requires diverse agricultural practices, including multi-species crop rotation and safe application of means of production. Such practices are easier to implement in larger farms, which is the ground for advisability of land concentration in Polish agriculture, also due to the implementation of the idea of sustainability. The greater the farm area, the easier it is to reconcile environmental and economic objectives.

Greater production potential of sustained forms of agriculture has also been stressed by labour resources – both their quantity and quality, which is expressed by the qualifications of the farm manager. Greater involvement of work units on more environmentally friendly farms is related to their area. Sustainable forms of agriculture, particularly organic farms, are more frequently managed by people with higher education level and professional qualifications

¹⁴ T. Toczyński, *Charakterystyka zrównoważenia polskiego rolnictwa w latach 2000-2010*, op. cit.

for work on farm in the form of agricultural school diploma. In the case of such farms, managers need better knowledge, skills and environmental awareness compared to owners of conventional farms. In the case of the latter, particularly on highly specialised farms, such knowledge is provided together with industrial means of agricultural production. Farmers that have larger farms are also characterised by higher qualifications. The findings are statistical evidence that qualifications of farm managers condition the opportunity and scope of implementation of environmentally friendly agricultural practices, and thus they determine the quality of farming.

Table 4.2 Average characteristic of farms and studied forms of sustainable agriculture in general

Specification	Farms				
	Total	SOMB+	SUS	ECO	NORF
Agricultural land (hectares/farm)	8.86	10.24	20.14	32.37	10.19
Labour input (AWU/farm)	1.24	1.28	1.73	1.46	1.19
Farm animals (LU/farm)	4.26	4.58	7.76	6.28	4.05
Standard production (thousands of euro/farm)	11.11	12.06	23.88	29.94	10.08
Standard gross margin (ESU/farm)	4.25	4.89	9.65	9.01	3.61

SOMB+ – farms with positive soil organic matter balance; SUS – quasi-sustainable farms; ECO – organic farms; NORF – farms using Norfolk crop rotation.

Source: W. Wrzaszcz, J.St. Zegar, *Sprawność ekonomiczna wybranych form rolnictwa zrównoważonego środowiskowo*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (23)*, Multi-Annual Programme 2011-2014, no. 100, IAFE-NRI, Warszawa 2014, pp. 9-38, based on FADN data.

An important factor that contributes to undertaking pro-environmental activity is a farmer's age. Farms where the above forms of sustainable agriculture are used were often managed by relatively younger people. Young farmers managed medium and large farms more often, while a significant portion of people who have reached retirement age ran small farms. The findings indirectly point to the fact that people who are better prepared for the job (i.e. those with agricultural education diplomas) and younger people with academic degrees are more often interested in managing large farms (taking them over or buying them), or their skills and farm management methods result in the significant accumulation of fixed assets. On the other hand, small farms are to a large extent the object of interest of people who have reached retirement age and who are additionally active in agriculture on a small scale.

The economic situation of the farms of sustainable agriculture has been evaluated through the production volume, the manner of its allocation, and the livelihood of the farmer's family. The research has shown that the market

activity of farms with pro-environmental agricultural production exceeds the average. More such farms are oriented towards sales on the local market as well. It regards particularly organic farms, which should be deemed positive, as shortening the food chain in the case of “sensitive” ecological products is beneficial for both the consumer and the producer. On one hand, the final recipient can directly verify the product they purchase by exchanging information with the producer and can influence its price (possible negotiations and elimination of further price components due to the shorter food chain). On the other hand, sales on the local market limits the potential risk of losses (e.g. related to transport and storage), and the whole economic surplus reaches the producer.

Greater production potential of the said forms of farms facilitates also economic sustainability. It is proved by the relatively larger percentage of farms that are the basic livelihood for the farmer’s family. It concerns particularly quasi-sustainable and ecological farms. Those two groups of farms are distinguished by their best economic structure. The greater the farm, the higher percentage of families that live on farm income (work on their own farm), and the lower the percentage of families that earn their living from employment or social benefits (retirement or structural pensions).

What should be stressed is the activity of organic and Norfolk-type farms outside the field of agriculture. Such farms have obtained additional funds on the basis of the resources and assets of the farm (workforce, land, buildings, machine park, etc.). Compared to other studied groups, organic and Norfolk-type farms more frequently ran businesses that were directly related to their agricultural activity (it was production or provision or services on their own account). The assets of those farms made it possible to undertake agritourism activity, and in the case of organic farms, start processing agricultural products. Such integration of activity outside the agriculture, which supplements the agricultural activity, made it possible to use resources in a way that brought both economic and environmental benefits, particularly in the case of organic and Norfolk-type farms.

Average productivity (measured using the value of standard production per farm and AWU) of most of the studied forms of sustainable agriculture positively distinguished them among private farms. To a great extent, those relations resulted from the differences in the production potential of the studied groups of farms. Average results in relation to a unit of area, however, were comparable in the case of quasi-sustainable farms and farms with positive soil organic matter balance, while in the case of organic and Norfolk-type farms they were lower by as much as 25%. The presented forms of sustainable agriculture are related to the market to a various extent, which is a consequence of their

production capacity and the specific nature of their production. At the same time this is a reason for separate treatment of the alternative forms of agriculture in question, at least with regard to government-funded support and development programmes.

Extent and direction of the change in the standard production and standard gross margin per area unit indicates that the economic results of increase in the area of the studied farm groups differ. Land productivity measured using standard production and standard gross margin increases with the area of a farm – except organic farms – but this does not concern the largest farms (50 or more hectares).

4.5. Productivity

In the conventional approach, productivity is the relation between outputs and inputs or resources appraised by the market. The relation omits the so-called external impact – both with regard to inputs and outputs. Thus, it fails to include important factors – primarily those related to the environment, such as water, biodiversity, greenhouse gas, and soil organic matter. As a result, the application of contemporary productivity evaluation methods to sustainable agriculture is limited. Progress in this regard has been made due to the development of the total social factor productivity (TSFP). In its previous forms, it usually includes inputs, but omits positive external impact. Such approach gives results that are favourable for conventional agriculture, while the results related to sustainable agriculture are lowered. Products – goods and services – provided by agriculture, especially its sustainable branch, are not only important for human welfare and good condition of the environment but are necessary to preserve conditions for life on planet Earth.

FADN data time series has been used in the study of productivity of Norfolk-type and organic farms, while the analysis of changes to inputs and outputs (particularly with regard to energy and land) used economic accounts for agriculture (EAA).

The findings show that both in the case of organic and Norfolk-style farms productivity is lower than in the case of corresponding control groups. What is more, the applied cultivation techniques, including crop rotation, result in noticeable increase in advantage of Norfolk-type farms over organic farms with regard to land productivity (Table 4.3). This leads to the conclusion that environmentally friendly forms of agriculture cannot cope with market competition without state aid.

Table 4.3. Land productivity of Norfolk-type and organic farms
in 2005-2012 (PLN/hectare, current prices)

Farms	2005	2006	2007	2010	2011	2012
Norfolk-type	3,082	3,502	4,176	3,941	4,708	4,860
Organic	2,386	2,710	3,096	2,809	3,101	3,291

Source: Z. Floriańczyk (ed.), J. Buks, S. Jarzębowski, *Z badań nad rolnictwem społecznie zrównoważonym (22). Produktywność różnych form rolnictwa zrównoważonego i konwencjonalnego, Multi-Annual Programme 2011-2014, no. 79, IAFE-NRI, Warszawa 2013.*

The statistical analysis of land and labour productivity and profitability at Norfolk-style, organic, quasi-sustainable farms, farms that take part in the agri-environmental programme, and control group farms (specialised farming) used 2012 Polish FADN data. The findings (Table 4.4) show the lower land productivity in more environmentally friendly farms. Depending on the size of the farm, the differences may change, and the highest productivity is achieved by farms with 25-50 hectares of land. In exceptional cases, high productivity is achieved by the smallest farms, i.e. in the 1-5 ha group, which results from the presence of entities additionally involved in growing fruit or raising animals. Land productivity is definitely lowest in the case of organic farms.

Table 4.4. Land and labour productivity and productivity in various forms
of farms, FADN 2012

Details	Control group	Organic	Agri-environmental programmes	Norfolk-type	Quasi-sustainable
Production/ha (PLN/ha)	7,303	3,083	6,044	6,611	6,501
Farm income (PLN/ha)	2,731	1,834	2,718	2,605	2,747
Production (PLN/AWU)	133,610	61,138	139,708	116,192	140,453
Income (PLN/FWU)	57,699	44,620	71,311	5,027	66,805

AWU – annual work unit (family and employees); FWU – family work unit.

Source: K. Prandecki (ed.), W. Wrzaszcz, J. Buks, M. Bocian, *Z badań nad rolnictwem społecznie zrównoważonym (25). Produktywność wybranych form rolnictwa zrównoważonego, Multi-Annual Programme 2011-2014, no. 112, IAFE-NRI, Warszawa 2014.*

As far as labour productivity is concerned, increased efficiency of the use of labour resources can be noticed in the case of quasi-sustainable farms and farms that implement the agri-environmental programme. This also translates into their profitability. This shows that farmers who use environmentally

friendly practices choose them not only due to the environmental criteria, but primarily for their own benefit. Just like in the case of land productivity, the results achieved by organic farms are definitely worse¹⁵.

In the case of evaluation of change in input and productivity measured based on the EAA data, it can be observed that productivity of input in the technical (quantitative) approach increased in 1999-2012, while it declined in the value-oriented approach, i.e. when the price scissors that were unfavourable for agriculture are included. Transfers related to CAP compensated that with a certain surplus (increase in productivity by 3 percentage points)¹⁶.

4.6. Food quality and safety

The issue of food quality and safety is the subject of increasing interest around the world. It particularly regards highly developed countries. Human health is not only influenced by following nutritional recommendation, but also by the quality of agri-food products¹⁷.

Food safety means taking care to prevent risks for the consumer's life and health, to ensure health and well-being of plants and animals, maintain environment around people, agricultural production and processing, as well as care for the consumer's economic security. The most important factors that affect food quality and safety include: environment (quality of soil, air and water), quality of plant and animal agricultural products, processing, distribution, food-related legislation (national and EU), and the control and certification system.

¹⁵ J. Buks, Z. Floriańczyk (ed.), T. Toczyński, *Zagadnienia produktywności w strategiach rozwoju w odniesieniu do gospodarstw zrównoważonych*, Multi-Annual Programme 2011-2014, no. 27, IAFE-NRI, Warszawa 2011.

¹⁶ K. Prandecki (ed.), W. Wrzaszcz, J. Buks, M. Bocian, *Z badań nad rolnictwem społecznie zrównoważonym (25). Produktywność wybranych form rolnictwa zrównoważonego*, Multi-Annual Programme 2011-2014, no. 112, IAFE-NRI, Warszawa 2014.

¹⁷ M. Kwasek (ed.), B. Brzostek-Kasprzak, W. Michna, M.W. Obiedziński, *Z badań nad rolnictwem społecznie zrównoważonym (13). Jakość i bezpieczeństwo żywności a zdrowie konsumenta*, Multi-Annual Programme 2011-2014, no. 8, IAFE-NRI, Warszawa 2011; M. Kwasek (ed.), B. Brzostek-Kasprzak, A. Obiedzińska, W. Piotrowski, *Z badań nad rolnictwem społecznie zrównoważonym (17). Ocena stanu żywienia ludności w Polsce w aspekcie bezpieczeństwa żywnościowego*, Multi-Annual Programme 2011-2014, no. 59, IAFE-NRI, Warszawa 2012; M. Kwasek, A. Obiedzińska, *Spożycie żywności a środowisko*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa*, Multi-Annual Programme 2011-2014, no. 93, IAFE-NRI, Warszawa 2013, pp. 139-152.

Food quality and safety have to be ensured throughout the agri-food chain: “from the field to the table”. In the case of crop production, both cultivation and harvesting conditions are important because they influence the chemical composition and nutritional value of fresh or processed plant products, their aesthetic value (taste, smell, texture, colour), natural pollution and antioxidant content. In the case of animal production, the important factors include: nutrition, animal health and well-being, transport and slaughtering conditions. Those factors affect the quality and safety of meat and meat products.

As far as food safety is concerned, it is necessary to remember that the formation of compounds that affect the consumer’s health negatively during processing and meal preparation, especially the thermal processes, remains a problem. The issue regards organic and conventional food to an extent.

The natural environment is important for both the quality of healthy food produced in the specific area and its nutritional value. Chemicalisation of the natural environment and the related commonness of various dangerous and harmful chemical substances inevitably results in the presence of such substances in food.

Physical properties of food are determined by storage and distribution conditions. The factors that are important for food product quality at that stage include: limited shock number and intensity during transport (e.g. in the case of soft fruit), appropriate temperature, storage time, air humidity and composition, manual processing conditions, and application of plant protection products. Processing techniques also have specific effects for food quality.

The importance of food safety is expressed by relevant legal regulations. In the case of the European Union, the most important document from the field of food laws is Regulation (EC) No. 178/2002 of the European Parliament and the Council of 28 January 2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food security. Its purpose is to guarantee that food on the market has been produced in accordance with existing regulations and is free of physical, chemical and microbiological pollutants. This is the aim of the control and certification system, whose most important aspect is full identification of the origin of agri-food products – from the production of raw materials on the farm to the final processed food product. The possibility of tracking food, fodder, animals intended for food or substances intended to be included in food or fodder throughout all the stages of production, processing and distribution is referred to as traceability.

There are no grounds to claim that organic products are better than conventional in terms of the consumer’s health, though the former are characterised by a definitely lower level of pollution with residues of plant

protection products, persistent organic pollutants, and heavy metals. What is more, organic products are associated with care for work and living environment as well as well-being of plants and animals

Improvement in the financial situation of societies and the growing consumers' awareness of the influence of food on health and environment lead to increasing interest in safe food, which contributes to growing demand for high quality food. Among the consumers with high income there is a tendency to reduce consumption of mass produced food products in favour of regional, traditional and organic products¹⁸. The 2012 study by TNS Polska show that 4% of consumers regularly buy organic food and 25% buy it from time to time (due to its price), but would like to do so more often.

According to the 2010 Eurobarometer study, nearly half of the EU residents (48%, and 53% in Poland) are afraid of health decline caused by food. The concern is related to such issues as pesticide residues in fruit, vegetables and cereals, antibiotic or hormone residues in meat, food quality and freshness, use of additives (dyes, preservatives), use of genetically modified organisms, and well-being of farm animals. The 2012 Eurobarometer study on food quality, agriculture and rural areas shows that the definite majority of EU citizens consider food quality (96%, 95% in Poland) and price (91%, 94% in Poland) very or quite important when they buy food¹⁹.

4.7. Economic and environmental objectives: collision or harmony?

Division of natural resources between economic objectives that contribute to material welfare and environmental objectives that are necessary for sustainable development is particularly important nowadays. The principal role in this division is played by market mechanisms, especially economic competition. Omission of external impact by that mechanism results in the discrepancy between the economic and the social optimum. The research on the subject based on the FADN data has shown that greater economic potential of farms makes it possible to keep agricultural production at higher sustainability level, but in the case of the environmental issue, this dependency is related to certain constraints²⁰. On one hand, it has been found that the largest farms (above 40 ESU) pose the greatest threat to the environment, and on the other

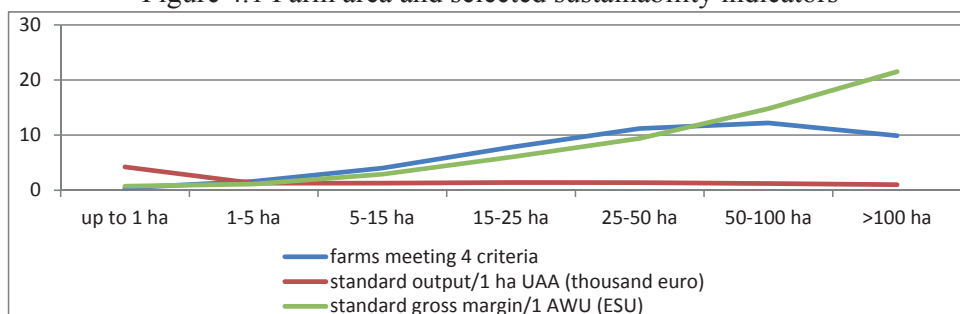
¹⁸ B. Brzostek-Kasprzak, M. Kwasek (ed.), A. Obiedzińska, M.W. Obiedziński, *Z badań nad rolnictwem społecznie zrównoważonym (21). Żywność ekologiczna – regulacje prawne, system kontroli i certyfikacji.*, Multi-Annual Programme 2011-2014, no. 80, IAFE-NRI, Warszawa 2013.

¹⁹ Ibidem.

²⁰ W. Wrzaszcz, *Czynniki kształtujące poziom zrównoważenia gospodarstw rolnych*, op. cit.

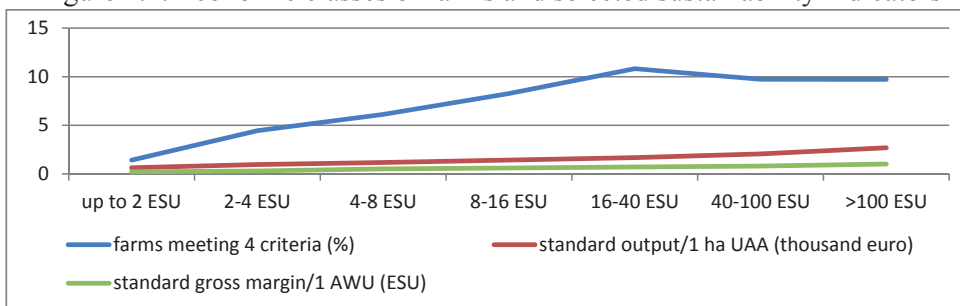
hand, agricultural production in small ones (particularly in the 2-4 ESU group) is also insufficiently sustainable in this regard. These findings are confirmed by the 2010 National Agricultural Census data, which served as the basis for analysis of sustainability of private farm groups according to the area of agricultural land and economic size classes (Fig. 4.1 and 4.2).

Figure 4.1 Farm area and selected sustainability indicators



Source: J. St. Zegar, *Konkurencyjność celów ekologicznych i ekonomicznych w rolnictwie*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa, Multi-Annual Programme 2011-2014, no. 93, IAFE-NRI, Warszawa 2013, pp. 28-46.*

Figure 4.2. Economic classes of farms and selected sustainability indicators



Source: J.St. Zegar, *Konkurencyjność celów ekologicznych i ekonomicznych w rolnictwie*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (20). Wybrane zagadnienia zrównoważonego rozwoju rolnictwa, Multi-Annual Programme 2011-2014, no. 93, IAFE-NRI, Warszawa 2013, pp. 28-46.*

The percentage of farms that meet four criteria of sustainability at the same time (percentage of cereals, wintertime plant cover, plant groups and livestock density per 1 hectare of agricultural land) has been adopted as the measure of environmental sustainability. The indicator used to measure land productivity – which is important for food security – was the size of standard production per hectare of agricultural land (thousand of euro), and the standard gross margin per annual work unit has been adopted as a synthetic measure of

labour productivity (ESU/AWU). Policy may mitigate the conflict between the objectives. CAP has particularly good results with regard to sustainable development of agriculture, especially due to the agri-environmental programme, the cross-compliance principle, and the so-called greening²¹. In the light of the statistical dependency between the area and sustainability of farms, regulations related to land trade play an important role²².

4.8. Summary

The new situation with regard to challenges and development conditions for agriculture requires directing the development in accordance with the principles of sustainability, because only such development may ensure long-term food security and preserve the value and numerous functions of the environment. This determines continuous renewal of the natural basis for agricultural production, the amount of biomass that is produced, and the quality of food products.

The natural basis for agricultural production means primarily the preservation of soil fertility, biodiversity, use of renewable resources according to their renewal rate (which particularly regards water), and gradual reduction of use of non-renewable fossil fuels.

Increasing the productivity of agriculture – land productivity, i.e. increasing the biomass – is necessary to cope with the challenge of feeding the world – food security. In practice, increase in the volume of agricultural production may take place due to the intensification of production. There are two basic options in this regard, namely: industrial intensification (increase in the use of means of production of industrial origin – non-renewable fossil fuels) and agroecological intensification (use of knowledge of relations in nature). The latter refers to such agricultural practices that make it possible to produce more using a specific resource without violating ecosystem stability.

Food quality, which is very important for health and social well-being, depends on the agricultural system and other links of the food chains. The most important factors in this regard include: the environment (soil, air and water quality), agricultural (plant and animal) product quality, processing, distribution, food laws, and the control and certification system.

²¹ K. Kociszewski, *Ekologiczne aspekty zmian Wspólnej Polityki Rolnej a zrównoważony rozwój polskiego rolnictwa*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (23)*, Multi-Annual Programme 2011-2014, no. 100, IAFE-NRI, Warszawa 2014, pp. 124-157.

²² A. Majchrzak, *Obrót gruntami rolnymi jako determinanta zrównoważonego rozwoju rolnictwa*, [in:] J.St. Zegar (ed.), *Z badań nad rolnictwem społecznie zrównoważonym (24)*, Multi-Annual Programme 2011-2014, no. 109, IAFE-NRI, Warszawa 2014, pp. 106-127.

In the nearest future, global agriculture will not only have to provide more food, but also improve its quality under conditions of climate change (floods, droughts), reduced access to land and water, decreasing biodiversity, new plant and animal diseases, increasing speculation on agricultural raw materials market, growing disproportion and rate of natural increase, and increasing consumers' requirements with regard to food. Coping with that challenge requires using the advantages of conventional and sustainable agriculture with the long-term orientation towards the latter. The reason for this is that reconciling the (economic, environmental, social) requirements of sustainable development of agriculture and the entire food system is easier in the sustainable agriculture model, which is less economically effective than the industrial model. Thus, the state policy should mitigate the divergence between the aims in this field. In practice, the said divergence is mitigated by the evolution of the industrial model in the pro-environmental direction (precision agriculture, integrated farming) and growing economic efficiency of the sustainable model.

Sustainability level of farms is positively correlated with the area of agricultural land and the economic size – standard gross margin. The shape of the correlation approximates a parabola, i.e. after a certain area or economic size is reached, the value of some sustainability indicators drops. This also regards the land productivity per unit. The findings of the analysis of alternative forms of agriculture indicate the need to continue the transformation of the agrarian structure of Polish agriculture towards moderate land concentration, i.e. family farms primarily based on family labour. Such concentration of land is favourable for the sustainable development of agriculture and rural areas, increase in competitiveness, growth in agricultural income for farms, and it contributes to the overall social and economic development of the country. To some extent, smaller area of farms can be compensated by increased cooperation between farms and other entities (cooperatives, partnerships, clusters).

Sustainable agriculture offers food that has been produced using minimum quantity of fertilisers and plant protection products, and it is oriented towards such use of natural resources that does not destroy their sources, but allows further generations of producers and consumers to satisfy their basic needs. Thus, the implementation of sustainable agriculture, which produces organic food using traditional technologies, regional food, i.e. the so-called niche food, which is increasingly demanded on the market, which is determined by the improvement in the financial situation and the growing customers' awareness of issues related to health and environment. Such food may play an important role

in rural development, and it may also be a chance for Poland to gain competitive advantage on the global market.

The agricultural development policy must be guided by certain values because long-term objectives cannot be set and a relevant development strategy cannot be defined otherwise. Effective policy requires holistic approach to agriculture in a systemic manner and orientation to use the synergy effect. This primarily regards the integral approach to development components: the environment, agriculture, agri-food processing, food security, and good health. This should guide political activity that meets the flexibility criterion and relations between competitiveness (market) and cooperation should be subjected to that. At the moment, such activity is barely expressed in legal legislation and government (public) programmes, which contribute to broader implementation of selected pro-environmental practices, and thus to development of various forms of sustainable agriculture, through conditional funding.

The policy has to take account of the fact that productivity is not only related to commercial commodities, but also numerous goods and services that accompany the production process. Traditional (total and partial) productivity analysis methods are limited to products that are appraised by the market and omit the latter. Economic appraisal of water, soil fertility, biodiversity, greenhouse gas emission, and carbon absorption is particularly important.

The necessary conditions for the development of environmentally friendly agriculture and processing include: creation of legal and financial mechanisms for supporting farmers switching from conventional agriculture, availability of counselling services, and high credibility of certification and state support in the society.

A specialised pollution and chemical residue (chemical risks) monitoring systems as well as critical quality and traceability criteria, which would cover the entire food organic chain in terms of time and space for increasing credibility of declaration with regard to health and safety concerning organic food and its origin, are lacking. Ensuring health and economic security of consumers requires systemic solutions with regard to protection of food products against intended biological, chemical, physical or radiological pollution across the entire agri-food chain – “from the field to the table”.

The inalienable right of economic entities is the right to be guided by the microeconomic efficiency criterion, and the inalienable responsibility of the state is to be guided by the social efficiency criterion. The minimisation of the divergence between the two requires a set of political instruments that promote the protection of public good and minimisation of the negative external impact. Free market omits those important elements and forces economic activity that

exclusively follows the principle of economic competitiveness. Without the necessary care for the common good taken by political institutions, economic entities that follow socially-oriented principles will constitute a mere niche in Polish agriculture.

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5. Budget grounds for improvement of the competitiveness of the Polish agriculture

5.1. Introduction

Competitiveness is a term that has become astonishingly popular in recent years. It has started to be used thoughtlessly, and in Poland, it is often not defined at all. Sometimes competitiveness is even confused with effectiveness, which seems way too much. Thus, an accurate definition by Freebairn is worth quoting: “competitiveness is an indicator of the ability to supply goods and services in the location at the time they are sought by buyers, at prices that are as good as or better than those of other potential suppliers, while earning at least the opportunity cost of returns on resources employed”¹. There is also another term that should be explained – competitive capacity. In a very general sense, it is a lasting profitability and preservation of market share. If we are to specify this category in the field of the sector and an enterprise, we can say that it is a lasting ability to gain and maintain share in the local, regional, national and international market when the access to it has been liberalised². The above implies that being competitive means for a farm/business nothing other than to maintain the potential and capacity to survive and develop. In order to be competitive, an enterprise has to be effective, and not only in the operational (better performance of routine, repetitive tasks than the competition), but also the strategic sense (a unique manner of operation, different from the competitors). Only after these two aspects of competitiveness³ have been achieved, there is a chance to attain relatively stable competitive advantage. If an entity fails to become a leader in terms of effectiveness, the environment can easily take over a portion of economic surplus produced by a specific enterprise, particularly when suppliers and recipients have greater bargaining power, which is common in agriculture.

There are many conditions that affect competitiveness, but this chapter focuses only on the determinants from the field of public finance. Thus, the issues covered will include various budget spendings, taxes, and quasi-fiscal

¹ The above definition comes from W. Brandesem, *Wettbewerb in der Landwirtschaft aus Sicht der evolutarischen Ökonomik “Agrarwirtschaft”*, Jahrgang 49, Heft 8, 2000.

² Ibidem.

³ G. Osbert-Pociecha, *Twórcza destrukcja jako uwarunkowanie konkurencyjności przedsiębiorstwa*, “Gospodarka Narodowa” 2004, No. 7-8.

charges. The general research assumption is that it is difficult to define the sum of the pure impact of budget instruments on the competitiveness of agriculture and farms because they have many social and economic purposes at the same time, and these purposes are mutually complementary and independent, but also compete with one another.

5.2. The influence of the “agricultural budget” on functioning and competitiveness of agriculture

The Polish accession to the EU resulted in fundamental changes, not only to the scale, but also the structure of support for agriculture. It should be stressed here, that the perspective of the “agricultural budget” includes the issue of support for rural development, which reaches beyond the limits of the agricultural sector. As far as national spendings on agriculture are concerned, the increase was particularly large in 2004-2009, when the dynamic was greater than in the case of the entire national budget. A definite decrease was noted after 2009. To a large extent it is only apparent and it is related to the fact that before 2010, funds for agriculture included a loan for pre-financing of the CAP. The allocation of the amount in Bank Gospodarstwa Krajowego results in the fact that it is impossible to compare spendings on various purposes before and after 2010⁴.

A broader analysis of the national and the EU budgets allocated to support for agriculture and rural development in longer term shows that both the scale and structure of those expenses systematically change, and the direction is not always clearly marked. The phenomenon is similar in other countries, e.g. the USA. Undoubtedly, important factors that determine such changes include the balance of forces among the policy makers, the condition of public finance, the general prosperity, trade agreements, and particularly, decisions taken by the WTO.

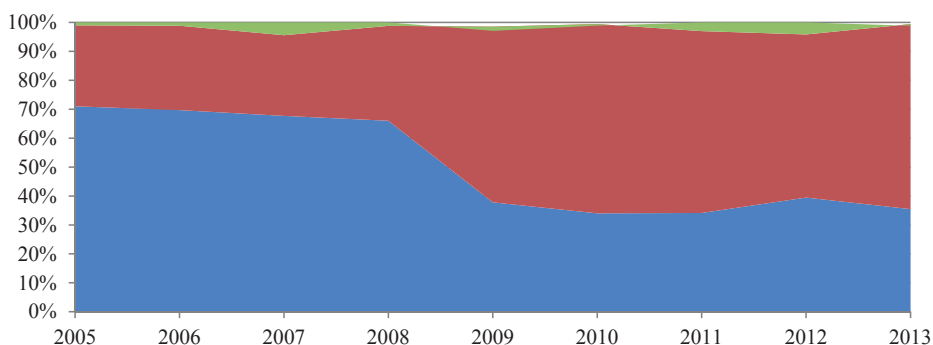
The structure and the scale of support is not without influence on agriculture and its competitiveness. An analysis of the impact of CAP funds on Polish economy and agriculture confirmed the findings of the research on previous programming periods⁵ and demonstrates that the greatest effect can be expected if the spendings on investment instruments increase⁶.

⁴ A. Czyżewski, A. Matuszczak, *Krajowy i unijny budżet rolny dla Polski. Próba określenia proporcji, współzależności oraz efektów dla sektora rolnego*, [in:] A. Czyżewski, A. Matuszczak, B. Wieliczko, *Ocena projekcji budżetowych UE dotyczących kolejnego okresu programowania w kontekście Wspólnej Polityki Rolnej*, Multi-Annual Programme 2011-2014, no. 11, IAFE-NRI, Warszawa 2011.

⁵ The review of those studies is included in the following chapters: 2. *Oddziaływanie środków UE na rozwój Polski*, and 3. *Ocena wpływu środków WPR na rozwój Polski i sytuację polskiego rolnictwa*, [in:] B. Wieliczko (ed.), *Ocena wpływu budżetu rolnego Wspólnoty na lata*

At the same time, the analysis of the structure of sources of additional funds for the Polish agriculture shows increasing importance of the public sector (which encompasses the national and the EU funds allocated to support for agriculture). In 2005-2013, its share grew from 28% to 65%, and it reached 66% in 2010 (Fig. 5.1). This growth takes place at the expense of the importance of the operational sector, i.e. funds that are transferred to agriculture due to the sales of its products. Then again, the role of financial market sector remains insignificant.

Figure 5.1. Structure of sources of additional funds for Polish agriculture in 2005-2013 (%)



Green: market segment, red: public segment, blue: operational segment.

Source: own elaboration based on data: A. Kowalski (ed.), *Analiza produkcyjno-ekonomicznej sytuacji rolnictwa i gospodarki żywnościowej w 2012 roku*, IAFE-NRI, Warszawa 2013 and earlier.

The decreasing percentage of funds generated due to the operational segment of additional funds is a proof that the sector is increasingly dependent on public aid. It can be a reason for postponing the decision to implement innovative solutions or change the type or structure of production. What is more, the data concerning the use of payments in 2008 under the single payment system (the so-called SPS), which is applied primarily in the EU-15 countries,

2014-2020 na kondycję finansową krajowego rolnictwa i całą gospodarkę, Multi-Annual Programme 2011-2014, no. 81, IAFE-NRI, Warszawa 2013.

⁶ B. Rokicki, *Ocena wpływu "budżetu rolnego" Wspólnoty na lata 2014-2020 na kondycję finansową krajowego rolnictwa i całą polską gospodarkę*, [in:] B. Wieliczko (ed.), *Ocena wpływu budżetu rolnego Wspólnoty na lata 2014-2020 na kondycję finansową krajowego rolnictwa i całą gospodarkę*, Multi-Annual Programme 2011-2014, no. 81, IAFE-NRI, Warszawa 2013.

indicates that the average percentage of the funds used to cover current expenditure was 82%, and only 14% were invested⁷.

It should be stressed, however, that strong dependence of income on public aid is not exclusively a Polish phenomenon, but is also present throughout the EU. It could be said, that it is one of the characteristics of the so-called European Agricultural Model⁸. At the same time, farmers declare that 62% of investments planned for 2014-2020 will be funded mainly from the farm income, large portion of which comes from direct payments⁹. Bank loans will be the leading funding source for 30% of planned investments, and investment support will fund only 4% (income from outside agriculture – 3%; other sources – 1%). It should be emphasised that the structure of main funding sources for planned investment depends on the type of projects, but most of the projects from all investment categories will be funded primarily by farm income, and investment support will be the primary funding source for 2-6% of investments.

As indicated by the research of V. Marconi et al.¹⁰, removal of investment support under rural development policy would negatively affect the investment level. It should be stressed, however, that not all investment aim primarily at increasing the competitiveness of a farm, which is proved by the fact that most of the respondents of a survey by M. Lefebvre et al. indicated that the expected result of the future investments will be improvement in working conditions on the farm¹¹. As far as direct payments are concerned, their nature, i.e. the fact that they are related with the production or not, does not affect the investment level¹². Simultaneously, those instruments do not force implementation of any

⁷ M. Lefebvre, K. de Cuyper, E. Loix, D. Viaggi, S. Gomez-y-Paloma, *European farmers' intentions to invest in 2014-2020: survey results*, JRC Science and Policy Reports, Luxembourg 2014.

⁸ The specific nature of the European Agricultural Model has been described in detail in the following article: S. Kowalczyk, R. Sobiecki, *Europejski Model Rolnictwa wobec wyzwań globalnych*, Problems of Agricultural Economics 2011, no. 4.

⁹ M. Lefebvre, K. de Cuyper, E. Loix, D. Viaggi, S. Gomez-y-Paloma, *European farmers' intentions...*, op. cit., Fig. 15.

¹⁰ V. Marconi, D. Viaggi, M. Raggi, M. Lefebvre, S. Gomez-y-Paloma, *A farm level model to evaluate the impact of the Common Agricultural Policy on EU farmers' Investment decisions*. Paper delivered during the AIEAA seminar, 27 June 2014.

¹¹ 40% of the respondents selected this answer. Farmers could select any number of answers. 35% of the respondents stated that the purpose of the investment is improvement in production quality, and 25% stated that it is reduction in costs, which is directly linked to competitiveness in the traditional sense.

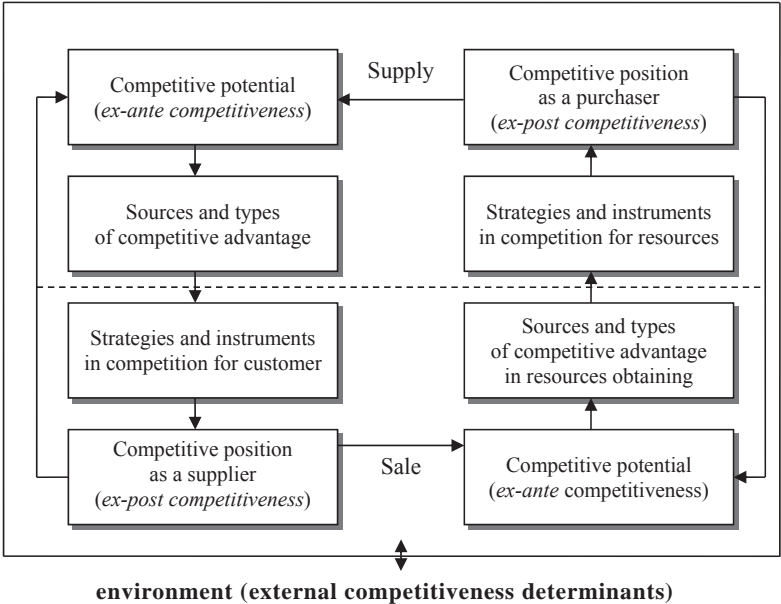
¹² It is indicated e.g. by research findings presented in the following publications: 1. D. Viaggi, F. Bartolini, M. Puddu, M. Raggi, *Farm/Household-Level Simulation Results of Testing Policy and Other Scenarios, Comparative Analysis of Factor Markets for Agriculture across the Member States*, Working Paper 2013, no. 54; 2. G. Guastella, D. Moro, P. Sckokai, M. Veneziani, *Simulation Results on the Impact of Changes in the Main EU Policy Tools on*

measures that positively affect the competitiveness of farms that receive them. The influence of budget spendings in the EU agriculture on competitiveness in the traditional sense is thus diverse. The main reason for this is their multi-channel impact, which is often self-contradictory.

5.3. Subsidies and finance. Sustainability and competitiveness of farms

The above problem has been studied primarily on the basis of entities covered by the Polish FADN solutions. The indicator and regressive analysis used the 2005-2012 farm panel. On the other hand, the modelling was based on data from a single year. The newest data concerned 2012. The general framework for analysis of mutual dependencies between subsidies, finance and competitiveness of farms has been shown in Figure 5.2.

Figure 5.2. Basic dependencies in the field of competitiveness of enterprises/farms (broad sense)



Source: modified proposal presented in: E. Urbanowska-Sojkin (ed.), *Podstawy wyborów strategicznych w przedsiębiorstwach*, PWE, Warszawa 2011.

Farm Investment Behaviour Analysis of Factor Markets for Agriculture across the Member States, Working Paper 2013, no. 56.

Findings of financial and regressive analysis based on the 2005-2011 Polish FADN data can be summed up as follows¹³:

- Subsidy rates grew more or less until 2009. Later on, they started to decrease, but in 2012 they were all higher than in 2005-2007 and 2008-2010. On the other hand, the share of entirely decoupled support systematically grew. It formally suggests that farmers' decisions should take the account of market signals rather than the declared direction of agricultural, and especially budget policy. The proportion of operating subsidies in the total sum of support stayed more or less at the same level. All the 2005-2012 subsidy rates in question clearly decreased as the economic size of a farm increased. The farms that were most dependent on budget aid were the ones that specialised in field crops. The situation of the horticultural farm was the opposite.
- Financial and economic effectiveness showed fluctuations that are typical for agriculture. In 2012, however, all profitability indicators, cash returns from assets and equity exceeded the mean level in the two defined three year periods: 2005-2007 and 2008-2010. The changes to the share of standard gross margin in agricultural production, which is a relation from the field of operational effectiveness, were very small. Due to easily understandable reasons, the last indicator was most favourable in the case of very small entities. However, if we omit that, the increasing economic size translated to higher profitability and cash return all the time. As far as production types are concerned, the highest profitability characterised field crop-oriented entities, which received most subsidies, but in the case of cash returns, they did not have that much advantage over horticultural farms.
- The impact of budget support on the financial situation of Polish FADN farms was very diverse. Indubitably, it improved static liquidity, both in terms of the mean values for the entire panel and the survey of economic size and production types, after our accession to the EU. Their dynamic liquidity, measured based on cash flow, was stable. The tendencies in the financial structure, defined on the basis of the share of equity in total assets and the assets structure (the fixed assets to current assets), were similar. In general, the studied farms relied primarily on financing their activity from equity. In this regard, they followed a conservative financial strategy that was not very

¹³ J. Kulawik (ed.), *Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych*, Multi-Annual Programme 2011-2014, no. 20, IAFE-NRI, Warszawa 2011; J. Kulawik (ed.), *Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych*, Multi-Annual Programme 2011-2014, no. 46, IAFE-NRI, Warszawa 2012; J. Kulawik (ed.), *Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych* (3), Multi-Annual Programme 2011-2014, no. 82, IAFE-NRI, Warszawa 2013.

risky. On the other hand, their assets were dominated by fixed assets. This factor results in fixed costs, which, in the purely theoretical approach, reduces flexibility of adjustment to changes in the environment. It is a feature typical for traditional agriculture. Due to obvious reasons, farmers' investment activity fluctuated strongly.

- Subsidy rates, which resulted from relating the single area payment to the value of agricultural production and the income from a family farm, affected all profitability indicators in a negative and statistically significant manner, both cash returns and operational effectiveness (share of standard gross margin in the value of agricultural production). This negative correlation was basically preserved also where regression was performed separately for production types. However, the situation was different if parameters were estimated based on separate economic size groups of farms, where the negative correlation referred only to profitability of large entities. In the remaining groups, positive relations were also present, but they were often statistically insignificant. In the four region system, negative correlations, more or less in balance, in terms of their statistical significance or lack thereof, were dominant. The variation in estimations of regression parameters was also visible when the farm managers' age and their formal education level were used as a criterion for grouping. In general, it is reasonable to conclude that future studies should use regression models that are suitable for taking account of non-monotonicity of subsidy rates¹⁴.
- The share of operating subsidies in the total support most often positively affected cash returns and operational effectiveness, but it negatively affected profitability. Statistically dominant correlations were dominant. However, the clarity of impact of separating subsidies from agricultural production on economic and financial effectiveness was missing. Correlations that stood to the test of their statistical significance were rare.
- Agri-environmental payments were the budget support instrument whose impact on economic and financial effectiveness was always positive, and its statistical significance was unequivocal. In the case of the LFA scheme, the estimates of multiple regression varied strongly, but they were always negatively correlated with operational effectiveness. Only a portion of

¹⁴ Similar conclusions were reached e.g. by: J. Michalek, P. Ciaian, d'Artis Kancs, *Capitalization of the Single Payment Scheme into Land Value: Generalized Propensity Score Evidence from European Union*, Land Economics 2014, vol. 90, no. 2, May; F. Wu, Z. Guan, R. Meyers, *Farm capital structure choice: theory and empirical test*, Agricultural Finance Review 2014, vol. 74, no. 1; X. Zhu, G. Karagiannis, A. Oude Lansink, *The Impact of Direct Income Transfers of CAP on Greek Olive Farms Performance: Using a Non-Monotonic Inefficiency Effects Model*, "Journal of Agricultural Economics" 2011, vol. 62, no. 3.

estimates had satisfactory statistical significance. In the case of investment subsidies, the situation was very similar – the dispersion of results was great, but they all lowered both cash returns in a statistically significant manner.

- Budget support instruments can also be treated as measurements, i.e. as amounts, in the multiple regression. After applicable calculations have been made, it turned out that the positive correlation of single area payment, LFA payments, agri-environmental payments and investment subsidies with profitability and cash returns was very weak, but it was rarer in the case of their correlation with operational effectiveness. Low partial regression coefficients and rare statistical significance of estimates suggest that subsidy measurements were rather neutral to economic and financial effectiveness. Due to the strongly preliminary nature of this direction of analysis, there should be no attempts at formulating more clear-cut generalisations.

Each of the previous CAP reforms introduced changes to the complex set of its instruments. Similarly, the current 2014-2020 reform has introduced changes that affect the size of the flow of funds, but also constraints related to the land use structure due to the concept of greening of CAP. Research related to estimating the impact of the planned modifications of CAP for Polish farms has also been conducted using the farm optimisation model. The research focused primarily on the impact of greening of CAP. The basic tool used for that purpose was the farm optimisation model. Farms models have been developed for selected farm types using assumptions of the FADN typology and several agricultural policy scenarios.

Modelling used base scenarios [Base 2009, 2010, 2011, 2012], for calibrating models, and the Baseline scenarios for 2014 and 2020. The Baseline scenarios, which, just like the base one, assumed a continuation of the current CAP, where the reference point for other scenarios for the reformed Common Agricultural Policy. The further stages used a simple farm optimisation model, then it was extended by including a Positive Mathematical Programming (PMP) module¹⁵, and the scenarios were constructed using results from the CAPRI partial balance model¹⁶.

The basic source of data for the model were farm data from the Polish FADN database for 2007-2012. Results of model solutions for the selected farm types were aggregated in the early research phase to the FADN sample scale, then to the national scale, and in the final phase, also to the scale of FADN

¹⁵ R.E. Howitt, *Positive Mathematical Programming*, American Journal of Agricultural Economics 1995, vol. 77, no. 2.

¹⁶ W. Britz, P. Witzke, *CAPRI model documentation*, 2012, http://www.capri-model.org/docs/capri_documentation.pdf.

regions. The structure of farms in the FADN population changes with regard to compliance with the conditions changed depending on the stage of development of the greening concept and proposed requirements.

The results of model solutions indicated that greening of CAP, in its more rigorous variant from the starting proposal by the European Commission, would result in nearly 4% drop in agricultural income throughout the Polish industrial farm sector compared to the Baseline scenario. Mitigation of the requirements in the final variant is neutral for the average agricultural income, which is primarily a result of exemption of numerous farms from obligatory greening and relatively small difficulties resulting from mitigated requirements. Possible negative impact is weakened by the increase in average direct payment level in the period until 2020.

The results of the greening of CAP, however, are distributed unequally between various farm types. Agricultural income is decreased primarily in farms with strongly simplified production structure (e.g. monoculture), particularly on good soil, and also in farms where a large portion of arable land should be excluded from production due to the allocation of 5% of arable land to ecological focus area (EFA). The variant of the greening scenario that assumes resignation from adjustments and from 30% rate of direct payments turned out to be unfavourable and is no alternative for the majority of farmers.

The research that has been conducted shows that the greening of CAP will not have a significant impact on the production volume and income in the Polish agricultural sector. The negative impact of greening will be present in farms that are not adjusted, whose production structure is greatly simplified, and without EFA. At the same time, it should be stressed that the strongly mitigated greening concept will not result in significant environmental effect due to the significant percentage of farms that are exempted from obligatory greening or already adjusted. It clearly shows that greening will have no major impact on the competitiveness of Polish farms, at least in the long term.

5.4. Tax and insurance instruments and competitiveness of agriculture

In each country, the government uses defined financial resources, collected under its fiscal policy, to perform its tasks. The basic fiscal instrument is the tax system, which is used by the state to raise funds for its proper functioning and performance of its social and economic functions. This system is supported by social insurance, which is the basic tool of the social policy. This means that the existence of those instruments is unavoidable because everyone expects the state to provide them with various goods and services. Tax and fiscal policy plays a major role from the perspective of competitiveness, which, on the

other hand, is an integral part of market economy. The literature sees it as *a sine qua non* condition for economic development because it forces entities to look for better technical and organisational solutions, which thus facilitates innovation in the economy¹⁷. Tax and insurance instruments can serve that process, thereby influencing the development of a specific sector and the entire economy.

Tax and insurance instruments can be used to shape competitive advantage, particularly in such fields as effectiveness and productivity, innovation and entrepreneurship, corporate social responsibility (CSR), or creating shared social and economic value (CSV). Achievement of such advantage makes it possible to attain strong competitive position for a specific sector on the national, but also international market. It is particularly important because competitiveness is, e.g., a means to perform budget goals for a specific country. It should be stressed, however, that the influence of selected fiscal instruments on achievement of competitive advantage in the agricultural sector is equivocal and has many directions (Table 5.1). A review of selected fiscal instruments indicates that they greatly contribute to advantage in the field of CSR and CSV. In practice, a definite majority of analysed instruments facilitates the development of sustainable agriculture, which leads to the balance between the economic, social and ecological aspects of agricultural activity. New taxes, i.e. environmental and “junk food” taxes, can significantly affect the achievement of advantage in the field. They force such measures that limit the use of rare and environmentally valuable resources and contribute to undertaking socially desirable initiatives. Due to the fact that those instruments are rarely applied, we will have to wait for their effects.

The list of instruments with definitely positive impact on achievement of the described competitive advantage should include land tax value and social insurance for farmers (KRUS). Their legal construction results in the fact that the fiscal burden for the agricultural sector is low, which makes it possible to obtain advantage in terms of effectiveness, and it favourably affects the achievement of advantage in the field of CSR and CSV. Such advantages make an increase in the overall competitiveness level possible not only within the sector, but also in the national and international perspective.

The above reflection shows that the overall competitiveness level includes an additional element, which is why many countries make particular use of the right to shape such a tax system that would be adequate to their needs and capacity. The diversity of tax systems among the EU countries results in tax

¹⁷ L. Oręziak, *Konkurencja podatkowa a międzynarodowe przepływy kapitału*, International Journal of Management and Economics 2007, vol. 21, Wyd. Kolegium Gospodarki Światowej SGH, Warszawa.

competition. It should be understood as a symptom of a kind of struggle for potential investors and capital for the development of a specific state using available financial instruments. The means for that purpose include low tax burden, which is the main factor that determines the development of a specific country and its perception as an attractive place for making investments.

Table 5.1. Potential impact of taxes and insurance on competitive advantage in agriculture

Specification	Effectiveness/ productivity (statistical)	Based on innovation and entrepreneurship (dynamic)	Referring to corporate social responsibility (CSR)	Based on the concept of creating shared value (CSV)
Land tax	+	-	+	+
Income tax	-	+	+	+
Tax on special branches	+/-	+/-	-	-
VAT	+/-	+/-	+/-	+/-
Junk food taxes	-	+	+	+
Environmental taxes	-	+	+	+
Social insurance	+	+/-	+	+
Insurance on assets	+	+/-	+	+
Insurance on crops and animals	+	+/-	+	+

+/- simultaneous positive and negative impact

Source: own elaboration.

R.A. Nawrot, however, notices that legal regulations related to the tax system of a specific country are not competitive on their own, but they become such when a taxpayer from another country uses them¹⁸. Hence, shaping preferential tax system in the agricultural system is supposed to facilitate its strengthening and achievement of competitive advantage in the fields that may be important for its development. Such tax competition, however, may result in excessive reduction of tax burden by the government, which can lead to the insufficient capacity to fund the functions performed by the state. What is more, supporting some economic sectors forces the increase in the tax burden on other sectors, which might weaken their competitive position¹⁹.

¹⁸ R.A. Nawrot, *Szkodliwa konkurencja podatkowa*, Difin, Warszawa 2011.

¹⁹ L. Oręziak, *Konkurencja podatkowa...*, op. cit.

A review of tax systems of the EU Member States indicates that many of them use special tax and insurance solutions in agriculture, which make this sector significantly privileged and contributes to favourable conditions for its development. Preferential tax and insurance systems mean all kinds of special solutions related to the manner of calculating tax on agricultural activity and calculating and subsidising insurance premiums by the state budget that are exclusively established for farms. Countries that have preferential tax systems include Belgium, France, Germany, Spain, and Poland. Special insurance systems are in such countries as Austria, Finland, France, Greece, Germany, and Poland²⁰.

The analysis of tax systems of the EU Member States shows that tax preferences are addressed exclusively to farmers who conduct agricultural activity on a small scale. The exception is Poland, where the special tax system covers nearly all farmers, regardless of the production scale and farm size. It should be added that apart from special solutions for agriculture, farmers are included in the normal tax system and have the opportunity to settle taxes under it. Moreover, they are often entitled to additional tax exemptions and reliefs. Poland is also an exception in this respect, as the tax system treats agricultural production (except for its special branches) differently from other economic activity. As far as the insurance system is concerned, many countries use special methods for calculating premiums, which are significantly subsidised by the state budget. The analysis shows that there is no uniform method to calculate them, but most of the states use estimated income, which is often the basis for calculating income tax. Poland is an exception again, as the basis for calculating premiums is 10% of the basic retirement pension. It should be added that the share of the premium in financing retirement pension is small and ranges between 14% and 30%.

The list of tools that are components of agricultural tax system that facilitate achievement of competitive advantage, particularly with regard to effectiveness/productivity and innovation, can include: instruments that reduce tax burden (privileges related to loss accounting, tax credit, the possibility to estimate taxable amount); instruments that influence improvement in structure (tax privileges for retiring farmers, tax relief for young farmers, tax reductions for elderly or disabled owners selling their farms), and instruments that support investment (investment relief, accelerated depreciation, refinancing of loans, deduction of loans for ecological investment, creation of investment funds that reduce the taxable amount).

²⁰ J. Pawłowska-Tyszko (ed.), *Zmiany systemu ubezpieczeń społecznych a finanse państwa*, Multi-Annual Programme 2011-2014, no. 2, IAFE-NRI, Warszawa 2011; J. Pawłowska-Tyszko (ed.), *Systemy podatkowe w krajach UE*, Multi-Annual Programme 2011-2014, no. 83, IAFE-NRI, Warszawa 2013.

Summing up the above, it should be indicated that the currently functioning tax and insurance systems facilitate achievement of competitive advantage in agriculture. The existing structures, however, do not result from competition with other countries with regard to fiscal policy, but should rather be seen as a symptom of sovereignty in the field of shaping national social and economic strategies. This is a consequence of the fact that citizens of different countries have different preferences concerning the goods that they think the state should provide. Thus, various preferences in tax and insurance system that aim at strengthening the market position are suitable where this sector is important for the development of the country. It should also be noted that competitiveness is not only determined by the tax and insurance system, but many other elements, including low labour cost, infrastructure, quality of workforce and administration, or transparency of legal regulations, as well. Their combination affects the competitive position at the sector, national and international level.

5.5. Summary

Partial single-period analysis of the application of budget instruments in agriculture in the closed economy convention shows that their impact on competitiveness in the traditional sense is diverse. There are many channels and mechanisms of their influence, and they are often totally contradictory. Thus, it comes as no surprise that the reaction of the financial potential, profitability and value creation in agriculture to individual budget spendings on the sector and taxes levied on it, not mentioning a combination thereof in the form of a defined financial policy, varies. In the case of agriculture in the EU countries, the latter is only partially autonomous at the national level, it is generally discretionary (i.e. it depends on discretion of policy-makers), shows significant delay (inertia) in its reaction to impulses (shocks), it is often expansive and acyclic, it primarily consists in redistribution, but, at the same time, it tries to create community public goods (subsidiarity).

The EU attempts at introducing some stimuli to spread the concept of integrated competitiveness in agriculture, i.e. competitiveness that combines the economic, social, and environmental aspect. It primarily concerns direct payments related to *cross-compliance* and greening, agri-environmental and climatic programmes, and partially, the LFA payments. The environmental component they include, however, is not very stimulating and demanding. It seems that the above instruments are actually another channel for transfers to agriculture and a subtler attempt at legitimising budget support for the sector

than an effort to achieve more ambitious environmental goals. The latter, on the other hand, might be in conflict with the dominant competitiveness on foreign market in the traditional sense.

Tax shifts, resource allocation deformations and weakening of effectiveness they cause, on the one hand, and capitalisation as well as transfer and subsidy leak to the environment of the agricultural sector, on the other, are the most spectacular examples of limits to the efficiency of budget instrument use in the sector. Thus, we need a broader formula for analysing them and studying the impact. It seems that our future effort should focus primarily on general equilibrium models, calculation of changes to welfare and social functions of welfare, analysis of costs and benefits, transaction costs vs precision of fiscal instruments addressing, optimisation of inter-periodic choices, internalisation of external impact, and optimisation of public goods provision. An undoubtedly serious challenge will be to situate the budget policy in agriculture in the open economy formula, i.e. the one affected by globalisation. Certain distinctions also have to be included for countries remaining outside Eurozone.

We also have to remain aware that the budget policy without a structural, growth and development, environmental, and income policy will not be capable of improving the competitiveness of agriculture, and sometimes may work against it. It seems particularly dangerous to build agricultural competitiveness strategy primarily on the basis of subsidies. We should also remember that both budget policy and competitiveness are merely means for improving the welfare of farmers and other citizens.

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6. Changes in the socio-economic structure of rural areas as a factor of competitiveness of rural areas

6.1. Introduction

The transformations which took place in the Polish economy after the systemic changes, and then after the Polish accession to the European Union gave an impetus to the development of the agricultural sector, but also resulted in a need to face many new challenges, underpinned mainly by the growing competition in the domestic and global agricultural products markets. The changing macroeconomic conditions as well as unprecedented opportunities for the Polish rural areas and agriculture, thanks to the possibility of using CAP support, contributed to accelerating the transformations within rural communities. They were multi-directional, multi-faceted and manifested both the weaknesses and difficulties in adaptation processes and economic, and civilisation benefits resulting from the development trends.

The analysis of the transformations in the socio-economic structure of rural areas covered three segments of the rural reality – the characteristics of the human factor in the context of creating added value in the creation of development processes, the role of institutions in activating the local investments and the situation in the agricultural land market in 2011-2014. The above-mentioned issues included not only the analysis of conditions which are today considered to be the most significant determinants of the economic growth, but also the mechanisms whose launch is particularly important in most development strategies relating to rural areas both at the EU and national level¹. The analyses carried out were based both on own studies, general statistical data (mainly CSO, Eurostat), information provided by the ministries and by other institutions acting for agriculture and rural areas, as well as the literature regarding related issues.

¹ Cf. *Europe 2020. A strategy for smart, sustainable and inclusive growth*, COM(2010) 2020 final version, European Commission, Brussels, 3.03.2010; *Długookresowa Strategia Rozwoju Kraju Polska 2030. Trzecia fala nowoczesności*, Ministry of Administration and Digitisation, Warszawa 2013; *Strategy for Sustainable Rural Development, Agriculture and Fisheries for 2012-2020 (SZRWRiR)*, document adopted by the Council of Ministers on 25 April 2012, Warszawa 2012.

6.2. Human capital in the processes of structural transformations of the rural areas and agriculture

Assuming that in relation to the civilisation progress and transformations in the economic structures, taking place in the Polish rural areas, the human factor becomes even more important the conducted studies were primarily to diagnose the potential represented by the rural community and changes in this regard. Therefore, the analysis covered the level of education, educational activity and civilisation competence of the rural population. The spatial and social mobility of the rural residents was analysed and the scale of the regional diversification in the characteristics of the rural population was determined. The categories of rural population were defined due to the allocation of the economic activity. This applied in particular to engagement in agricultural activities, in this context, the socio-demographic characteristics of managers of agricultural holdings (private farms) and their impact on improving the competitiveness of agriculture were determined. Also, the scale of involvement of the rural residents in the development of non-agricultural economic sectors in rural areas was determined.

Study materials were mainly the results of the IAFE-NRI surveys carried out in 2011 among more than 8,477 rural families, of which 3,331 families owned agricultural holdings with the area of more than 1 ha of agricultural land (AL). The families covered by the survey lived in 76 villages located across the country. The scope of information gathered was extensive and referred to many aspects of rural population and the functioning of agricultural holdings. In determining the growth rate of the changes taking place, the results of studies of the similar community, mainly in 2000 and 2005², were the reference point. Material from the field studies was supplemented by the statistical data from the CSO.

Demographic characteristics and mobility of rural population

The rural areas in Poland are inhabited by 39% of the population of the country. As shown by the carried out studies, for many years the increasing part of this population has not been related to the agricultural holding. In the study sample surveyed in 2011, the number of non-farming rural families, i.e. those having no land or using plots of less than 1 ha of AL, represented more than 60% of the total number of the surveyed population and was by 3 percentage points (p.p.) higher

² Cf. A. Sikorska, *Zmiany strukturalne na wsi i w rolnictwie w latach 1996-2000 a wielofunkcyjny rozwój obszarów wiejskich. Synteza*, IAFE, Warszawa 2001 and A. Sikorska, *Procesy przekształceń strukturalnych w wiejskiej społeczności i chłopskim rolnictwie*, Research project no. 0021/B/H03/2011/40, IAFE-NRI, Warszawa 2013.

than six years before. The basic determinant of this process was the fact that the rural population abandoned agricultural activities and became professionally active in other sectors of the economy or ended the period of economic activity due to reaching the retirement age. Most often, the socio-economic status was changed by the families using farms with a relatively small area. The most important factors determining the mobility of rural families may include the advancement in the multifunctional development of rural areas, the situation in the local labour markets, distance from cities, the level of development of agriculture (in particular, determined by the characteristics of the agrarian structure).

In determining the spatial and social mobility of the population, of great importance were the socio-demographic characteristics of this population, i.e. the level of education, age and gender. The principle of migratory processes was the selectivity due to the characteristics of emigrants, they were relatively young and relatively well-educated when compared to the overall rural population. It should be stressed here that social migrants, i.e. persons changing their economic status, were relatively older and less educated than those who had left the analysed villages.

Just like in cities, in rural areas there was a clear process of ageing of the society, whereby this phenomenon applied both to the entire population and to a group of persons involved in the agricultural activity. From the CSO data it resulted that in 2012 per 1,000 children and young people aged 0-14 years, there were 759 people over 64 years of age (when compared to 720 in 2005 and 604 in 2000). Moreover, in 2012 the old-age dependency ratio was at a relatively low level³. What is more, as a positive sign of civilisation transformations in the rural areas we should consider the fact that, in accordance with the national trend in the analysed period, there was a decline in infant mortality and the permanent extension of the average life expectancy.

Selected determinants of human capital development

In accordance with the terminology adopted in the literature⁴, in the analysis of the characteristics of human potential the outstanding feature is, first of all, the level of education. The studies conducted show that over the past ten

³ In 2012, per 100 persons in working age there were 58 persons in non-working age, when compared to 76 in 2005 and 65 in 2000.

⁴ Cf. M. Dudek, A. Wrzochalska, *Conditions of the development of farmers' human capital in Poland*, [in:] *Changes and perspectives in the rural areas and in the agriculture of Bulgaria, Poland and other EU Member States*, Agricultural Economics and Management, Agricultural Academy, Sofia 2014 and P. Chmieliński, M. Dudek, B. Karwat-Woźniak, A. Wrzochalska, *Conditions of the development of human capital in agriculture and in rural areas*, Multi-Annual Programme 2011-2014, no. 1.1, IAFE-NRI, Warszawa 2011.

years there have been positive changes in that regard. In particular, the percentage of persons with secondary and tertiary level of education increased. Ten years after the Polish accession to the EU, nearly every tenth rural resident had higher education. Also, the number of such persons was still lower in the rural areas than in the urban areas, where in the same period their share amounted to 21% of the total population. From the surveys carried out by the IAFE-NRI, it resulted that the increase in the level of education has been recorded both among people from rural farming families and from non-farming families.

The increase in the level of education concerned mainly non-agricultural degree programmes, while there has been no progress in the prevalence of agricultural school qualifications. In 2000-2011, the share of managers who completed agricultural schools was at the level of 23-24%. At the same time, the share of farmers who completed only courses preparing for practising the profession of a farmer was regularly decreasing (from 27% to 17%). This phenomenon confirms the process of professionalising the work of a farmer, which requires higher and higher qualifications. Moreover, the slow pace of agrarian transformations do not foster a significant increase in the percentage of farms with production assets adjusted to the development needs of their owners.

The studies confirmed a further increase in the relatively high popularity of non-agricultural types of education among farm users. In 2000-2011, the share of persons with such educational profile among managers increased from 40% to 53%. Improving the level of non-agricultural professional qualifications in the analysed group should be considered as a beneficial situation, not only from the point of view of the possibilities of diversifying the professional activity and improving opportunities to employ outside the farm but also improving the conducted agricultural activity. Today, the effective performance of an agricultural holding requires persons working there to have many skills and competences exceeding the conventional preparation for practising as a farmer.

For many years, all sorts of trainings have been the traditional form of education in rural areas. In 2005-2011, they were organised in every fifth surveyed village. The surveys showed that the rural population was still greatly interested in this form of education. Even in case of courses on non-agricultural subjects, one fourth of participants came from families having an agricultural holding. We should stress the fact that the respondents reported a need to organise courses regarding very diverse subjects.

The knowledge and information make it easier to adapt to the changing management conditions and to implement new solutions in agriculture. They also allow to better prepare for potential threats in the conducted economic activity and limit a risk of failure in achieving intended effects. What is important in this

context is access both to the relevant information as well as the ability to use it properly. A very important source of knowledge, which may be of economic significance for agricultural producers, is access to the Internet, which requires a computer. The studies showed that there had been positive changes with regard to the civilisation competence understood as the ability to use digital technologies by the rural population. According to the CSO data, in 2013, 65.1% of households had a computer, and 61.1% had access to the Internet. Thus, more than half of the rural population had an opportunity to use those means of communication in the conducted economic activity.

The next analysed determinant of the level of human capital in rural areas was the health status of the population. The surveys showed that the rural residents rated their health status relatively well – 42.2% of the respondents rated it as good, 4.5% as very good, while 37.5% as average. At the same time, opinions on the operation and availability of health care institutions were very critical⁵. The respondents emphasised especially difficult access to medical specialists. Apart from improvement in this regard, education on health-oriented attitudes and occupational hygiene, including compliance with the relevant safety regulations when operating agricultural machinery and equipment, is also important.

Employment in Polish agriculture – rationalisation processes

The studies conducted showed that there had been an increase in the size of the group of persons from farming families, actively seeking for alternative employment, often abandoning completely the work at a farm. Thus, there are the growing tendencies to rationalise employment in agriculture, as agricultural activities involve only persons who are actually required to run them. As a result, the decreasing number of farming family members participate in the work at the agricultural holding. This results in the declining importance of the family farm as a place of economic activity. It should be stressed that this situation also applies to the significant group of farm managers, even those from relatively large area units. The studies showed that as many as 36% of this group combined agricultural activities with the off-farm work⁶.

At the same time, the analyses carried out, based on the survey data, documented that the farming population was permanently characterised by the relatively high (67%) economic activity, which, as already stressed, was

⁵ A. Wrzochalska, *The health status of the rural population in Poland*, [in:] *Proceedings of X scientific conference with international participation "ECOLOGY AND HEALTH"*, 5th June 2014, Plovdiv, Bulgaria, pp. 29-34.

⁶ P. Chmieliński, *Aktywność ekonomiczna kierowników indywidualnych gospodarstw rolnych*, [in:] *Cechy społeczno-demograficzne i aktywność ekonomiczna kierowników gospodarstw rolnych*, Multi-Annual Programme 2011-2014, no. 84, IAFE-NRI, Warszawa 2013, p. 97.

increasingly located beyond the farm used. The diversification processes of the professional activity of this community became stronger along with the advancement of the processes of the Polish economy's adaptation to the functioning under the conditions of competition and economic structures of the European Union and, above all, along with the increasing possibility of taking up gainful employment in the country and abroad. As a consequence, in 2011, only 57% of the employed farming family members were employed only in their own agricultural activity, while 13% only outside the agricultural holding. Others (30%) combined their professional activity with the work both on- and off-farm⁷.

A prerequisite to structural changes in agriculture and in rural areas is to reduce employment in the agricultural sector and to support the process of the multifunctional rural development. One of the primary determinants of this process are changes in the local labour market, towards creating the demand for labour resources in the countryside⁸. The studies conducted showed that enterprises located in rural areas were dominated by service establishments, which in 2011 accounted for as many as 42% of the total number of entities employing residents of the surveyed villages. Other establishments located in the countryside dealt mainly with the production activity (32%). The rural population was also employed in the public institutions operating in the rural areas and related to the functioning of local government administration, education and healthcare (26% of the total establishments in rural areas).

The analysis of the data obtained in the IAFE-NRI survey study in 2011 showed that micro-enterprises had the largest share in the creation of the rural labour market. Almost equally large group were small and medium-sized enterprises. Large production companies, employing in total more than 250 persons, employed every third person working outside agriculture, although they constituted a negligible proportion (less than 5%) of the total companies in rural areas. This category was dominated by large, international production companies. Service establishments and other entities created jobs for about 20% of the total number of persons employed outside agriculture. The studies also showed that from the point of view of the rural labour market and the development of rural entrepreneurship, the relatively high demand for work was created by emerging manufacturing companies and service companies, which in addition to production plants were also an important determinant of the local demand for work.

⁷ B. Karwat-Woźniak, *The processes of employment rationalization in Polish agriculture*, [in:] *Changes and perspectives in the rural areas and in the agriculture of Bulgaria, Poland and other EU Member States*, Agricultural Economics and Management, Agricultural Academy, Sofia 2014.

⁸ P. Chmieliński, *Ludność wiejska na rynku pracy. Zarobkowanie, bezrobocie, przedsiębiorczość i praca za granicą w latach 2005-2011*, Research project no. 0021/B/H03/2011/40, A. Sikorska (ed.), IAFE-NRI, Warszawa 2013, p. 5.

Under the conditions of growing importance of the non-agricultural professional activity of rural residents, the future development of rural areas in Poland will be increasingly linked to the strengthening of the residential function. Its importance, in turn, will grow along with the development of communications, municipal and social infrastructure, which determine the quality of life in the countryside. The strengthening of the residential function of rural areas and process of convergence between the rural and urban lifestyle and aspirations result in the growing demand for commercial and service companies, which so far have been rare in the countryside, and this creates opportunities for the further development of entrepreneurship in rural areas.

6.3. Institutional impact on raising investment attractiveness of rural areas

From considerations on the multifunctional and sustainable development of rural areas it appears that to determine the bases of this development it is required to identify and analyse the relevant factors shaping it. One of them are investments both in agricultural holdings and in the non-agricultural activity. Due to the special role of investments in these sections of the economy, the rural space was analysed through the prism of its investment attractiveness, which is affected by a number of factors vital from the point of view of planned investments and undertaken actions. The studies assume that the present and potential investment attractiveness of rural areas is a group of actions taken in the rural space for its sustainability, with participation of a number of institutions (EU, national, regional and local). The concept of the institution refers to institutions supporting the population and economic entities functioning in a given area and to the institutionalisation, which determines the activities of these institutions by identifying the rules of their operation. The institution thus presented reduces uncertainty and makes the entities act in a specified manner in the management process.

Taking up the issues of the importance of the institutional system in the sustainable development of rural areas and agriculture, we presented institutions operating in various administration structures and their adaptation to the changes in the CAP and to the improved living conditions in rural areas and we assessed cooperation and coordination among the institutions acting for the sustainable development of rural areas and agriculture.

The main hypothesis, accompanying the studies, was based on the conclusion that, in the institutional structures, the public sector – expressed by self-government administration – is an important promoter of the development of agriculture and rural areas towards their sustainability, however, the geographical space differentiates its effect.

To analyse the presented issues, we used mainly the literature of the subject, statistical data of the CSO Local Data Bank, surveys of the institution acting for the agricultural and rural development, materials of the Ministry of Regional Development (currently MID), Ministry of Agricultural and Rural Development and published and unpublished materials of many institutions acting for the agricultural and rural development. The analysis of statistical material has been made based on a number of statistical methods such as the correlation and regression coefficients, Hellwig's synthetic measure of development and multidimensional comparative analysis.

Evaluation of the significance of institutions in shaping the sustainable agricultural and rural development

The adoption of the concept of the sustainable agricultural and rural development resulted from too intense use of resources in the rural space, in violation of the environmental balance. Thus, the sustainable development may not lead only to improved living conditions of the current generation, but should provide access to resources also for the next generations. In the sustainable rural and agricultural development, an important role is played by the efficient institutional system, from the EU level to the local level, which reduces uncertainty and imposes a specific way of acting in the management process. The evaluation of the significance of the institutions is particularly important here, because neither initiating this process, nor its implementation may take place without its active role, due to the imperfection of the market mechanism in the sphere of taking care of environmental resources. Therefore, the institutional system has been presented in the context of the changes in the CAP and rural development strategy and it has been examined whether there was any relationship between the changes in rural areas and in agriculture and the evolution of the institutional system⁹.

The main functions of the EU institutions (Council of the European Union, European Commission, European Parliament) come down to broadly understood coordination of activities with regard to the rural and agricultural development. In the EU institutional system a strong position is occupied by the European Commission, with which governments of the Member States (ministers of individual ministries) negotiate directly the provisions of programming documents, being a basis for the implementation and disbursement

⁹ This problem has been presented in more detail in the publication by: D. Kołodziejczyk, M. Gospodarowicz (ed.), *Ocena dostosowania systemu instytucjonalnego działającego na rzecz obszarów wiejskich i rolnictwa do Strategii Rozwoju Kraju i kierunku zmian WPR*, Multi-Annual Programme 2011-2014, no. 12, IAFE-NRI, Warszawa 2011.

of the EU funds for the sustainable development of individual regions. The European Commission plays the coordinating and managing role for the EU funds, as well as monitors their practical implementation by the Member States. In this task, it is assisted by the European Court of Auditors, as well as the Economic and Social Committee and the Committee of the Regions.

The most important decision-making institutions of the national level include the Ministry of Agricultural and Rural Development (MARD) and the Ministry of Infrastructure and Development (MID), which cooperate with each other and with a number of institutions, in accordance with the EU principle of subsidiarity. The MARD is responsible for the implementation of the government policy for the agricultural and rural development and for the implementation of the Rural Development Programme. The activities of the MARD as regards implementation of the sustainable agricultural and rural development is supported, first and foremost, by the Agency for Restructuring and Modernisation of Agriculture, as the executive body of the agricultural and rural development policy, it implements the CAP instruments co-financed from the EU budget and provides aid from national resources. In addition, this process involves: Agricultural Market Agency – performing tasks with regard to the stabilisation in the agricultural products and foodstuffs markets under the CAP mechanisms, Agricultural Property Agency – performing tasks resulting from the state policy for improving the acreage structure of agricultural holdings, as well as Agricultural Advisory Centres, National Chamber of Agriculture or National Rural Network, which perform advisory and information functions. In addition, through their field branches, these institutions support coordination of any initiatives for the promotion and dissemination of the concept of the sustainable agricultural and rural development, such as: building partnership and dialogue, educating and activating local communities, activating economic operators involved in this development and supporting the exchange of experience and expertise in the field of the sustainable development at the local, regional and national level.

The coordinating role in implementing the objectives of the sustainable rural development policy is also played by the MID, mainly in implementing the Cohesion Policy instruments in rural areas, aimed at building territorial cohesion of the country. Creating favourable conditions for raising the investment attractiveness in rural areas also belongs to the tasks of the Polish Agency for Enterprise Development (PAED), which as part of the Operational Programme Human Capital implements activities related to training of employees and entrepreneurs. Through its subordinate organisations – National Service System for Small and Medium-Sized Enterprises, National Innovation Network and their field offices, it stimulates and creates entrepreneurial attitudes among rural residents.

Entities responsible for implementing the majority of decisions concerning the sustainable agricultural and rural development at the European and national level are mainly self-government authorities at the regional and local level, which results from relevant acts on territorial self-government. From the above legal acts it results, first of all, that the allocation of tasks among the region, district and commune in the individual spheres of the sustainable development depends mainly on the spatial range of their impact, and the joint implementation of the tasks should be based on partnership relations. It should be stressed that in the sustainable rural development it is the commune self-government which plays the greatest role, as an organiser of activities, financing body, advisor and coordinator of the development.

The studies on the institutions' activities for the sustainable agricultural and rural development showed that¹⁰:

- There is much ambiguity in the operation of the institutions, which result from the continuous socio-economic changes in rural areas and changes in the agricultural policy. These changes result from the power decentralisation, assumed in the state policy and from Polish participation in the EU structures. This is expressed, *inter alia*, in creating the institutional environment (standards and rules) which will be able to provide better and better conditions for the development of effective organisational structures shaping the economic, social and environmental sphere of life in rural areas.
- Sometimes it happens that the institutionalisation taking place lags behind the processes occurring in rural areas and agriculture or not all achievements are development-oriented. The compatibility of the institutional environment and organisational structures largely depends on the state policy. In connection with that, state actions are required to stimulate the evolution of the institutional environment conducive to the creation and strengthening of organisational structures necessary to implement the measures presented in rural development strategies and to introduce the CAP changes; the commune self-government creates conditions for the local development mainly by building infrastructure necessary to pursue the agricultural and non-agricultural activity, as well as to improve the living conditions of the community. This involves pursuing a proper investment policy. Due to the

¹⁰ These tasks have been presented in more detail in the publications by: D. Kołodziejczyk (ed.), *Instytucjonalne uwarunkowania rozwoju infrastruktury jako głównego czynnika zrównoważonego rozwoju rolnictwa i obszarów wiejskich. Część 1*, Multi-Annual Programme 2011-2014, no. 85, IAFE-NRI, Warszawa 2013 and D. Kołodziejczyk, M. Gospodarowicz (ed.), *Instytucjonalne uwarunkowania rozwoju infrastruktury jako głównego czynnika zrównoważonego rozwoju rolnictwa i obszarów wiejskich. Część 2*, Multi-Annual Programme 2011-2014, no. 104, IAFE-NRI, Warszawa 2014.

high costs of investment in infrastructure, not every commune may fully guarantee the funds for this purpose from its own income. The recently observed tendency to a decrease in the share of own income in overall income of communes, from 45% in 2005 to 42% in 2012 (with a little increase in 2008), is a reason for which the financial situation of local authorities is uncertain. Local authorities seek aid (mainly from the EU) funds for the development of infrastructure, which are only available for self-governments.

- The communes differ greatly as regards the number of activities undertaken for the development of infrastructure. The majority, as about 80% of the analysed communes, among the organisational and technical measures indicated the preference for projects related to the development of infrastructure. The analysis of activity of communes in outlining the development priorities in the context of their sustainability level, shows concentration of certain activities, i.e. in communes with the highest level of sustainability the planned activities focused primarily on the development of the economic sphere. This confirms the previous observations, according to which the changes in the social and environmental sphere must be preceded by the economic development. Within a range of functional and technical activities, the least popular were initiatives on cooperation between self-governments for the development of infrastructure and tasks performed based on the Act on public-private partnerships. On the other hand, in all of the surveyed communes, priority activities were those connected with their economic situation, such as: maintaining investment inputs at the level of at least 20% of the total expenditure and acquiring the EU funds at the annual level of 4% of income of the commune (this situation concerned about 70 surveyed communes). In contrast, the development strategy allowing to take loans for the development of infrastructure was declared by about 40% of the surveyed communes.
- From the studies it results that no local self-government took projects to improve the functioning of the commune. In general, it should be stated that along with an increase in the sustainability level of the communes they are willing to launch a larger number of activities than the communes with the lower sustainability level; the level of the development of technical and social infrastructure development in individual types of communes is very diverse. In about 80% of urban communes, the level of development in this area was considered to be very high, but this situation applied to only 3.1% of rural communes. The studies indicate that in the group of communes with the low and average development level the highest share accounted for rural communes and urban-rural communes. Again, this confirms the much worse

investment attractiveness of rural communes and urban-rural communes in relation to urban communes. In this situation, a positive impact on improving the institutional conditions for the development of infrastructure at the local level may be obtained by the activities of the state with regard to: creating appropriate administration structures fostering the development of local infrastructure; establishing regulations stimulating other entities to support the development of infrastructure; creating the regional and local policy enabling the creation of partnership structures; developing strategic infrastructure development programmes; territorial targeting of infrastructure projects, in accordance with local needs and providing stable and predictable conditions for investment financing in this regard.

Assessment of cooperation and coordination between the institutions acting for the implementation of the concept of sustainable agricultural and rural development

The process of the sustainable agricultural and rural development, due to its complexity, should be implemented at all administrative levels, taking into account the principle of subsidiarity. The scale of individual problems related to the achievement of territorial cohesion requires an integrated approach on the part of the institutions acting for the agricultural and rural development at various administrative levels. The integrated institutional approach may help to avoid duplication of activities and to eliminate the existing gaps in support for certain spheres of activity essential for the rural and agricultural development. Therefore, this process requires cooperation and coordination of activities of various institutions supporting the rural and agricultural development.

The studies conducted with regard to assessing cooperation and coordination of the institutions acting for the sustainable agricultural and rural development showed that¹¹:

- The institutions undertake the task to coordinate the development activities, to a lesser extent, and they prefer to cooperate with each other. This results from the fact that the representatives of these institutions are afraid to transfer some of their competences and related financial resources to other entities.
- The current institutional system is not fully conducive to these processes, there are no procedures describing the rules for the functioning of the

¹¹ For detailed information see: D. Kołodziejczyk (ed.), *Ocena koordynacji i współpracy między instytucjami działającymi na rzecz rozwoju rolnictwa i obszarów wiejskich – na poszczególnych poziomach administracyjnych*, Multi-Annual Programme 2011-2014, no. 47, IAFE-NRI, Warszawa 2012 and D. Kołodziejczyk (ed.), *Importance of institutions in the process of implementing the sustainable agricultural and rural development*, Multi-Annual Programme 2011-2014, no. 131, IAFE-NRI, Warszawa 2014.

coordination process, i.e. indicating the institutions, their functions and ways of cooperation at the individual administration levels;

- There are no coherent coordination instruments for the entire programming of rural areas and agriculture, using the potential of the region.
- Regional self-government performing quite an important role in the process of the rural and agricultural development at the regional level has too weakly developed coordination mechanism.
- We should stress the absence of mechanisms allowing to specify the relation between the central administration and self-governments. The activities of the central administration towards self-governments come down mostly to shifting difficult tasks, without providing resources for their implementation.
- There are no instruments/funds addressed to self-governments, which would aim to increase the scope of competences and responsibility of local government units for the creation and implementation of activities for the sustainable development, as well as allowing to establish permanent cooperation also with regard to coordination of activities. Probably, the new instrument entitled “Integrated territorial investments”, scheduled to be implemented in the 2014-2020 financing period, is an opportunity to enhance the scope of cooperation and improve the quality of coordination of the activities of the institutions acting for the sustainable development.
- Public institutions acting for agriculture and rural areas cooperate mainly with each other, but also with non-governmental organisations (associations, foundations). The study noted that most proposals of cooperation are received by the regional Rural Advisory Centres (RAC). They are also highly rated as a coordinator of activity of other institutions in rural areas. Similar observations, although to a lesser extent, relate to the National Rural Network (NRN). On the other hand, the studies showed that public entities hardly ever cooperate with private institutions, treating them as a competitor, and often, as it may even seem, a threat to their functioning. It is characteristic that in the mutual evaluation, private institutions received the highest ratings from the entities they cooperated with. In general, it should be stated that private institutions were rated as a competent partner for cooperation, while in this respect the lowest rating was given to cooperation with economic chambers. The analyses carried out showed that the most popular areas of cooperation among the analysed institutions were: the exchange of experiences, transfer of information, co-organisation of training, competitions, study trips and promotional events.
- Farmers’ cooperation with the institutions acting for the rural development was relatively strong (especially with the RACs), but the effects of this cooperation (e.g. maintenance of the agricultural production in areas with

less favourable natural conditions) were not always visible. The lack of a comprehensive approach to support (restricting the activity of the individual institutions to statutory activities) was one of the possible reasons for such a situation. Coordination of activities in this area is particularly important when various public institutions, at various administration levels, incur expenses for individual tasks they set for themselves (e.g. advisory and training functions carried out by the agricultural advisory centres and chambers of agriculture, or representing and defending the interests of the agricultural population by chambers of agriculture, trade unions and professional associations of farmers).

- Most often the analysed units of institutions acting for agriculture, both at the regional and local level, as the main barriers to cooperation with the EU institutions, government administration bodies, government agencies and organisations bringing together farmers, indicated the bureaucratic, financial and legal barriers and often the lack of interest in cooperation. The need for better coordination of activities applies to both horizontal and vertical structures of the institutional system. While in the analysed institutions the need for coordination of activities with other entities is noticed, no one points to a leader that could take the lead in creating coordinated agriculture support mechanisms.

6.4. Agricultural land market

Taking into account the structural characteristics of Polish agriculture and, in particular, the agrarian fragmentation of family farms, any changes in land use are particularly important in determining the development processes of this sector. Also, taking into account the fact that land is indispensable in any human activity, and its space is limited and permanently located, each country not only tries to monitor, but also to control the forms of its use, so as to protect agricultural land, thus guaranteeing food security for its citizens.

In this context, the annual analysis of the situation in the agricultural land market, carried out between 2011 and 2014, was, first of all, to determine how the processes taking place in trade in land, their intensity and forms affect the acceleration of efficiency-oriented transformations in the agrarian structure of Polish agriculture and what factors contribute to the slowdown of such processes. The studies conducted covered the legal, economic and social conditions affecting the changes in land use. Also, the activity of the Agricultural Property Agency was characterised. When developing the land market issues, the subject matter related to the purchase of land by foreigners was considered, so were the rules applicable in trade in agricultural properties in the selected European countries.

The analyses carried out used mainly source materials from the reports of the Agricultural Property Agency, notary offices and the CSO. The information of general statistics was also complemented by the data from own surveys¹².

Conditions in trade in agricultural land

With regard to the legal situation applicable in Poland in the field of trade in agricultural properties, the Act on the establishment of the agrarian system, as amended is of fundamental importance. It specifies the upper limit of the family agricultural holding, the rules of selling land and, above all, it sets the rights of the Agricultural Property Agency as the main institution supervising trade in agricultural land. As part of its core activity, the Agency deals with management of the State Treasury land. In this regard, in relation to the statutorily adopted procedures, the Agency creates a separate segment of the land market. The applicable Act also includes the provisions aimed at the possibility of using, by the Agency, the right of pre-emption in the private market, in a situation where the planned transaction does not result in any improvement in the agrarian structure of holdings.

The current observations and analyses of trade in agricultural land, show that the main part of the Agency's activities was focused on appropriate management of agricultural land of the State Treasury. Consequently, in the regions where there were large clusters of such land (mainly western and northern areas), the acreage structure of individual holdings is definitely better than in other parts of the country. Currently, this role of the Agency has been substantially restricted, in connection with the increasingly smaller area of unmanaged land of the State Treasury Resource. Also, in view of the approaching date of the full opening of the Polish land market for foreigners from the EEA countries and the Swiss Confederation (May 2016), the increasingly more important problem is to establish uniform rules for trade in agricultural land, as well as full monitoring of the tendencies taking place in this market.

The reason for revising the legislation and preparing new prerogatives regarding trade in agricultural land is not only the ending validity period of some of them. In particular, it becomes necessary to standardise and enhance the coherence of the rules applicable within individual segments of the land market. It is also necessary to develop the legislation with regard to other legal arrangements having a significant impact on the functioning of the land market. This applies to, e.g., social security of holding users, rules of land conversion to non-agricultural purposes and, first of all, establishing a clear definition of family farms.

¹² A. Sikorska, *Procesy przekształceń strukturalnych w wiejskiej społeczności i chłopskim rolnictwie*, op. cit.

A separate issue is to organise the rules of preparing registers of changes with regard to the ownership and temporary use of agricultural land. These activities are necessary to restrict informal transactions which still take place in trade in land properties among neighbours (it applies mainly to neighbour's leases). The legal acts were to affect the intensification of land concentration processes. In fact, this objective was possible to be achieved mainly in areas where the Agency could support the local supply with land from the State Treasury Resource.

The demand-supply imbalance, which has been persistent in the land market for many years, is mainly associated with the socio-economic conditions. The increase in the demand for agricultural land was affected mainly by the growing competition in selling agricultural products. Holdings, which wanted to maintain the strong market position, had to meet the requirements set by customers of their goods, which involved mainly the increased production scale and its improved quality. With respect to the agrarian fragmentation of Polish agriculture, this was mostly related to investments in productive assets, mainly in land. The adjustment of the production potential to the market requirements was taken most often by the group of farmers from holdings, which had already been characterised by the relatively large production scale and were the biggest beneficiaries of the CAP support schemes. This in particular refers to direct area payments, whose amount is dependent on the area of cultivated land. The grants received allowed them to launch the activities for increasing land resources.

The significantly smaller supply of agricultural land designed for sale did not correspond to the demand for land, created by development holdings. In this case, of importance were material factors. In most Polish individual holdings, the possessed productive assets, especially land, is the family property handed down from generation to generation and any decision on its selling or reduction should be, by assumption, connected with a special situation justifying such a move. Even if the holding acts mainly as a home, and the agricultural production is limited to own purposes, the possessed land property is a very good capital investment and guarantees surviving in the period of potential economic difficulties (loss of employment, fortuitous situations). In addition, owners of such holdings and their families benefit from the many advantages available to farmers – from direct payments to low-cost health insurance and pension scheme.

The demand-supply imbalance, which has been persistent in the land market for many years, is even strengthened by the local nature of this market. From the studies conducted at the IAFE-NRI it results that in areas where traditional attitudes towards holdings used are still strong, the role of the market in the agrarian changes gives in to family trade and, as a consequence, area

transformations are smaller than in areas where the demand for agricultural land is mitigated by the activity of the Agricultural Property Agency through the allocation of properties from the State Treasury Resource¹³.

Another factor, which in the last decade has increasingly affected the evolution of the agricultural land market, was the expansion of urbanised areas. This applied mainly to the areas of receptive labour markets and transport routes facilitating access to agglomerations. In those areas, the intensity in trade in land properties was usually related to their conversion to non-agricultural purposes. It should be stressed that since the Polish accession to the European Union, as a result of accelerating infrastructure investments and launching the instruments to support the diversification of economic functions of rural areas, this process was significantly strengthened. While in 2005-2010, 3% of agricultural land were eliminated from land use, on average, it may be estimated that in 2011-2014 the same indicator was about 4%. We should expect that despite the legal protection of the agricultural, natural and landscape environment, accordingly to the further speed of the macroeconomic development, the acreage of agricultural land will still decrease. This applies, in particular, to direct surroundings of large agglomerations, which through the receptive labour market affect the changes in the existing settlement structure. It is then required to devote more attention to zoning plans taking into account the principles of sustainable development, in particular as regards the protection of soils most useful for agriculture.

Trade in agricultural land and agricultural land prices

From the studies conducted at the IAFE-NRI, it resulted that in the subsequent years covered by the analysis (i.e. 2011-2014), trade in agricultural land included an increasing part of all changes in the land ownership. With the increase in market transactions, the importance of cases of non-market (family) land acquisition was gradually decreasing. In 2012, their number was by more than 12% lower than in 2011, and included 42% of all changes in ownership of agricultural properties registered with notary's offices. In the subsequent years, that process strengthened and it may be concluded that in 2014 only about 40% of trade in agricultural land market was of family nature, while the majority were market transactions.

On a yearly average, the number of land purchase and sale transactions in the analysed period was about 90 thousand, which, per 1,000 holdings, accounted for 58. The value of that indicator consisted of 48 contracts concluded among natural persons and 10 contracts with the participation of legal persons,

¹³ A. Sikorska, *Obrót ziemią a przemiany agrarne w indywidualnym rolnictwie*, Problems of Agricultural Economics 2013, no. 1.

mainly the Agricultural Property Agency. The uneven segmentation of the agricultural land market is a consequence of the increasingly limited APA offer, as most land from the Resource has already been permanently managed. At the end of 2013, 52.4% of land at the disposal of the APA were sold, and the acreage of land sold in this form since 2011 was more than 100 thousand ha, on a yearly average.

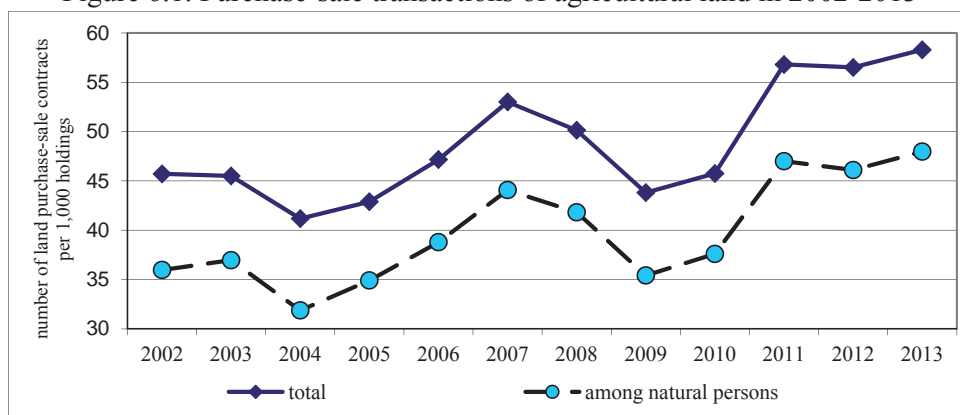
Monitoring of the agricultural land market draws attention to the fact that at longer time intervals we may observe a phenomenon of oscillation in the prevalence of trade in land in a form of purchase-sale. After the periods of increased intensity of that phenomenon, there was a decrease in its range and then it increased gradually in the following years. When looking for causes of the observed trends, we must take into account that investments in land are usually associated with plans to extend the production scale and expectations of specific economic benefits. Further investments in this area are usually shifted until expected profits are obtained and funds for further investments are collected. Under the Polish conditions, the importance of this factor is strengthened by the fact that, due to the agrarian fragmentation and diversification in the economic significance of the agricultural activity in sources of income of families, only some holdings play a significant income-generating role and seek to strengthen their market position by extending the production scale. For many years, this community has been fairly stable, and it covers approximately 230 thousand units and it mainly forms the group creating the demand in the agricultural land market¹⁴.

Admittedly, holdings seeking to improve their market competitiveness by increasing the productive assets are situated throughout the country, but they are distinguished by the particular density in the central-western area (regions: Wielkopolskie and Kujawsko-Pomorskie), which in case of the land market intensifies the importance of supply-side determinants in the scale of trade in agricultural land. As a consequence, agricultural land is most expensive there, when compared to other regions of the country¹⁵.

¹⁴ B. Karwat-Woźniak, *Gospodarstwa wysokotowarowe w rolnictwie chłopskim. Synteza wyników badań 2005-2009*, Multi-Annual Programme 2005-2009, no. 151, IAFE-NRI, Warszawa 2009.

¹⁵ A. Sikorska (ed.), *Rynek ziemi rolniczej. Stan i perspektywy*, no 16, Market Analyses 2013, IAFE-NRI, APA, MARD, Warszawa, December.

Figure 6.1. Purchase-sale transactions of agricultural land in 2002-2013



Source: elaborated based on the data from the Statistical Department at the Ministry of Justice and the CSO.

It should be assumed that it is mainly the supply-side determinants which affected the dynamic rise in land prices observed in the analysed period. From 2011, agricultural land has risen in price by 31.7%. Such a significant rise in land prices should be associated not only with the scale of the demand-supply imbalance in the local and regional markets, but also with the macroeconomic determinants. In the recent years, when the global crisis and rising unemployment have resulted in a growing sense of instability, land properties have become very profitable capital investments. We should expect that land prices will continue to be relatively high with a tendency to grow further. This process will be determined not only by the demand-side pressure, but also by the growing land conversion to non-agricultural purposes.

Land lease

When seeking an increase in the acreage of crops, land lease is an alternative to purchase of land. From the studies it results that the greatest interest in leases is visible in areas with the significant demand-supply imbalance and high prices of land (this applies mainly to the following regions: Wielkopolskie and Zachodniopomorskie). The study conducted by the IAFE-NRI shows that in total about 20% of individual holdings used own and leased land. The importance of this form of land use in the land concentration processes was evidenced mainly by the high share of land leasing holdings in the number of units with an area of more than 20 ha of AL. In this group, this situation applied, in fact, to half of the holdings¹⁶.

¹⁶ A. Sikorska, *Przemiany w strukturze agrarnej indywidualnych gospodarstw rolnych*,

The amount of land lease charges was dependent on the quality of leased land. For example, in relation to the whole country, the lease fee paid for good class land was by 21% higher in 2013 (in 2011, it was 25%) than the average value, and, in case of poor class land it was by 23% lower (26% in 2011). When interpreting differences in land lease charges, we should take into account the fact that many contracts are informal. Still, there are situations where the equivalent of the lease fee is paid in kind or in exchange for payment of tax or resignation from cancellation of land aid for the benefit of the land owner. In 2013, according to the ARMA data, single area payment amounted to PLN 830/ha, and thus it was by nearly 16% higher than the average lease price. From the analyses, carried out based on the surveys, it resulted that in areas where the lease fee was relatively low, direct area payments were usually taken over by land owners and not by actual land users. In turn, settlements in kind took place most often in areas with the most fragmented agriculture, while the forms of payment were not only agricultural products but also work off using mechanised equipment or assistance provided within the framework of the household. At the same time, it should be stressed that in the regions characterised by high performance agricultural structures, the forms of payment for land lease other than a charge were extremely rare. This applied mainly to the northern and western areas of the country.

6.5. Summary

In the work carried out, it was documented that the improved situation with regard to the determinants specifying the human capital characteristics (mainly, the level of education and broadly understood educational activity) of the rural population has not only a civilisation but also an economic dimension. The quality of the rural human potential affects directly the intensity of production, openness to innovation and efficiency of management.

Engagement in raising competences is seen in the theory of economics as one of the most important types of investment in human capital, which is directly translated to the level of income and the relatively lower risk of job loss. It is especially important with respect to middle- and old-aged persons, who have been professionally active for a long time. In this context, the changes in the schooling degree of the rural community indicate the activation of positive processes of transformation.

The issue of reducing employment in the agricultural activity and shifting labour resources from agriculture to non-agricultural sections is an essential condition for improving the agrarian structure, increasing the efficiency of

management and positive changes in the income situation of not only farmers, but also of other rural residents. As a consequence, the increased diversification of the professional activity leads not only to the implementation of the multifunctional agricultural and rural development, but is also a factor of modernisation of the entire economy.

When analysing the rural development in the context of the investment attractiveness, we may conclude that it depends not only on the scale of infrastructure investment, but of great importance are also management mechanisms and ways to target these investments. For these reasons, the local authorities should complement the strategic programmes with the elements to facilitate management and coordination of work on the implementation of rural development concepts being carried out. Therefore, it is necessary to create organisational structures built around projects (economic, social and environmental) that are carried out by collaborating institutions at various levels, which, for the duration of a given project, form a cooperation network. In this aspect, the coordinator is particularly necessary for the implementation of selected projects. Raising the attractiveness of rural areas using public funds, should be, to an increasing extent, implemented under the operational (project) model. Perhaps, this will “make” many institutions, performing partially the same or similar tasks, cooperate and coordinate in the interest of the final beneficiaries of these measures.

When it comes to agricultural land market, it must be recognised that in the subsequent years, regardless of the whole complexity of the circumstances affecting the changes in the agrarian structure of individual farming, the agricultural land concentration processes took place mainly by means of market trade in agricultural land. To a definitely lesser extent, such transformations resulted from handing down the holdings within the family, because in this case land was treated not as a means of production but as a property handed down from generation to generation.

The characteristics of the agricultural land market in Poland indicates that the mechanisms shaping the situation in this respect become more and more similar to the rules of operation of this market in the so-called “old” EU countries. Also, we should stress the role of market trade in agricultural land in creating the transformations of the agrarian structure and activating the agricultural land concentration processes.

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7. Competitive agricultural holdings in Poland: in the present and in the future

7.1. Introduction

Many authors point to analyses concerning the future, convinced that they can help them predict the future state of the economic position of domestic agricultural holdings. However, the market environment is more and more complex; hence, drawing conclusions on that basis is beginning to raise concerns. This is why the following study tries to direct the reader's attention to selected, but at the same time, most important issues which may exert a certain influence on the future of these farms.

Since 2003, Poland has been an increasingly large net exporter of agri-food products, therefore, this aspect of the future of Polish agricultural holdings will be decided by events connected not only with the domestic economic policy and membership in the European Union, but also those associated with globalisation. This concerns: climate change, increase of the GDP per capita due to globalisation, changes in the age structure of food consumers and the related consumption, advancement in agricultural produce acquisition in areas which are not characterised by small productivity, etc. It also concerns the influence of possible scientific and technological revolution which may arise in the national economy of Poland¹.

The stability of agricultural holdings in a longer time perspective is influenced by their capacity to compete against analogous entities on the market: local, national and wider – European and even global ones. Competitive farms are larger, they invest more, they absorb innovations, obtain revenue as well as profits from their own invested capital, and even from management. Apart from that they also operate in a group, which strengthens their position on the market and enhances their endeavours to protect widely defined natural environment, stimulated by the policy².

This chapter is composed of four parts. The first one contains estimates that describe changes in a number of domestic competitive agricultural holdings in 2004-2012. The second one identifies domestic agricultural holdings in 2006-

¹ W. Józwiak, *Świat, Unia Europejska i Polska 2050 – refleksje nad paradoksami futurologii*, Problems of Agricultural Economics 2014, no. 2.

² W. Józwiak, *Polskie rolnictwo i gospodarstwa rolne w pierwszej i drugiej dekadzie XXI wieku*, Multi-Annual Programme 2011-2014, no. 53, IAFE-NRI, Warszawa 2012.

-2011 and presents them in the context of analogous entities selected from other countries of the European Union. The third one contains the results of the analysis of the production costs of selected agricultural products, the profitability of that production and its effectiveness in 2006-2011, as well as projections of their average sizes in 2015 and 2020, made on the basis of multiannual time series. These findings are supplemented by a description of the scope of the variability of the projections of the values of factors shaping the production costs as well as a description of events pertaining to politics and demand, which may influence agricultural holdings in the country in 2020. The fourth chapter points to possible factors which may exert a positive and negative influence on the number of domestic agricultural holdings in several subsequent decades.

The anticipatory thinking adopted for the purposes of this paper was mostly focused on the medium-term perspective. Analyses of events that use mainly figures derived from studies conducted by the Central Statistical Office, results from the monitoring of the European and Polish FADN as well as other empirical data, concerning the costs of production and the financial situation of holdings that arose from the assets of former State Agricultural Enterprises, have become the basis for predictions concerning the future of agricultural holdings (enterprises)³. The paper also uses literature and applies three sources in the description of representations concerning the long-term perspective.

7.2. Changes in the number of domestic competitive agricultural holdings in 2004-2012

The estimates made based on empirical data⁴ indicate that at the end of the last decade of the 20th century, over 100 thousand Polish agricultural holdings were distinguished by expanded reproduction of fixed assets. That was a sign that in case of improvement of the economic situation of the domestic agriculture, their competitiveness would increase. This increase began along with the commencement of preparation for the accession to the European Union and gained momentum during the first years after Poland's accession.

There were three main conditions that facilitated the development of new Polish farms with competitive capacity and those with potential to achieve this capacity between 2004 and 2013. To a great extent, this was possible thanks to an increase in subsidies for agricultural holdings, which in turn increased their

³ A. Kagan, *Stan i perspektywy wielkotowarowych przedsiębiorstw rolnych w Polsce*, IAFE-NRI, Warszawa 2013.

⁴ W. Józwiak, *Przewagi komparatywne polskich gospodarstw rolniczych*, IAFE, typescript, Warszawa 2003.

revenue and supported their investment activity. The second essential prerequisite was the development of food industry⁵ and a low wage level, which led to an increase in the export of food items, thus ensuring a relatively fast increase in prices of agricultural products. The third significant factor in the development of new holdings with competitive capacity and those which can achieve it quickly was also an active approach of some agricultural producers, which was based on seeking and implementing a wide range of efficiency-oriented measures⁶.

The estimates made with the use of a plausible method and empirical data, covering the years between 2005 and 2007, indicated that there were 90 thousand holdings with competitive capacity, i.e. with net profit from equity and expanded reproduction of fixed assets⁷. Moreover, the estimates indicated that apart from the farms mentioned above, there were also 84 thousand farms with capacity to obtain competitiveness. Part of the latter group was distinguished by profit from equity and negative asset reproduction, while others were characterised by losses and positive reproduction of the owned assets. The majority or a significant part of agricultural holdings belonging to both of the groups highlighted above were also distinguished by: simplification or specialisation of production combined with resignation from producing less profitable goods, implementation of a range of innovations as well as resignation from growing crops under negative natural conditions and on unprofitable land layout, and from low-scale, mostly ineffective breeding. Some of the analysed holdings also co-created or belonged to producers' groups and organisations in order to increase their competitive capacity.

Analogous findings were made based on data from 2010-2012. This data indicated that the number of farms owned by natural persons with competitive capacity was similar to the number of analogous holdings between 2005 and 2007, while the number of those which had the opportunity to achieve competitive capacity increased by approx. 119 thousand. This was a result of an increased number of holdings that obtained profit from equity but were characterised by negative reproduction of fixed assets. Thus, between 2010 and

⁵ R. Urban, *Polski sektor żywnościowy w pierwszych latach członkostwa*, [in:] A. Kowalski (ed.), *Ekonomiczne i społeczne uwarunkowania rozwoju polskiej gospodarki żywnościowej po wstąpieniu Polski do Unii Europejskiej*, IAFE-NRI, Warszawa 2006.

⁶ W. Józwiak, *Polskie rolnictwo i gospodarstwa rolne...*, op. cit.; Z. Kołoszko-Chomentowska, *Przyrodnicze i organizacyjno-ekonomiczne uwarunkowania rozwoju rodzinnych gospodarstw rolnych w województwie podlaskim*, Studia i Monografie 2013, no. 41, IUNG-PIB, Puławy.

⁷ W. Józwiak, A. Kagan, G. Niewęgłowska, J. Sobierajewska, M. Zieliński, *Czynniki warunkujące wzrost konkurencyjności polskich gospodarstw rolnych dziś i w przyszłości*, IAFE-NRI, typescript, Warszawa, December 2014.

2012 there was a total of 205 functioning agricultural holdings with competitive capacity and those which could achieve this capacity in the future. Therefore, their percentage in the overall number of domestic agricultural holdings was merely a dozen or so percent, although the estimate shows that they delivered around half of the value of the domestic production of agricultural goods.

To clarify, it needs to be added that the conditions that arose in 2010-2012 differed from those which were predominant in the previous years. The rates of direct payment expressed in euro were the same as in 2010 and the increase in prices of agricultural output ceased to outpace the increase in prices of agricultural input. Therefore, it is probable that the deterioration of the economic situation discouraged some competitive holdings from investing on a scale that would ensure expanded reproduction and as a result place them among those farms whose circumstances allowed them to regain this capacity once prosperity was restored.

This situation of farms owned by legal persons was different than the status of those belonging to natural persons⁸. Between 2007 and 2009 as much as 93-94% of those farms was distinguished by competitive capacity or had a chance to achieve this capacity in a short period of time, and a little over half of those holdings were competitive. However, in 2010-2012 the number of farms in all three of the distinguished groups decreased compared to that other period. Those with competitive capacity decreased by 4.8%, the number of those with possibility of achieving this capacity dropped by 13.7% and the ones without competitive capacity decreased by 36%. The ownership transformation, resulting not only from the deterioration of economic prosperity, but also from the institutional reasons, led to the appearance of private holdings owned by private and natural persons or their divided assets were purchased or leased by holdings owned by natural persons.

The level of sustainability of agricultural holdings, which determines the sustainability of holdings in a longer time perspective, is worrying. This concerns the overall evaluation of their economic situation and influences of their agricultural output on the natural environment. The analysis of the literature showed⁹ that among the farms owned by natural persons, sized at least 2 ESU, only 13% could be considered sustainable. On this basis, and on the basis of the data gathered by the CSO, it can be estimated that only 5-6% of all holdings in the country with agricultural activity and crop area of at least 1 ha were distinguished

⁸ A. Kagan, *Stan i perspektywy wielkotowarowych przedsiębiorstw rolnych...*, op. cit.; W. Józwiak, A. Kagan, G. Niewęglowska, J. Sobierajewska, M. Zieliński, *Czynniki warunkujące wzrost konkurencyjności polskich gospodarstw rolnych...*, op. cit.

⁹ W. Wrzaszcz, *Zrównoważenie indywidualnych gospodarstw rolnych w Polsce objętych FADN*, Problems of Agricultural Economics 2013, no. 1.

by this feature at the end of the first decade of this century. These were mostly larger farms. Sustainable production was not a big threat to the natural environment and the obtained revenues allowed for modernisation of holdings, increase in the scale of their output and maintenance of farmers and their families at a level not lower than that of the families of employees earning the national average wage.

It cannot be ruled out that the percentage of sustainable holdings would have been greater if the evaluation of the phenomenon had considered “charging” for one’s own work at a level adopted in the calculation presented above, which served as a way of establishing the number of farms with competitive capacity.

Of course, the percentage of agricultural holdings that implemented only the selected actions influencing sustainability was greater. Based on the literature, we know for example that 74% of holdings specialising in the production of crops and plants, which were technologically similar and covered by the surveillance of Polish FADN, were characterised by a positive balance of carbon sequestration in soil in the second half of 2010s¹⁰. Hence, these farms limited the negative impact of agricultural production on the climate.

The above evidence means that part of the Polish farms may pose a threat to the environment, expressed in: continuous mineralisation of the organic substance contained in soil, contamination of surface water and confined groundwater, succession of wild and unwanted flora in areas previously used for extensive farming, etc.

Similar phenomena are also occurring, albeit to a smaller extent, in agricultural holdings in areas covered by conservation. In total, they cover over 32.5% of the country’s area¹¹ which contributes to the fact that our country is perceived as the “green island” of the EU, which in turn facilitates and will continue to facilitate our foreign trade in agri-food products.

7.3. Competitive agricultural holdings in Poland and other selected Member States between 2006 and 2011

The comparison of Polish competitive agricultural holdings to analogous farms selected from several other European countries points to a number of differences in most of the cases¹². The analyses were made in different years of

¹⁰ M. Zieliński, *Emisja gazów cieplarnianych a wyniki ekonomiczne gospodarstw specjalizujących się w uprawach polowych*, IAFE-NRI, typescript of a doctoral dissertation, Warszawa 2014.

¹¹ W. Józwiak, A. Kagan, G. Niewęłowska, J. Sobierajewska, M. Zieliński, *Czynniki warunkujące wzrost konkurencyjności polskich gospodarstw rolnych...*, op. cit.

¹² W. Ziętara, *Pozycja konkurencyjna gospodarstw rolnych w Polsce i innych krajach unijnych w latach 2006-2011*, IAFE-NRI, typescript, Warszawa, December 2014.

the 2006-2011 period, so the economic sizes of the distinguished groups of holdings had to be presented in two different units. The focus was on the minimum size of competitive holdings.

The minimum size of Polish competitive holdings specialising in plant production (growing cereals, different crops or fruit picking) was between 8 and 16 ESU (European Size Unit = European unit for farm size measured by the amount of gross margin calculated in a normative manner). The situation was similar in Hungary in the case of farms specialising in the production of cereals as well as those with various crops, whereas the minimum size of fruit picking holdings was around 40-100 ESU in that country. In Germany these values were a lot higher. The minimum size of holdings specialising in cereals exceeded 100 ESU, while those with various crops and fruit picking specialisations were between 40 and 100 ESU. The minimum size of fruit picking holdings in the Netherlands was even greater, and exceeded 100 ESU.

The situation of holdings specialising in vegetable production was slightly different. Their minimum size in Poland and Hungary was between 16 and 40 ESU, while the German and Dutch holdings of this type were a class larger, ranging from 40 to 100 ESU.

The minimum size of Polish and Hungarian holdings specialising in the production of milk or in breeding working cattle other than cows had the standard output (SO = the amount of income calculated in a normative way) of EUR 50-100 thousand. The minimum size of German and Danish holdings of this type ranged between EUR 100 thousand and EUR 500 thousand SO, whereas the size of Dutch holdings was over EUR 500 thousand SO. In Poland and Hungary the minimum size of holdings specialising in breeding domestic pigs ranged from EUR 50 thousand to EUR 100 thousand SO, but in the case of German, Danish and Dutch holdings the minimum size was EUR 100-500 thousand SO.

The comparison of holdings specialising in poultry production indicates a more favourable position of this particular group of Polish holdings. The minimum size of competitive farms did not differ from the size of the same holdings in Hungary and Germany. They all ranged from EUR 50 thousand to EUR 100 thousand SO. It is worth adding that the Danish and Dutch holdings specialising in poultry production did not show development capabilities regardless of the economic size.

It follows from the above information that in the first decade of the 21st century the minimum size of Polish competitive agricultural holdings slightly deviated from the sizes of competitive holdings in Hungary, although it was often significantly smaller than the minimum size of the same type of holdings in Germany, the Netherlands and Denmark. It is likely that the most significant

reasons for this situation were differences in the level of costs of production. These differences were smaller compared to the situation in Hungary. In the analysed years the cost of land lease was 11-27% smaller than in Poland and the interest on capital was 24% lower, although the level of remuneration for hired labourers in agriculture was 24-31% higher. On the other hand, in Germany the cost of land was higher than in Poland by 134-187% and the level of remuneration for hired labourers in agriculture was 241-285% higher than in Poland, whereas credit interest rates were 29% lower.

The conclusion following from the above comparison is that the higher level of economic development positively correlates with the higher costs of land and labour and negatively correlates with the costs of third party equity, which in turn leads to an increase in the output scale in agricultural holdings in order for them to stay competitive. Cheap capital in these circumstances simply substitutes expensive land and labour. This conclusion has important implications for the evaluation of the direction taken by Polish agricultural holdings in the next few decades.

7.4. The factors shaping the competitiveness of domestic agricultural holdings in the mid-term perspective

It may be safely assumed that in 2015-2020 some of our business-oriented agricultural producers will still take advantage of the progress which results from implementing various projects, specialising production and increasing its scale as well as from other efficiency-oriented solutions aimed at the improvement of farms' operation. It is known, however, that the payments will be slightly lower when it comes to an increase in income than in 2004-2013. It will also be the final stage of the current global economic recession, combined with a probable increase in the demand for agricultural produce in developing countries as a result of the globalisation of world economy with simultaneous reduction of an increase in the supply of these goods due to climate change. All this could translate into conditions in which agricultural products and food may enjoy a similar, if not better, situation to the one observed presently. However, there are unanswered questions which tone down this optimism.

European and Polish analysts estimate¹³ that abolishing quota for the production of milk in the whole European Union in 2015 will translate into

¹³ Commission Report: *Zniesienie kwot mlecznych to wzrost produkcji mleka*, <http://finanse.wp.pl/kat,1034079>. Title. Raport-KE-zniesienie-kwot-mlecznych-to-wzrost-produkcji-mleka, wid.16680187, wiadomość.html?ticaid=112e7e [access: June 2014]; *Zachód Europy szykuje ekspansję, czy wytrzymamy zniesienie kwot mlecznych?*,

a drop in prices for this commodity by 10-20%, leading to an increase in its demand. They predict a modest increase in the supply of milk in Poland due to unfavourable climatic conditions (increased drought in growing seasons reducing the harvest of grass and other forage crops) and an unfavourable economic situation of smaller agricultural holdings specialising in milk production. This is due to the fact that lower labour and service costs are levelled out with great unit costs of keeping animals in small herds, poor reproduction, increased cow culling and high mortality among calves. This is accompanied by ambitious plans of Asian and South American countries to increase milk production. It is known, for example, that by 2020 the Chinese plan to increase the production of milk by 40% in order to satisfy the needs of the domestic market. Some experts predict, however, that not all developing countries can afford to make such an effort.

The doubts also concern the cultivation of sugar beets after 2017, when quotas for sugar and its competitor, isoglucose, will not be applied any more. The cultivation of sugar beet is profitable in Polish agriculture, not only compared to winter rye but also in the context of income obtained from winter wheat and the second important industrial crop in the country: winter rapeseed. The rules based on which the EU sugar market will function after abolishing production quota have not been specified yet, but it can be expected that the increased sugar production will lead to a decrease in sugar prices and consequently the average sugar beet price. Based on the analysed literature, it is also likely that the variability of prices will be increased year after year¹⁴.

Moreover, the problem of extending the moratorium on the import of soy meal, which is largely produced from modified soy with the use of genetic engineering (GMO plants), will return in 2017. Modified soy is cheaper although its properties do not differ from those of soy obtained from traditionally grown varieties. Soy meal is a rather irreplaceable fodder component used in breeding young poultry, broilers, piglets and wild boar piglets, but the Polish public opinion is prejudiced against such crops, so it cannot be ruled out that the moratorium on the import of genetically modified soy meal will not be extended. This means that we can expect an increase in the cost of the production of eggs, slaughter poultry and pork livestock starting from 2018¹⁵.

<http://mlecznaferma.pl/zachod-europy-szykuje-ekspansje-czy-wytrzymamy-zniesienie-kwot-mlecznych/> [access: April 2014]; A. Skarżyńska, *Koszty, dochody i opłacalność pozyskiwania wybranych produktów rolniczych w Polsce w latach 2006-2011 oraz w perspektywie średnioterminowej*, IAFE-NRI, typescript, Warszawa, December 2014.

¹⁴ E. Bolisęga, *Przyszłość rynku cukru*, Biuletyn Informacyjny ARR 2012, no. 4.

¹⁵ W. Józwiak, *Polskie rolnictwo i gospodarstwa rolne...*, op. cit.

The percentage of milk, poultry and pork livestock, eggs and sugar beet in 2013 was 52-53% of the domestic production of agricultural goods, so the changes outlined above may have a considerable negative influence on economic effects for a great part of domestic agricultural holdings.

The projection for 2020¹⁶, prepared for the conditions resulting from long-term tendencies, indicates that in the case of cereals there is a likelihood of an upturn of income as an effect of better harvesting and a higher price of grain. However, the production of winter wheat and spring barley can be characterised by a sharper rise of the costs incurred than that of the profit, so there might be a slight decrease in the profitability of the production of these commodities. On the other hand, it is probable that the production of rye will increase due to the fact that the income will be increasing faster than the production costs. It is also estimated that winter rapeseed harvest will increase, along with its price. Thus, the profitability of this oilseed may increase in the target year.

Over the next few years, due to changing weather and prices, there may be deviations from these average tendencies that characterise the profitability of the production of agricultural goods. The conducted estimates¹⁷ conclude that rye is an activity that is distinguished by the greatest susceptibility to all profit-forming factors – harvest, price of the grain and production costs – out of all cereals. Only under exceptionally favourable conditions can rye crop ensure a tolerable profit, but its cultivation will probably still be burdened with great risk, perhaps due to the fact that it is grown at the worst stations. But then, winter rapeseed – in comparison to cereals – will probably be characterised by a higher percentage of income deviation from the projection established on the basis of trends depending on the variation of harvests resulting from weather changes, mainly in late autumn, winter and early spring.

The experiences from recent years described in the analysed literature also indicate that the demand for organic food will probably increase, although its share in the domestic food production will be small.

Nonetheless, we cannot completely rule out the worst-case scenario, mainly resulting from prolonged economic recession, reflected in the situation of the southern states of the EU, such as Greece, Portugal, Spain and Italy. Other factors which may prolong the recession are: the tensions arising in Eastern Europe and some Muslim countries of the Middle East as well as the deterioration of economy in China and Brazil.

¹⁶ A. Skarżyńska, *Koszty, dochody i opłacalność pozyskiwania wybranych produktów rolniczych...*, op. cit.

¹⁷ Ibidem.

All that may exert a negative impact on the economic situation of some countries of the world for several subsequent years, and deteriorate the market for agri-food products. There might also be other phenomena specific to our country, which could contribute to this situation. This year's parliamentary elections can lead to a political power shift in 2016, which would entail a long delayed reform of social insurance for farmers and a change of the agricultural holdings taxation system¹⁸. Of course, we can count on the adaptation of the domestic food industry and domestic agricultural holdings to the new situation, which would reduce negative effects of the mentioned phenomena, but the adaptation will not eliminate the difficulties completely.

Actually, in such a situation we can form a conclusion that new domestic agricultural holdings with competitive capacity will appear at a reduced rate in the period leading up to 2020 and we may even risk a conclusion that their number will drop, as they will lose their status of competitive farms and be classified as holdings with opportunity to regain competitiveness.

7.5. Domestic competitive agricultural holdings after 2020

Part of the issues concerning the period from 2020 onwards do not require the use of futurology methods, as they are already subject to political arrangements. The most significant problems will involve limiting emission of greenhouse gasses within the European Union by 2030. Poland is a considerable emitter of these gases in relation to the generated GDP, so the lack of investments addressing their reduction (contractual fines) as well as making such investments with the use of public funds may slow down Polish economy for a certain period of time, which would have a negative effect on the domestic demand for agri-food products, thus decreasing the number of domestic agricultural holdings with competitive capacity as well as those in which this capacity can be achieved in the near future.

There is also more and more serious talk of the need to initiate modernisation of the Polish economy in the nearest quarter-century. This future transformation is to involve the emergence of creative society and the creation of economy based on the growing knowledge acquired with the use of scientific methodology¹⁹. Successful implementation of these changes, and consequently a modernisation leap (also called scientific and technological revolution), will facilitate the search for solutions to problems brought about by climate change, ageing of society and possibly other factors. At the same time, national wages will increase, thus leading to the continuation of the trend of abandonment of

¹⁸ W. Józwiak, *Polskie rolnictwo i gospodarstwa rolne...*, op. cit.

¹⁹ J. Kleer, *Wizja przyszłości Polski. Raport Polska 2050*, Biuletyn PTE 2013, No. 2(61), April.

small agricultural holdings. As a result, agriculture will be dominated by farms with medium and large production concentration, most of which will be competitive or able to achieve competitiveness in the future.

In conclusion, it might be worth pointing to an even more distant perspective. Futurologists formulate prognoses in order to focus on possible future threats and possibilities for further development.

We are often bombarded with catastrophic images concerning the problems of feeding the world population and the future development of agriculture, but futurological studies generally point to the falseness of such notions²⁰. Around 2/3 of all farmers in the world own fairly small holdings, which they manage with the use of manual tools. Their income barely guarantees minimum living standards for their families and themselves and it is not sufficient to purchase better production facilities²¹. However, this situation is changing. Globalisation intensifies urbanisation processes, which leads to the concentration of land in a decreasing number of holdings, an increase in production intensification and income from agricultural activities, as was the case with countries which are currently economically developed. Urbanisation has yet another important effect. It leads to a drop in births, which in turn contributes to a slower increase in the demand for food²².

On the other hand, the concentration of land in an increasingly smaller number of agricultural holdings in economically developed countries is of a lesser importance and there is nothing extraordinary about it. Here, the population is hardly growing and actions are aimed at environmental protection, with emphasis placed on measures that lead to limiting emission of greenhouse gasses. In the case of developed countries, technicalised agriculture has a negative impact on the environment, especially on its most important aspect, i.e. the climate. Nonetheless, the change of economic policy in these countries does not have to entail a decrease in the supply of agricultural goods. To a certain extent the measures associated with storing part of greenhouse gases (mainly carbon dioxide) in soil are complementary towards income from farming²³. For these reasons, after 2030 the domestic agriculture will mainly consist of farms with a large concentration of production and labour efficiency, which apply production technologies that reduce the negative impact of agricultural output on the climate and probably also on other aspects of conservation.

²⁰ J. Randers, *Rok 2052. Globalna prognoza na następne czterdzieści lat*, Dom Wydawniczy ELIPSA, Warszawa 2014.

²¹ Z. Mirkowska, W. Józwiak, *Rozwój gospodarki świata i Unii Europejskiej w perspektywie długoterminowej. Miejsce sektora rolnego*, IAFE-NRI, typescript, Warszawa 2014.

²² J. Randers, *Rok 2052...*, op. cit.

²³ M. Zieliński, *Emisja gazów cieplarnianych...*, op. cit.

However, the actual long-term situation of domestic agricultural holdings may deviate from the state presented above. This is because we have not allowed for a different scenario – let us call it scenario B – which can have threefold causes.

Firstly, there may be negative effects of the acceleration of changes occurring in the surroundings of individual people, to which the human psyche, physiology or social structures are not adjusted. Each change could cause stress and frustration in a number of people, which may lead to aggression or apathy in situations when the effects of previous changes have not yet been evaluated and when there is no time to adapt to them. Modern means of communication allow like-minded people to join groups, sometimes sizeable ones, which are able to influence the direction of further social and economic transformations.

Secondly, scenario B may be triggered by differentiated economic development of individual countries. Some nations have already experienced the effects of industrial, scientific and technological revolution while others have just began, or are about to begin (as is the case with Poland) the latter two. Other countries, populated by the majority of the world population, are experiencing different stages of the industrial revolution. We have learnt from the recent history of Europe and Japan that this does not always have to be accompanied only by an aspiration to improve the well-being of a given society. The various levels of development in the countries that are undergoing industrial revolution facilitate the increase of terrorism and, what is more, lead to a desire to reshape borders, absorbing less developed neighbouring countries, which may end the current stage of peaceful development of the world. By observing world politics we can see that such phenomena have already occurred, or at least are being inspired, in Asia and Africa, and even in Eastern Europe. Any armed conflict that may arise as a result of these tendencies can be broad in scope. It is comforting, however, that people need to eat even during war, which might create opportunities for farmers from countries that are not engulfed by conflict.

Moreover, it cannot be ruled out that the intensified frequency of extreme weather phenomena (draughts, hurricanes, floods, etc.), which are the aftermath of climate change²⁴ will entail higher costs of recreating the production potential of businesses²⁵, including agricultural holdings. Even mastering non-emission or low-emission methods of producing energy carriers will not eliminate the

²⁴ Z.W. Kundzewicz, *Cieplejszy świat. Rzecz o zmianach klimatu*, Wydawnictwo Naukowe PWN, Warszawa 2013; C. Leggewie, H. Welzer, *Koniec świata jaki znaliśmy. Klimat, przyszłość i szanse demokracji*, Wydawnictwo Krytyki Politycznej, Warszawa 2012.

²⁵ J. Randers, *Rok 2052...*, op. cit.

intensified prevalence of extreme weather phenomena in the analysed time period. Research shows that it takes around sixty years to increase the share of energy generation from a new (not yet discovered) carrier to 25% in the world consumption.

7.6. Summary

The increase in the competitiveness of Polish agricultural holdings is a process which involves a growing share of farms distinguished by competitive capacity, i.e. those which obtain income sufficient to satisfy aspirations of their owners when it comes to living standards, and those that invest in agricultural holdings. In 2004 and subsequent years, Poland continued adaptation processes initiated beforehand, but new processes were also started under the influence of a significant improvement of the relatively well developed domestic food sector. Between 2010 and 2012 a dozen or so percent of domestic agricultural holdings belonging to natural persons were either competitive or had the potential for achieving competitiveness in the future should management conditions improve. These deliver around half of the value of domestic agricultural production.

Deterioration in economic conditions is reducing the pace of the increment of competitive holdings, while the number of farms that have potential for achieving competitiveness, should the economic situation improve, is increasing. The increment of agricultural holdings with competitive capacity and with potential for competitive capacity in the near future will depend on conditions other than those which were prevalent between 2004 and 2012. Each time, however, the most important factor is whether or not there are conditions that favour the placement of agricultural products on the market.

After evaluating the competitiveness of Polish holdings compared to the holdings of the selected countries, it needs to be stated that they compete indirectly rather than directly with their counterparts from other countries. A possible prolongation of the global recession poses a threat to the development of Polish agriculture in the future. Domestic policy may constitute yet another threat to our agriculture.

Limited proceeds to the state budget can lead to a revision of social insurance for farmers and the income tax imposed on their holdings. Part of domestic agricultural holdings will be negatively influenced by eliminating milk quota and any possible internal ban on the import of fodder with genetically modified components. Around 2030 the costs of energy carriers in Poland will probably increase, which will result from the EU policy directed towards limiting emission of greenhouse gasses. Creative society is also likely to

emerge, along with economy based on scientific and technological revolution (continuously broadened knowledge acquired with the use of scientific methods). Consequently, smaller and inefficient agricultural holdings will give way to farms with competitive capacity and potential competitive capacity. These might have to face unfavourable economic conditions for agricultural products until the end of the first half of this year.

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8. Development of exporting clusters in the context of international competitiveness of the Polish agri-food sector

8.1. Introduction

The competitiveness of national economies and their individual sectors in the international dimension has become a matter of general interest in the world of science and economic policy since the 1980s, when the Presidential Commission on the Industrial Competitiveness in the United States started its works to support the US economy in practice, so that it could regain its competitive advantage in a number of key branches in that period. In the summary report, the competitiveness was defined as a degree to which a nation can, under free and fair market conditions, produce goods and provide services that meet the test of international markets, while at the same time maintaining or expanding the real incomes of its citizens¹. Although some time has elapsed since the moment it was defined, the definition of competitiveness in the international dimension seems to remain valid, although it is a statement from which no concrete normative conclusions result on how to achieve the desirable state in this respect.

Empirical observations of actions leading to success on international markets show quite clearly that the activity of specific companies expanding internationally is always its origin. On current increasingly globalising international markets, individual companies may, however, find it more and more difficult to achieve and discount competitive advantage. Apart from the competition determining the markets' competitiveness, the cooperation between different subjects turns out to be equally important and may have an impact on final effects of the activities of competing companies, and consequently on the results of the competition between national economies. In the light of the above, in the search for ways of maintaining, in particular increasing the competitiveness of the national agri-food sector, it is worth considering the possibilities which may result from the support to the development of export-oriented business clusters. An important argument for the validity of such

¹ *Global Competition – The New Reality*, [in:] *Report of the President's Commission on Industrial Competitiveness*, U.S. Government Printing Office, Washington 1985.

activities is an increasingly accepted view, propagated by M.E. Porter², that these are not individual enterprises or companies, but the very clusters which enable competitive advantages to be built and used on global markets.

Assuming that the general assumption about a positive impact of strong exporting clusters on the competitiveness of branches and sectors is justified, it should be borne in mind, at the same time, that the promotion of the development of such clusters under public intervention should not be incidental, but should result from a well thought-over evaluation of the development potential of clusters, the basis of which is an appropriate level of economic activity concentration. Using the results of the studies on mapping of agri-food clusters in Poland and modelling their development³, this study is to answer questions which are important from the point of view of the rationality of the economic policy, namely, how the development potential of Polish agri-food clusters develops from the regional perspective, and which exporting clusters in the Polish agri-food sector should be promoted and how.

In order to identify clusters and evaluate their development potential, it is necessary to adopt or specify a specific definition of the term. This results from the fact that clusters may be considered at least from three different perspectives. The first conception is general and conceptual and results from the mostly cited definition that a cluster is “a geographic concentration of interconnected companies, specialized suppliers and service providers, firms in related industries, and associated institutions (for example universities, standards agencies, and trade associations), in particular fields that compete but also cooperate”⁴. However, the definition is not sufficient to identify clusters and their development potential in the sufficiently objective way. The second conception is analytical and based on the evaluation of the concentration degree of employment or the number of subjects and the mapping. It provides much wider possibilities. The analysis of competitive and cooperative relationships (among others, the character of cluster initiatives and their role in this respect) is also an important element of the second conception. The third conception of clusters may be construed as a model construction which is reflected in the

² M.E. Porter, *Clusters and the New Economics of Competition*, Harvard Business Review, 1998, Nov-Dec, pp. 77-90; Porter M.E., *On Competition. Updated and Expanded Edition*, A Harvard Business Review Book, Boston 2008.

³ This study was carried out as part of the research task “Clusters mapping in the agri-food sector for the purpose of modelling their development” under the Multi-Annual Programme 2011-2014, IAFE-NRI, Warszawa.

⁴ M.E. Porter, *Clusters and the New Economics of Competition*, op. cit., pp. 77-90; M.E. Porter, *On Competition. Updated and Expanded Edition*, op. cit.

cluster map and the value chain structure. In searching for answers to the questions on the development potential of agri-food clusters in Poland and ways of promoting exporting clusters, the second conception and the third conception, to a specific extent of the above mentioned definitions of clusters, were primarily used. The approach based on the so-called diamond model was also used for the purpose of the analysis⁵.

8.2. Development potential of agri-food clusters from the regional perspective

Irrespective of the belief in the importance of business clusters for economic development, their real significance for developing the competitiveness of sectors is dependent on their development potential. The evaluation of the development potential of Polish agri-food clusters was based on a commonly used measure of the relative concentration which is the location quotient. The general formula to calculate the quotient is the following:

$$LQ = \frac{\frac{x_{ij}}{x_j}}{\frac{x_{in}}{x_n}}$$

where:

x_{ij} – value of the analysed variable i in the area j ,

x_j – total value of the analysed variable in the area j ,

x_{in} – value of the analysed variable i in the reference area n ,

x_n – total value of the analysed variable in the reference area n .

The employment and the number of subjects registered in the National Official Business Register (REGON) were variables subject to analysis within the conducted studies. Values of the LQ for both variables in individual regions were calculated for three types of agri-food clusters singled out in accordance with the methodology and classification of the European Cluster Observatory (ECO). The three types of clusters include: Crop and animal production, Agricultural production and Food processing.

The threshold value of the LQ equal to 1 is the basis for concluding the occurrence of the relative concentration. In other words, wherever the condition $LQ > 1$ is fulfilled, an over-average degree of concentration of existing subjects analysed may be expected. As the number of employees together with the

⁵ M.E. Porter, *On Competition. Updated and Expanded Edition*, op. cit.; M.E. Porter, *Strategia konkurencji. Metody analizy sektorów i konkurentów*, MT Biznes, Warszawa 2010.

number of branch representatives, classified to different types of clusters, were taken into consideration for the purpose of the evaluation of the development potential of agri-food clusters, the geometric average of location quotients calculated for both variables was assumed as a synthetic measure of the potential. Therefore, the development potential of this type of clusters may be attributed to regions with $\sqrt{LQ_{zatr}LQ_{podm}} > 1$. Results of the calculations are included in Tables 8.1-8.3.

The calculated values of location quotients suggest a high regional differentiation of the development potential of agri-food clusters as singled out in accordance with the typology of the ECO. For the cluster “Crop and animal production”, the development potential is the highest for the following regions: Kujawsko-Pomorskie, Lubelskie, Opolskie, Warmińsko-Mazurskie, Wielkopolskie and Zachodniopomorskie. The development potential of clusters “Agricultural production” was observed in the six following regions: Kujawsko-Pomorskie, Lubelskie, Łódzkie, Opolskie, Podlaskie and Wielkopolskie. The cluster “Food processing” is the most frequent one among Polish regions. The group includes the following regions: Kujawsko-Pomorskie, Lubelskie, Łódzkie, Małopolskie, Opolskie, Podkarpackie, Podlaskie, Świętokrzyskie, Warmińsko-Mazurskie and Wielkopolskie.

Table 8.1. Values of location quotients (LQ) for the cluster “Crop and animal production” for individual regions

Region	LQ_{podm}	LQ_{zatr}	$\sqrt{LQ_{zatr}LQ_{podm}}$
Dolnośląskie	1.24	0.70	0.93
Kujawsko-Pomorskie	2.60	0.97	1.59
Lubelskie	0.75	1.08	0.90
Lubuskie	2.45	1.47	1.90
Łódzkie	0.68	1.07	0.85
Małopolskie	0.53	0.69	0.60
Mazowieckie	0.19	0.65	0.35
Opolskie	2.52	2.55	2.53
Podkarpackie	0.38	0.38	0.38
Podlaskie	0.45	0.76	0.59
Pomorskie	0.83	0.62	0.72
Śląskie	0.26	0.68	0.42
Świętokrzyskie	0.34	0.51	0.42
Warmińsko-Mazurskie	1.13	1.58	1.33
Wielkopolskie	2.82	2.45	2.63
Zachodniopomorskie	2.52	1.04	1.62

Source: own calculations on the basis of the data of the Central Statistical Office of Poland.

Table 8.2. Values of location quotients (LQ) for the cluster “Agricultural production” for individual regions

Region	LQ_{podm}	LQ_{zatr}	$\sqrt{LQ_{zatr}LQ_{podm}}$
Dolnośląskie	0.58	0.77	0.67
Kujawsko-Pomorskie	1.70	1.65	1.68
Lubelskie	1.26	1.60	1.42
Lubuskie	0.55	1.15	0.80
Łódzkie	1.12	1.24	1.18
Małopolskie	0.41	0.77	0.56
Mazowieckie	0.55	0.88	0.69
Opolskie	2.17	1.27	1.66
Podkarpackie	0.88	0.93	0.91
Podlaskie	0.96	1.48	1.19
Pomorskie	0.79	0.76	0.77
Śląskie	0.79	0.66	0.72
Świętokrzyskie	1.04	0.96	1.00
Warmińsko-Mazurskie	0.71	1.19	0.92
Wielkopolskie	2.49	1.27	1.78
Zachodniopomorskie	1.04	0.93	0.98

Source: own calculations on the basis of the data of the Central Statistical Office of Poland.

Table 8.3. Values of location quotients (LQ) for the cluster “Food processing” for individual regions

Region	LQ_{podm}	LQ_{zatr}	$\sqrt{LQ_{zatr}LQ_{podm}}$
Dolnośląskie	0.50	0.72	0.60
Kujawsko-Pomorskie	1.34	1.19	1.27
Lubelskie	1.30	1.28	1.29
Lubuskie	0.99	0.91	0.95
Łódzkie	1.16	1.39	1.27
Małopolskie	1.00	1.03	1.01
Mazowieckie	0.89	0.84	0.87
Opolskie	0.92	1.17	1.04
Podkarpackie	0.97	1.12	1.04
Podlaskie	1.61	1.13	1.35
Pomorskie	0.72	0.76	0.74
Śląskie	0.71	0.92	0.81
Świętokrzyskie	0.96	1.24	1.09
Warmińsko-Mazurskie	1.82	0.93	1.30
Wielkopolskie	1.30	1.30	1.30
Zachodniopomorskie	0.83	0.74	0.79

Source: own calculations on the basis of the data of the Central Statistical Office of Poland.

The evaluation of the development potential of clusters in terms of the concentration of the number of subjects and the related employment may be enriched with the analysis of the occurrence of cluster initiatives as well as the evaluation of the character of their branch orientation⁶. The objective is to consider the matter of development possibilities of strong agri-food clusters not only from the perspective of natural and economic conditions, but also from the perspective of institutional promotion⁷. The cluster initiative means an organised activity focused on developing and strengthening the cluster's competitiveness, not only by its enterprises, but also by subjects representing authorities and research entities⁸. The promotion of cluster initiatives has become one of the leading elements of current economic policies in many developed countries. However, it must be borne in mind that cluster initiatives may be created in practice independently of the economic activity concentration degree, as well as processes of competitiveness and cooperation in currently existing clusters. In this respect, three alternative scenarios of relationships between the objective occurrence of naturally formed clusters and the creation of cluster initiatives may be singled out. The first scenario assumes a situation when a particular type of economic activity intensifies in the particular area, together with the processes of competition and cooperation, although no organisation has come into existence which could support the cluster. The second scenario, diametrically different from the above one, assumes that the cluster initiative is created when the processes of concentration and spatial specialisation do not exist or exist at preliminary stages. This scenario is usually carried out together with authorities at different levels and by means of public resources in hope that it will contribute to the creation of concentrations of enterprises with a homogeneous profile of operations, and consequently to the creation of a cluster. The third scenario assumes the creation of cluster initiatives to support existing cluster structures. From the point of view of the economic policy focused on promoting clusters, this scenario may be considered as the most desirable option, as it assumes the conformity of time and space in the cluster's functioning and its supporting cluster initiative.

⁶ S. Figiel, D. Kuberska, J. Kufel, *Klustry i inicjatywy klastrowe w polskim sektorze rolno-żywnościowym*, Multi-Annual Programme 2011-2014, no. 48, IAFE-NRI, Warszawa 2012, pp. 19-20.

⁷ S. Figiel, D. Kuberska, J. Kufel, *Analiza uwarunkowań i stanu rozwoju klastrów rolno-żywnościowych w Polsce*, Multi-Annual Programme 2011-2014, no. 15, IAFE-NRI, Warszawa 2011, pp. 99-100.

⁸ Ö. Sölvell, *Clusters – Balancing Evolutionary and Constructive Forces*, Ivory Tower, Stockholm 2009.

As part of the studies, 132 cluster initiatives were identified on the basis of the Internet research, which function in different areas of the agri-food sector or are connected with the sector or rural areas in terms of resources. The identified initiatives were analysed in terms of the type of their subjects and the character of their conducted activities. Each initiative was awarded from 0 to 3 pluses depending on the number of subjects operating in economic activity areas related to the three identified types of agri-food clusters⁹.

The conformity analysis of the occurrence of cluster initiatives with the economic cluster potential was conducted by means of the index of intensity and branch orientation of initiatives (INOB) which was specifically elaborated for that purpose, with the following formula:

$$INOB = \sqrt{\frac{N_i(I)}{\mu(I)} \frac{N_i(+)}{\mu(+)}}$$

where:

$N_i(I)$ – number of initiatives of the particular category in the region,

$\mu(I)$ – average number of initiatives of the particular category per region,

$N_i(+)$ – number of pluses awarded in the particular category of initiatives in the region,

$\mu(+)$ – average number of pluses awarded in the particular category of initiatives per one region.

The basis of the evaluation of the conformity of the occurrence of cluster initiatives in individual regions with their economic cluster potential was the comparison of the values of the index of intensity and branch orientation of initiatives (INOB) with the values of the location quotient (LQ), both for the employment and the number of subjects. In evaluating the conformity of the occurrence of analysed cluster initiatives with the cluster potential, it was assumed that the most desirable situation from the point of view of the effectiveness of the promotion of the development of clusters in the agri-food sector under public intervention is the situation when cluster initiatives fulfil two conditions. Firstly, their subjective and objective profile is characterised by the tightest possible relation with the objective scope of activity, as classified to the three considered types of agri-food clusters. Secondly, they function in the locations (regions) where there are quite strong clusters mapped on the basis of the employment and the number of subjects. In other words, the objective is that the occurrence and the branch orientation of cluster initiatives, evaluated by

⁹ S. Figiel, D. Kuberska, J. Kufel, *Klasy i inicjatywy klasztorne w polskim sektorze rolno-żywnościowym*, op. cit.

means of the INOB index, are as consistent as possible with the type, in particular with the development potential of clusters in the particular region, evaluated by means of the location quotient (LQ_{zatr} or LQ_{podm}).

With regard to the adopted criteria of evaluation of the clusters' strength, it was assumed that a high degree of conformity of the occurrence of cluster initiatives with the cluster potential existing in the particular region is when the values of the INOB index higher than one occur together with the values of the geometric average of the location quotients LQ_{zatr} and LQ_{podm} (LQ) higher than one, reflecting the development potential of clusters. An overview of the results of the analysis is included in Table 8.4.

Table 8.4. Values of the *INOB* index in comparison with values of the location quotient (*LQ*) for three types of agri-food clusters in individual regions

Region	Type UiCHZ		Type PR		Type PŻ	
	<i>LQ</i>	<i>INOB</i>	<i>LQ</i>	<i>INOB</i>	<i>LQ</i>	<i>INOB</i>
Dolnośląskie	0.93	1.08	0.67	1.61	0.60	0.83
Kujawsko-Pomorskie	1.59	0.62	1.68	0.66	1.27	0.39
Lubelskie	0.90	0.88	1.42	0.93	1.29	1.34
Lubuskie	1.90	0.51	0.80	1.14	0.95	0.63
Łódzkie	0.85	1.53	1.18	1.97	1.27	1.22
Małopolskie	0.60	0.36	0.56	0.66	1.01	0.39
Mazowieckie	0.35	1.97	0.69	1.31	0.87	1.38
Opolskie	2.53	0.00	1.66	0.00	1.04	0.16
Podkarpackie	0.38	1.53	0.91	1.31	1.04	1.11
Podlaskie	0.59	1.61	1.19	0.66	1.35	1.89
Pomorskie	0.72	0.62	0.77	1.31	0.74	1.11
Śląskie	0.42	0.00	0.72	0.00	0.81	0.22
Świętokrzyskie	0.42	1.90	1.00	1.31	1.09	0.86
Warmińsko-Mazurskie	1.33	2.49	0.92	0.66	1.30	1.99
Wielkopolskie	2.63	0.36	1.78	0.66	1.30	1.45
Zachodniopomorskie	1.62	0.36	0.98	0.66	0.79	0.95

Types of clusters: UiCHZ – Crop and animal production, PR – Agricultural production, PŻ – Food processing.

Source: own calculations on the basis of the data of the Central Statistical Office of Poland and the results of conducted studies.

Apart from the values of the geometric average of the location quotients LQ_{zatr} and LQ_{podm} (LQ), the values of the INOB index were provided for each type of clusters in individual regions. The values LQ and INOB for individual regions are higher than one only in 9 out of 48 analysed cases. With regard to the type “Crop and animal production”, the above characteristic was observed only in the region Warmińsko-Mazurskie, while with regard to the type “Agricultural production” in the regions Łódzkie and Świętokrzyskie. The

highest number of conformity cases for 6 regions refers to the type “Food processing”. While evaluating the conformity of the occurrence of cluster initiatives and their branch orientation profiles with the development potential of agri-food clusters in individual regions through the adopted measures and assumptions, it may be concluded that the most desirable scenario from the point of view of the rationality of the promotion policy is used less frequently than it could be expected. The above statement is of high importance for the correct targeting of potential public intervention aimed at promoting business clusters related to the agri-food sector.

8.3. Selection of key exporting clusters in the Polish agri-food sectors in terms of the promotion of their development

Theoretically, the positive impact of clusters’ functioning in the economic area on the sector’s competitiveness results, above all, from external economies of scale. Sources of such advantages are, among others, the following¹⁰:

- access to a common labour market and common public goods, e.g. infrastructure of educational institutions,
- development of auxiliary and supporting branches which supply the district core with specialised outlays and services,
- development of the local market of qualified staff,
- easy transfer of skills and innovations together with positive spill-over effects,
- lower transport and transaction costs thanks to the proximity of the location of companies along the chain value,
- possibility to jointly use specialised machinery and equipment.

The accuracy of theoretical assumptions about the positive impact of clusters on the competitiveness of economies and their individual sectors are confirmed by the results of empirical studies more and more often¹¹. The so-called exporting clusters, which are groupings of interconnected branches servicing markets outside their home region, have a basic role to play in this respect in the international dimension. The place of operation is selected in

¹⁰ D.B. Audretsch, O. Falck, S. Heblich, *It’s All in Marshall: The Impact of External Economies on Regional Dynamics*, CESifo Working Paper 2007, 2094, www.researchgate.net. Downloaded on 11 November 2013.

¹¹ S. Figiel, D. Kuberska, J. Kufel, *Rola klastrów w konkurencyjnym rozwoju sektora rolno-żywnościowego w Polsce*, Multi-Annual Programme 2011-2014, no. 92, IAFE-NRI, Warszawa 2013, pp. 55-73; A. Kowalski, *Rola klastrów w intensyfikacji współpracy nauki z gospodarką*, [in:] M. Weresa (ed.), *Polska – Raport o konkurencyjności 2010. Klastry przemysłowe a przewagi konkurencyjne*, Oficyna Wydawnicza SGH, Warszawa 2010; Ö. Sölvell, *Clusters – Balancing Evolutionary...*, op. cit.

a discretionary way, unless the location of natural resources determines the place of operation. They tend to be founded in regions with a specific competitive advantage. While operating on interregional and international markets, exporting clusters confront competitors from other regions. Therefore, they are considered to be a driving force for regional economies, which enables to achieve a high level of economic development. On the basis of the results of the analyses, three types of key exporting clusters were identified in the Polish agri-food sector, which may potentially have the biggest and positive impact on its competitiveness, as well as the biggest chance to play an important role globally. The identified clusters include berry, poultry and dairy clusters.

In selecting the clusters, the development potential reflected in the relative concentration of the number of subjects in individual agri-food branches was taken into consideration as well as the results of their exports together with the current situation in comparison with global competitors. It was assumed that agri-food exporting clusters, which are strong in the international dimension, may successfully function and increase their strength when the degree of fulfilment of these criteria is so outstanding that their promotion under the cluster policy could result in required effects quite quickly.

Table 8.5 shows that each of the identified clusters is based on the clearly visible concentration of the number of subjects operating in branches which are the basis of their functioning¹². Aspects of the relative concentration of these subjects ($LQ > 1$), referring at least to one activity class, may be encountered in 11 regions for berries and berry products, in 10 regions for poultry and poultry products and dairy products.

What is important from the point of view of international competitiveness, the volume and value of the production delivered by the analysed branches situates Poland among the most important producers of these goods and products not only within the EU, but also globally. Poland is the leader in the berry production in the EU and a very significant producer globally. In 2010-2013, the national berry production exceeded on average 550 thousand tons a year. Poland is the global leader in the production of chokeberries (90% of world crops) and blackcurrants (approx. 50% of the global production). It is also one of the leading global producers of gooseberries and strawberries. In 2004-2013, the exports of fresh fruit doubled up to a level exceeding EUR 80 million. In 2013, the total value of exports of processed fruit and fruit juices exceeded EUR 1 billion. Even though berries constitute only 2% of the total exports of agri-food products in Poland, the strong growth dynamics of exports

¹² The branches were singled out by selecting appropriate classes according to the Polish Classification of Activities (PKD) 2007.

and the increasing importance of Polish suppliers on international markets after the accession to the EU, as well as the high level of production specialisation, resulting, among others, from natural conditions, predestines this branch to develop a strong exporting cluster.

Table 8.5. Concentration of the number of subjects (LQ) by activity classes classified to the selected agri-food clusters in the regional dimension

Region	Berries and berry products			Poultry and poultry products		Dairy products	
	0125*	1032*	1039*	0147*	1012*	0141*	1051*
Dolnośląskie	1.08	<1	<1	<1	<1	<1	<1
Kujawsko-Pomorskie	<1	<1	1.47	<1	<1	1.68	1.58
Lubelskie	2.46	<1	2.03	1.17	<1	1.16	1.22
Lubuskie	1.55	<1	<1	2.39	2.58	1.43	<1
Łódzkie	1.28	2.2	1.6	1.17	1.34	<1	1.28
Małopolskie	<1	1.06	<1	<1	<1	<1	1.27
Mazowieckie	1.17	1.65	1.3	<1	<1	<1	1.16
Opolskie	<1	<1	<1	1.4	<1	<1	1.17
Podkarpackie	<1	<1	<1	<1	<1	<1	<1
Podlaskie	<1	<1	<1	1.21	1.07	5.55	1.72
Pomorskie	<1	<1	<1	<1	1.1	<1	<1
Śląskie	<1	1.19	<1	<1	1.07	<1	<1
Świętokrzyskie	<1	1.15	<1	1.11	2.51	<1	<1
Warmińsko-Mazurskie	<1	<1	<1	2.28	2.29	2.54	1.37
Wielkopolskie	1.35	<1	1.66	1.4	1.33	2.15	1.31
Zachodniopomorskie	1.97	1.18	<1	<1	<1	<1	<1

* – Class number according to the Polish Classification of Activities (PKD); 0125 – Growing of other tree and bush fruits and nuts; 1032 – Manufacture of fruit and vegetable juice; 1039 – Other processing and preserving of fruit and vegetables; 0147 – Raising of poultry; 1012 – Processing and preserving of poultry meat; 0141 – Raising of dairy cattle; 1051 – Operation of dairies and cheese making.

Source: own calculations on the basis of the data of the Central Statistical Office of Poland.

The Polish poultry branch holds also a significant position on the commercial international arena. Poland is the fourth largest producer of poultry meat in the EU with its market share exceeding 10%. In 2006-2013, the production of poultry meat in Poland increased by 50% up to 2 million tons, while the production of poultry products increased by 40% up to 380 thousand tons. In 2013, 30% of the production of poultry meat was exported, which was equivalent to 5.2% of the global exports of poultry meat. In 2004-2013, the value of Polish exports of poultry meat and products nearly quadrupled up to EUR 1.3 billion, which was equivalent to 6.6% of the total exports of the Polish agri-food sector. Poultry meat and products were the second largest product

group in terms of the value of the Polish agri-food exports¹³ in 2013. It is also worth pointing out that the share of poultry meat in the total exports of meat (44%) significantly exceeds the shares of pigmeat (34%) and beef (22%).

The dairy sector also stands out in terms of the production scale and results achieved in international trade by the Polish agri-food sector. In 2011-2013, the average production of dairy products (as a proportion of milk) amounted to 12.6 million tons. Poland is the fourth largest producer of cow's milk and the seventh largest producer of dairy products in the EU. In 2013, 18.1% of the production of dairy products (as a proportion of milk) were exported. In 2004-2013, the value of exports of dairy products nearly doubled up to EUR 1.7 billion (8.3% of the total value of exports of the Polish agri-food sector). In 2013, cheese and curd were the seventh largest product group in terms of the value of exports of the Polish agri-food products.

Summing up the results of the analysis of rationales for the presented selection of key exporting agri-food clusters in Poland, it must be underlined that they reflect the degree of fulfilment of the adopted criteria for identifying the development potential of clusters embedded in different branches of the national agri-food sector. The identified branches have a relatively high, characteristic for the majority of regions, degree of activity concentration, while products produced by their subjects are among the most important products of the Polish agri-food exports. Therefore, clusters, which are potentially related to these subjects, may be undoubtedly treated as exporting clusters. What is more, the national production scale of international importance and existing production capacities are the basis not only for maintaining, but also strengthening their current competitive position both on the European and the global market.

8.4. Summary

The promotion of the development of business clusters is becoming a paradigm of current economic growth policies in response to the progressive globalisation and increasing difficulties in maintaining the competitiveness of national economies internationally. Strong exporting clusters, which are considered to be economic structures enhancing the improvement of competitive advantages, are believed to play a specific role in this respect. However, the effective implementation of the economic policy focused on the development of such clusters requires well thought-over actions, based on a thorough evaluation of their development potential and their impact on the competitiveness of individual sectors of the economy. The regionalisation and the dispersion of

¹³ 4-digit aggregation level CN.

supporting measures does not stimulate the key goal of this policy, which is the increase in the competitiveness, in particular when cluster initiatives created and operated often irrespective of real economic conditions of the clusters' development benefit from this support.

The development potential of agri-food clusters in Poland is highly differentiated, both from the regional and sector perspective. Therefore, it is necessary to make rational choices in terms of directions and levels of promotion within the cluster policy. Taking into consideration the results of the conducted analyses, it seems that berry, poultry and dairy clusters in the Polish agri-food sector are the most probable to become strong, global exporting clusters. The promotion of their development under public intervention aimed at building an international competitive position should be focused on strengthening the weakest elements in the structure of the particular cluster and development cooperative relationships which are fundamental to shaping value chains. Such elements may be identified by means of elaborating relevant maps of clusters and analyses of their structures in terms of the Porter's diamond model¹⁴. The development of cooperative relationships requires in turn, first and foremost, all shareholders to be actively involved and should be natural. The involvement may be induced by increasing the awareness of all interested parties of the community of interests, in which public-sector subjects with an appropriate set of tools of cluster policies and scientific centres should play a key role.

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¹⁴ M.E. Porter, *On Competition. Updated and Expanded Edition*, op. cit.; M.E. Porter, *Strategia konkurencji...*, op. cit.

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Conclusions

Balance is one of the most important concepts of economics. The aim of modern economy systems is not to maintain the once achieved balance, but to seek its new positions on other, higher levels. The situation on the global food markets is undergoing far-reaching transformations. High-technology allows us to increase the production of food relatively easily, while traditional agriculture, dominated by production factors such as land and low-qualified labour force, is undergoing depreciation. The enlargement of the EU by 12 countries has created conditions for a distortion of balance which had already been hard to achieve on the European market. Seeking new balance has a significant and currently unpredictable impact on the global market, especially that the balance itself is dynamic. Along with globalisation and integration processes, differences in the preferences of consumers are decreasing. This results from continuous convergence of prices of goods and services, and the equalisation of purchasing power parities and standards of living in more and more areas of the globe. It needs to be pointed out, however, that the unification of markets has its natural limits which cannot be crossed even in the long run.

The past fundamentals of competitiveness in the Polish economy, such as: low labour costs, low prices of land and energy, are losing their significance while the importance of financial contributions to research and development, innovation and demographics is increasing. In the context of open borders it becomes important to ensure that the competitiveness on the internal and external markets is maintained. The development strategy for the Polish agri-food sector has to recognise these phenomena, which is why Poland should participate in shaping of the new EU strategies. Passive adaptation to the changing reality must be replaced by grasping the opportunities provided by the access to the single market and the globalisation of the economy.

The time of relative stabilisation of the global food economy and the main agri-food markets ended along with the onset of the 2007 global recession. Meanwhile, the Polish agri-food sector depends on external markets to an increasingly greater extent. This results from dynamic changes that are taking place in international relations, including ongoing globalisation and regional integration. The fast-growing foreign trade volumes in agri-food products, and the improvement of the positive trade balance have confirmed the existence of a marked influence of external markets on the domestic agri-food sector. At the same time, limited chances for an increase in demand on the internal market

constituted a barrier to its further growth. Thus, over the last few years non-domestic sales have played a key role in the development of agriculture and food industry. The economic fluctuations were expressed by high volatility of prices, influencing economic and financial performance of agri-food production and food processing. The economic fluctuations, ongoing WTO negotiations within the Doha Development Round, negotiated bilateral and multilateral trade agreements and modifications of the CAP and the CCP, further deepened the insecurity of market participants. By changing the market environment of Polish farmers and food processors, these processes had a profound influence on their economic prospects and competitiveness, creating new opportunities for development along with additional threats.

One of the mechanisms that positively influenced the competitiveness of the food economy and rural development in 2010-2014 was a comprehensive and complementary public policy, which applied RDP 2007-2013 and Structural Funds. Policy planning during that time was a long-term process that recognised socio-economic trends while allowing for the specificity of individual regions. Its aim was to increase competitiveness as well as multifunctional and sustainable rural development. The instruments of the agricultural policy and the regional development policy covered agriculture, non-agricultural activities in rural areas and non-market activities which were inseparably linked with agricultural production. The development of agriculture was especially fostered by RDP 2007-2013 instruments, which supported competitiveness among agricultural holdings and agri-food enterprises, increase in food quality, and structural changes. Environmental protection was supported by activities aimed at achieving biodiversity, conservation of soil and water, and obtaining renewable energy sources. Rural development was aided by measures that supported the development of entrepreneurship and non-agricultural activities, technical and social infrastructure development, increase in the quality of human capital and professional activation of rural residents. The direct payments were among the most important instruments that increased the agricultural holdings investment capabilities and farmers' income. The market- and development-oriented CAP, structural policy and regional development policy were key elements of the improvement of the competitiveness of the agri-food sector, entrepreneurship development and increased economic importance of rural areas as well as the protection of the natural environment and cultural heritage.

In this context it should be noted that the sustainable development of agriculture is no longer just an idea, but has become an element that determines its strategic direction. The last two decades have provided new arguments for the realisation of the idea of sustainable agricultural development, which came

into being in order to alleviate: the results of climate change, food quality and health risks, environmental degradation, limited natural resources, decreased biodiversity, waste of food accompanied by hunger, on the one hand, and obesity, on the other. Polish agriculture has not been spared by these negative trends. Environmentally friendly practices are applied on a small share of domestic agricultural land. Moreover, we observed a significant decrease in the area of agricultural land, negative balance of organic matter in soil, unreasonable management of water, excessive use of mineral fertilisers and crop protection chemicals, profit inefficiency, low fixed asset restoration, reduction of biodiversity, loss of cultural values and so on. Obviously, the reasons for such a state of affairs are not only in agriculture and history, but also, and perhaps most importantly, outside this sector. Here, we can point to consumerism or the industrial orientation of the research and development sector.

Considering the balance, the issue of food safety should be raised. It is attained only in the case of concurrent provision of socio-economic security and maintenance of domestic production on a level that guarantees accessibility of food, positive foreign trade balance and food reserves as well as proper processing and distribution. Food security is mostly a result of institutional solutions applied in the sphere of policy, economy and society. In order to achieve food security without further degradation of the environment, we need to implement the principles of sustainable agriculture. Sustainable agriculture involves food production with a minimal use of fertilisers and plant protection products and oriented towards cultivating land in a way that does not degrade its natural resources, but rather allows us to satisfy the basic needs of the future generations of producers and consumers. The implementation of sustainable agriculture model is a chance for Poland to gain competitive advantage on the global market. Sustainable food choices, compatible with the recommendations of the World Health Organisation (WHO), rationalisation of nutrition and reduction of food wastage in the whole agri-food system may contribute to a more effective resource management, leading to food security.

When analysing the socio-economic policy, it is extremely important to formulate rules of coherent policy in the scope of agriculture, environment, health and education. The implementation of such policy will contribute to:

- an increase in the competitiveness of agriculture, and hence the whole agri-food sector;
- an increase in the use of labour resources and improvement of the economic situation of farming families;
- improvement of the environment and sustainable consumption;

- improvement of human health and deliberate reduction of healthcare costs associated with the treatment of chronic non-communicable diseases;
- an increase in the environmental, nutritional and health awareness of the Polish society by educating all groups of people, mostly children.

As a result, this policy will contribute to an increase in economic prosperity. This mostly concerns rural areas, which are more and more diversified when it comes to their social structure, economic growth and conditions that shape the transition process. Apart from a dynamic growth of rural areas located in regions with a relatively differentiated economic structure, there are also peripheral areas. These are usually economically monofunctional, with relatively worse infrastructure, heightened demographic problems (ageing population, migration) and social difficulties (high unemployment, poverty). However, the investment attractiveness depends not only on the scale of investments in infrastructure, but also on the significance of management mechanisms and the ways in which these investments are oriented. Hence, the support for the growth and competitiveness of individual areas requires more and more selective actions involving identified objectives and instruments within the realised agricultural policy. Among the changing conditions influencing rural development, agrarian transformation plays a particular role. It is largely determined by the weakening position of a farmer – producer in the food chain. There is a continuous spatial differentiation within the structures of agriculture and agricultural culture, as well as advanced diversification of the functions performed by farms.

The EU Member States have always strived for the creation of a socio-economic model that would constitute a universal example to be followed by all states and at the same time ensure Europe's prosperity and distinguish Europe from the rest of the world. For many years such example for a great number of Europeans was the European Social Model, which was a system based on a high level of social security, social dialogue and public services ensuring activity with vital significance in social cohesion. Economic and political changes in the nineties and after 2000 made this model less distinctive. The crisis of the West European welfare state has led to some changes in the socio-economic models of the EU Member States. After their accession, new Member States had to face the inefficiency of the European model of market economy, to which they had adjusted. Due to these experiences the prospective questions about the socio-economic models of the EU Member States are of primary importance to its future.

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