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

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

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The publication was prepared within the Multi-Annual Programme **"Competitiveness of the Polish food economy in the conditions of globalization and European integration"**

The purpose of the study is to analyse the issue of competitiveness of agriculture and food economy. The authors of chapters included in this volume try to answer the questions concerning above-mentioned phenomenon, particularly in the light of globalization and European integration processes.

Contents

Foreword

This study attempts at taking a multi-faceted look at the issue of competitiveness of food economics and its individual elements. It consist of 16 original chapters forming a research work cohesive in terms of concept, which was developed with the involvement of representatives of research community from the following 12 research centres. Institute of Agricultural and Food Economics – National Research Institute, Warsaw; Research Centre for Agri-Food Economy and Development – Catalonia Polytechnic University – Research and Technology Food and Agriculture Castelldefels, Spain; Faculty of Market and Marketing, University of Life Sciences, Poznań; Institute of Farm Economics, von Thünen Institute, Braunschweig, Germany; Institute of Agricultural Economics, Sofia, Bulgaria; National Scientific Centre "Institute of Agrarian Economics" Kiev, Ukraine; Research Centre for Regional Analyses and Policies, The Bucharest Academy of Economic Studies, Romania; Research Institute of Agricultural Economics, Budapest, Hungary; Czech University of Agriculture, Prague; Institute of Innovative Providing and National Academy of Agrarian Sciences of Ukraine; Centre Economique Rural en France.

The deliberations included in this publication are focused around the processes of globalization and European integration deemed extremely significant for the trends and pace of current economic changes. Regardless of different research preferences, the level of the analysis (micro-macro), empirical examples pertaining to various countries, the works of individual authors demonstrate that the competitiveness of food economics is always linked to factors of different nature. On the one hand, there are the phenomena of endogenous nature, but at the same time, they remain largely dependent on the surrounding and exogenous impacts. At this background, some part of the works consider the scope and scale of public intervention as an important factor in competitiveness of the described sector.

The study opens with an introduction by professor Andrzej Kowalski. Professor Kowalski analyses the current global socio-economic situation. In the opinion of the author such phenomena as: deficit of natural resources, financial crisis, climate change or increase in uncertainty and risk are the challenges which force different actors to give a quick and adequate response. One of these actors is the European Union. In his view another important problem is whether the social sciences catch up with and correspond to the challenges of the present reality.

The next chapter by professor Józef Zegar on socio-economic competitiveness in agriculture. Therein the author discussed the essence of the currently predominating model of competitiveness and presents its most significant economic, social and environmental consequences. The criticism of the competitiveness concept of mainstream economy presented in that paper is accompanied by a proposal to extend it to social dimension. However, according to the author intervention of an institutional factor at various levels is required in order to im-

plement this postulate, which consists in considering externalities in market goods production and maintenance/creation of public goods, in reference to agriculture. In this context it is also necessary to find a solution to the problems related to the growing global demand for food or limited possibilities as regards conducting policy oriented at social goals.

The chapter by professor Wojciech Józwiak focuses on the issue of competitiveness and progress in the Polish agriculture. An assessment of domestic agricultural producers in respect to these aspects in conducted for the following periods: 1999-2003; 2005-2009, and respective scenarios for 2013 are presented. The text includes answers to many important questions troubling the researchers of the Polish agriculture. Firstly, what were the sources of increased productivity of domestic agriculture and its competitiveness after Poland's accession to the EU? Secondly, will the positive trends in this field continue in the future? Thirdly, what can be the economic standing of Polish agricultural producers on the verge of the new EU financial perspective and reformed CAP?

Apart from dynamic and deep changes in the Polish agriculture, the first decade of the 2000s implied also intensive transformations at another level of the domestic food chain – processing industry. The key manifestations of these changes are covered in the chapter co-written by dr Iwona Szczepaniak and dr Robert Mroczek. Analysis of production patterns, scale of investment activity, labour productivity, economic viability, pattern of business breakdown structure or the competitiveness indicators allows the authors to formulate assessments as regards the pace of Polish food industry development and the level of its competiveness on the regional (EU) and supra-regional scale. Moreover, the work defines more and less competitive branches of the sector, as well as indicates the most significant sources of the competitive advantages achieved by them.

As shown by the research results, food economy has been the object of intensive public support, both at the national and Community level. State aid is surrounded by a number of controversies for a long time now. The paper of dr Marek Wigier focuses on the issue of determinants, manifestations and consequences of public intervention, which took place in the Polish agricultural sector and food industry on the basis of CAP funds. The significance of CAP impact was demonstrated in reference to agriculture, above all, in the structural changes (agrarian structure), income situation of farmers and provision of fixed production assets on agricultural holdings. On the other hand, the analysis presented in relation to food industry concerned assessment of the significance of the EU aid in the modernisation process and growth in its competitiveness, in particular the impact of public funds on the adjustment to the sanitary and veterinary requirements binding in the EU, improvement of the production quality and growth in its value added, as well as marketing of new products.

The level and comprehensiveness of Community support bear witness to its considerable significance for the Polish agriculture and rural areas. Thus, the issue of size and shape of the EU multiannual financial framework for 2014-

-2020 becomes especially important. In the subsequent chapter dr Barbara Wieliczko discusses the budget proposals of the European Commission for the upcoming financial perspective focusing on agriculture and rural areas. She also presents the possible consequences of the implementation of the projected assumptions at the national level. The projected continuation, or what is more likely according to the author, reduction of the total EU support for Poland will translate not only into the shape of the future instruments of the first and second CAP pillar and the situation of its beneficiaries, but also it will bring specific results to the macro-economic policy of the state.

Price transmission is one of the basic mechanisms taking place at the agricultural markets. This is the object of many a research, especially in the vertical structures of different markets, lamb meat market among them. In the subsequent chapter professor Jose Gil and dr Monia Ben Kaabia analyse, with the use of data in the form of time series, the existing asymmetries in the process of price transmission between the agricultural holding and the retail distribution channel. The Spanish researchers are primarily interested in an answer to the question: whether lamb meat producers benefited from unforeseen demand and supply shocks.

The asymmetries in the price adjustment process testify e.g. to the fact that economic activity is inseparable with insecurity and high level of risk. Forecasting models present a way to minimize the risk and insecurity regarding the price shaping process, they provide information to market participants that can be useful both in short and long-term perspective. Competitive advantage may be achieved through the use of forecasts. These tools should, at the same time, underlie the economic decision-making processes being at the discretion of public authorities. Dr Mariusz Hamulczuk discusses the issue of forecasting the prices of agricultural raw materials with the use of time series. His research concerns short-term forecasts on the wheat market. Moreover, the author assesses the forecasting value of selected time series models at the background of experts' forecasts and those developed based on naive models.

Forecasting of wheat prices becomes increasingly important. Since, on the global scale, it is a cereal that enjoys growing interest among both producers and consumers. The strengthening competition between key wheat market players is related to actions driving at achievement of competitive advantage. Acquiring the right knowledge, use of the owned resources or the introduction of a specific production technology can determine the financial result, which will be satisfactory to the agricultural producer. The work of dr Paweł Boczar and dr Yelto Zimmer compares agricultural holdings producing wheat in respect to the achieved production costs and applied technologies. The holdings selected for the comparison are in the states being the worldwide key participants of the described market: the United States, Canada, Argentina, Australia, Russia, Ukraine, Kazakhstan and the EU countries. The comparison aims at indicating some selected factors that precondition the competitiveness of wheat cultivation.

The next chapter co-written by professor Rumen Popov and professor Plamena Yovchevska entitled "Priorities of Bulgarian agriculture as factors in competitiveness of the agri-food sector" contains an analysis of the main medium-term objectives of Bulgarian agricultural policy. The discussion is based on compilation of selected indicators pertaining to the condition of agriculture in Bulgaria at the background of respective characteristics of the sector in the EU, as well as a SWOT analysis of the sector. In Bulgaria, just like in other new Member States, European integration and growth in the global demand for food are perceived as considerable opportunities. In the opinion of the authors their use will depend on the occurrence of structural changes related to the efficient use of agricultural land resources, raising qualifications of the labour force, development of scientific research and advisory system, better access of agricultural producers to the market, increasing the share of high value added products and development of local markets and products.

Common European market provides opportunities not only to the EU Member States. Accession to the WTO and strengthened economic relations of Ukraine with the Community contribute to better prospects for the agriculture of this country. The most important features of Ukrainian agriculture were presented in the study of professor Yury Lupenko. According to the author this is a sector of strategic significance for the economy of that country. Its enormous potential can be most effectively used by way of close integration with the EU.

Next the paper of professor Gabriel Popescu covers the main problems of Romanian agriculture. The scale and efficiency of production in that country are among the lowest in the EU. According to the author, this situation is caused by negative quantitative and qualitative dimension of production factors input. Apart from the underdeveloped technology, the Romanian agriculture is characterised by agrarian overpopulation, negative demographic structure of rural population, unsettled agricultural land ownership structure and unsuitable regulation of the market. The text includes an answer to the question: did the CAP implemented therein since 2007 contribute to mitigation of the aforementioned structural problems?

The issue of the rural population situation, and in particular its standard of living and possibilities of creating new jobs on rural areas attracts the attention of the representatives of public institutions and agricultural economists also from other countries. The chapter written by dr Andrew Fieldsend constitutes a description of the applied methodological approach and results achieved under a research project: New Sources of Employment to Promote the Wealth-Generating Capacity of Rural Communities (Ruraljobs), supported with the funds from the 7th EU Framework Programme. The focus of the work was to identify how the specific local conditions influence the potential of the rural region as regards creation of new jobs. The analysis of the issue was conducted on the basis of eight case-studies from five different European countries. The aforementioned case studies covered also a SWOT analysis of the employment potential that was typical to each of the researched areas.

The unique features of individual regions may play a significant part in the development processes. In the literature of the subject one of such features is on many occasions found in the social capital. The level of social capital and possibilities of its generation are, however, differentiated and depend on many factors. In the next chapter professor Vera Majerova describes the feature of social capital in one of the regions in the Czech Republic – Vysocina, and attempts at determining its significance for the development of the area.

Dr Sergey Volodin, on the other hand, touches upon the issue of innovativeness as a decisive factor in competitiveness of agriculture in respect to Ukraine. The innovative policy background is shaped there as a result of cooperation between the Ministry of Agrarian Policy and Food as well as the National Academy of Agrarian Sciences. Both these institutions aim at effectiveness and competitiveness of the agri-food sector on the domestic and foreign markets. The author points to the selected determinants of development of agriculture based on innovations in Ukraine. According to the author the aforementioned area can form the grounds for cooperation with Poland and the EU.

The last work in the study is the paper written by dr Pierre Yves Lelong, which concerns the agriculture insurance system in France. The author focuses, above all, on the history, organisation and operation of the system. Just like in other EU countries, also in France the agriculture insurance system is largely funded from the state budget.

We present you with this extensive and multifaceted analysis hoping that we managed, at least to some small extent, to explain and partly answer the questions concerning the competitiveness of food economics in the light of globalization and European integration. We are aware that we failed to provide answers to all the questions pertaining to the publication title. We also know that despite the extensiveness of the study, we have not exhausted the list of questions related to the issue under consideration. Thus we will have the possibility to continue this serious discussion. Such a possibility is available to us because of the Multi-Annual Programme implemented in 2011-2014 by the Institute of Agricultural and Food Economics – National Research Institute under the title "Competitiveness of the Polish food economy in the conditions of globalization and European integration". The discussion on the issue will be continued on the platform of seminars and scientific conferences organised by the Institute, as well as in a publishing series Multi-Annual Programme reports. Thus, we encourage all readers to follow the results of our research and scientific discussion, for instance, via the Institute's website: www.ierigz.waw.pl.

Editorial Committee

Prof. dr hab. Andrzej Kowalski
Institute of Agricultural and Food Economics – National Research Institute, Warsaw, Poland

1. Introduction

This book is came out at an exceptional time. The historical moment we live in can be considered in a narrow sense – of a debate about the EU's financial framework for 2014-2020 and the overall Community policies – and in a broader sense, which pertains to the socioeconomic changes taking place under the impact of globalisation and economic crisis at the turn of the first decade of the current century.

The current stage of the civilisational development of humans is characterised by:

- increasing mobility of capital, goods and services;
- progressing liberalisation of numerous fields of economic, social, political and cultural activity;
- implementation of innovations on an unprecedented scale;
- development of international economic cooperation;
- increase in uncertainty and risk in the economic and social areas;
- acceleration of climate change.

Those processes force the necessity for all the entities of economic, social and political life to respond quickly. They have to make radical twists in their reasoning and activity all the time in order to catch up with the rate of changes that take place in the surrounding. It is unnecessary to convince anyone that the former process largely affects the debate about the economic and social future of the European Union.

The economic reality becomes more and more complex and unpredictable. The forecasts for the future are difficult. Nobody knows *ex ante* what it will be like in the future. The world's population is faced every day with contradictory information and opinions. Certain countries – for instance China and India – managed to overcome poverty in the case of a considerable percentage of their population, even in a very short time. However, the situation in many regions of the world looks much worse. Ten children die of hunger every minute. Nearly one-fourth of the world's population tries to get on with two dollars a day. Are we able to accept exclusion of such a large part of the population from the modern world? And how long will that inequity last?

On the one hand, the public opinion receives the information about the end of the crisis, about positive transformations on the capital market and, on the other, the opinions about constantly high unemployment rate, the threat of protectionism, currency war and the next stage of depression. However, those opinions apply to the symptoms and results rather than to systemic and structural

sources of the crisis. The history teaches us that the deeper the crisis, the larger the consequences in the former manner of thinking and way of procedure. Discontinuity and irregularity of changes not only in the time of crises forces a contemporary human to constantly make shifts in the manner of thinking and way of procedure despite high uncertainty and risk. Thus, uncertainty and risk are the increasingly popular elements in the social and economic life, and the flexibility in the reasoning, attitudes and way of procedure are becoming a global requirement for individual and collective behaviours.

Meanwhile, a new phenomenon has been revealed. Waves of protests unfold through the European civilisation. Unlike in the past, people protest when they do not want changes since they are afraid of the future that might bring problems instead of benefits. The societies are even afraid to make a choice. It is probable as well that the time to come will not be a time of great ideas, but the time of greater acceptance of diversity of positions, openness towards other orientations, increased courage to pose new question and extension of the debate space.

In the past, there was a clear division of roles and duties. Contemporarily, the boundaries between sectors and institutions become blurred. Charities more and more frequently resemble enterprises. Business takes over some of the duties of the state and the governments operate in a network of mutual influences they create themselves. Although it is a truism to ascertain that the most effective solutions to problems are brought by co-operation of the state, business, citizens and non-governmental organisations, it is still hard to tell how to establish partnership between sectors.

It is not the first time that changes take place on such a scale. The history of mankind is featured by periods of enormous transformations, which changed not only the way of thinking and behaviour of people, but also gave rise to a new social order and new institutions. In many cases, such changes were driven by groundbreaking technologies, which transformed the economy and culture by being disseminated in the society. However, the contemporary internet is the most powerful platform since it facilitates and accelerates the emergence of new creative breakthroughs.

The global financial crisis has demonstrated that the current economic system and related institutions are not sustainable. It has also revealed the error underlying the assumption that the market is able to regulate itself without state aid and without the necessity to adopt moral criteria. This idea is based on an impoverished concept of economic life that is perceived as self-regulating mechanism *sui generis* that is guided by its own interest and pursuit of profit. As a rule, it disregards the ethical side of the economy as an activity that is conducted by people for the people. Instead of production and consumption chain with narrowly perceived human needs, the economic life should be rather perceived as the exercise of human responsibility, the inherent objective of which is to promote the dignity of human being, pursuit of common wellbeing and inte-

gral development – political, cultural and spiritual one – of individuals, families and societies.

Hence, the fundamental question arises whether the tools used by social sciences catch up with and correspond to the challenges of the reality. The answer to that question is not optimistic.

Firstly, neither science nor economic practice is able to define proper development goals. It appears to me that transfer of the picture of the contemporary day to the tomorrow still prevails in the reasoning, failing to include in the way of thinking – in the increasingly complex models of the main element – the change to the hierarchy of values, changing relations of resources and development factors in their new meaning.

The helplessness of social sciences against the global challenges is demonstrated, for instance, by failure to implement the concepts of sustainable development. It emerged as a response to a negative effect of the process of globalisation. Common acceptance of that idea is faced by intellectual and practical barriers when we start to speak of its implementation.

Another proposed response to the emerging social, financial and economic crises is to limit the economic freedom, mainly in the area of financial flows – return to the national policies for strengthening the role of domestic instruments and restricting or excluding the countries that fail to comply with the rules from the international division.

The period of uncertainty aggravates the polarisation of views and forces it. Once again, the end of liberalism or the end of protectionism is announced. It is interesting how the roles unexpectedly change: the disciples of increasing the role of the state become the apologists of the market and the other way round.

When talking about the current crisis, the former supporter of free market, Francis Fukuyama, says: *that we have fallen victim to the ideology the central point of which was confidence in the market, its infallibility, the inevitability of complying with its laws* (…); *that this hypothesis justified the conviction that becoming richer is a fair reward for the contribution to the wellbeing of the society; that by refuting the hypothesis of market's efficiency, the crisis has undermined the rational justification of social disparities; that it destroys the moral foundation of the system that generates increasing inequities*.

And so, a great authority and supporter of market's self-regulation recognises the crisis not only as the basis to revise the economic efficiency mechanisms, but as a breakthrough that challenged the previous political order and moral system of societies.

Tony Blair, the former prime minister of the British government and a famous social democratic activist, co-author of the concept of "the third way", expressed an opposite view. He claims that it is not necessary to seek for an alternative to the market economy. He adds the following arguments as substantiation:

  - firstly, the market economy has not collapsed at all since the crisis affected solely the financial sector.

- secondly, it was not only the banks that failed, but also the government.

- thirdly, there was no huge political shift to the left in Europe. People understand that the state has to make interventions in order to stabilise the situation on the market, but they think that after achieving that goal, the state should immediately withdraw. The idea that the relations between the state and the market should be changed in a fundamental way is unacceptable for them.

The stance of a renowned Hungarian economist, J. Kornaj, can be understood in a similar way. When analysing the development paths of China and Vietnam, he ascertains that they have no socialist system if we apply the concept of Marxist socialism. They do not come closer to the social democratic model within the meaning of the Scandinavians, and they resemble to the highest degree the model of social inequities in Manchester in the 19th century or the Latin America ones. If so, then a question arises whether there is another way to achieve a sustainable economic success like the economic necessity to improve the efficiency and an active social policy in the area of distribution.

The views about the scope and depth of integration are polarised as well. The integrating processing of individual groups of countries, in particular the Western Europe, were an important factor that cleared the decks to facilitate the development of globalising processes. Regional integration triggered the globalisation process to a great degree, yet the globalisation was not its goal. Currently, with the existing progress of globalisation, regional integration changes its objectives, and one of its leading objectives is to achieve better conditions in a group to take the challenges and neutralise the threats brought by the globalisation. Therefore, it can be said that the higher the awareness of probable threats and huge difficulties in adjusting to globalisation in individual countries, the higher the interest in such an integration and deepening the integration that already exists. In a situation when the role of the state is weakened by the process of globalisation and the emergence of related restrictions in the imposition of necessary boundary conditions on the market, it is most essential to look for other institutional opportunities to implement the above-mentioned goals. In a situation when political globalisation clearly lags behind the globalisation of economy, the economic processes get out of social control. In that situation, the role of regional integration is increased. Thus, it may be said that the more new problems, additional conflicts and inconsistencies, deeper effects of polarisation arising from the process of globalisation, the more new reasons for regional integration. Many countries want to find shelter in integration blocks to feel safer against the global competition and against the not fully identifiable phenomena brought by globalisation. The countries hope that, by hiding in integration blocks, they will find an entity that is strong enough to oppose the power of the global capital market. It is because there are more and more countries that are aware that left alone they will not be able to effectively oppose the rules of the globalised market. Within that meaning, regionalism is an antithesis of globalisation since it is used to limit the negative effects thereof.

The recent years clearly increase the expectations about regional integration. It is understandable as the awareness of changes and challenges brought by the process of globalisation needs time. As the awareness of globalisation-related processes increases and the complexity and difficulties arising from the new revealed problems and new contradictions are understood, the understanding of the role of integration rises. The understanding of the impact of integration, on the one hand, on the acceleration of some globalisation processes and, on the other, on the moderation or even prevention of other processes arising from globalisation.

The higher expectations in relation to integration, the higher the awareness:
- of the increase in strength of capital markets that emancipate themselves from the control of states,
- decrease the freedom for manoeuvre within the policies of the countries that are increasingly dependent on the capital, which, due to the freedom of establishment, forces them to accept their rules,
- limitation of democratic control of economic and social decisions that are subject to the requirements of the global economics, which is independent of national control of representative bodies,
- increased strength of transnational corporations, which abuse the freedom arising from their extra-territorial nature, often impose disadvantageous changes in the organisation of production and functioning of the labour market,
- difficulties arising from the threats to the natural environment, no progress in the formulation of supra-national administrative institutions.

Therefore, it is the goal of European Commission not only to counteract the effects of the economic crisis, but also to form the legal basis for the measures of Member States – to preserve the integrity of uniform market and to prevent harmful competition and transfer of costs between Member States (beggar-the-neighbour policy).

The positions on the shape of CAP also get polarised. Admittedly, the necessity of interventionism in that sector is denied less and less frequently. The views that criticise goals thereof and applied solutions are more common. Such opinions are justified using the arguments that indicate that they are used only by small groups that can take care of their image and conceal the benefits behind big words. However, there are a lot of losers: a taxpayer who finances the subsidies, a consumer that pays too much for food without knowing that, an African, Asian or Brazilian farmer who is not able to export. Technological progress is slowed down because it is not needed anymore to capture the markets; the spirit of entrepreneurship, which is not needed at all in a sheltered sector, is being destroyed; countries are deprived of benefits that are comparable to the subsidies and that would be available in case of trade. Such effects are triggered by any type of protection: it slows down the growth in the North and in the South.

According to the supporters of changes, a distinction should be made between assistance to the farmers and the obstacles in trade. It is put forward to

change the area of producer subsidies instead of product subsidies. The representatives of that current of thinking do not always precisely answer the question: How to distinguish assistance to people from assistance for production?

The future form of CAP has to take into account the fact that various sectors will compete for the political means. An average family in the USA spends more money on healthcare than on food. Humankind is at the risk of "water disaster", i.e. absence of water. Approximately 2.8 billion people (44 percent of the world's population) live in the areas that are affected by serious drinking water deficits. So far, nobody has come up with an idea how to satisfy the world's demand for freshwater. The problem is so urgent that the biggest think tanks should start to search for a solution before conflicts arise due to deficits of that natural resource.

An important challenge faced by the world involves separation of the world from fossil fuels that make them dangerously dependent and building an economy that is based on environment-friendly energies, which will make it possible for the humankind to survive the next ages. With the current development pace, there are decades of time between the proposal of any sources of green energy and the day of its common use.

The authors of this publication have made an attempt to respond to some of the challenges. However, they have to confess that the attempt to answer some questions gives rise to other ones, which are not less important.

Prof. dr hab. Józef St. Zegar
Institute of Agricultural and Food Economics – National Research Institute, Warsaw, Poland

2. Agricultural policy in relation to economic and social competitiveness

2.1. Introduction

The long-term research program "Competitiveness of the Polish food economy in the conditions of globalization and European integration" embraces the topic Competitiveness of sustainable agriculture[1]. This form of agriculture generates growing social interest primarily because of its environment-friendliness, the importance for the quality of food and the viability of rural areas. However, regardless of the interest and more or less favourable ethical opinions, if this form does not meet the requirement of competitiveness, it will not have the opportunity to develop in the conditions of market economy. This is because the foundation of market economy is the mechanism of competition – gaining advantage by the farms in the market to maximize the economic benefits necessary for the development or just for stay on the surface of the economy. Not being competitive leads directly to the crowding out and thus losing the benefits of the social division of labour. Then the farm is forced into liquidation, or if the farming family has alternative sources of income, to convert the farm into subsistence farm.

Competitiveness is the *credo* of modern economic and social thought. It is believed to be the panacea to solve all the problems of socio-economic life. In the competitive struggle the economic criterion is brought to the fore. Competitive constraint creates the temptation to use all the possibilities, including resorting to unfair practices and to obtain benefits at the expense of others. Farms can obtain short-term and medium-term competitive advantages at the expense of the future, at the expense of the natural environment, or other entities – participants of socio-economic life. In fact, it is about gaining competitive advantage by omitting negative externalities whose costs are charged to other operators or "mute" market participants, i.e. the nature (ecosystems) and future generations.

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[1] The multiannual programme "Competitiveness of Polish food economy in conditions of globalization and European integration", established by the Resolution of the Council of Ministers of 1 February 2011, is being implemented in the IAFE-NRI in 2011-2014. Topic Competitiveness of sustainable agriculture includes three research tasks, namely: 1. Alternative forms of agriculture in the development strategy for agriculture, food and rural areas; 2. Productivity of different forms of sustainable agriculture; 3. Sustainable agriculture versus food safety and health.

The temptation and the possibility of avoiding the costs of externalities *ergo* shifting them to others and increase competitive advantage this way are increasing with the liberalization of economies and the globalization of markets, which create the conditions for anonymity of manufacturers, and with the rise in dominance of inter- and transnational corporations.

Competitiveness of agricultural farms, i.e. *ex definitione* the (micro) economic competitiveness, does not translate clearly on the competitiveness of the agricultural sector. Goals and interests of the agricultural sector as a whole, can be achieved only in the primary system – in the social system. Because the competitive pressure *ceteris paribus* is in opposition to the pressure for protection of the environment and other social values, there is a question of extending the category of competitiveness, so far formulated as a monetary economic category integrally related to the market, with the non-monetary and non-market issues. The concept of (micro) economic competitiveness, i.e. pure private competition, needs to be complemented by macro-economic competitiveness, which can be equated with social competitiveness. The idea is to complement the market – an independent pillar – with a political pillar – creating a control mechanism for the development of the socio-economic system – in this case the agriculture. The focus on the dominant agricultural model is of fundamental importance in this regard, which should govern the basic decisions in the field of agricultural policy.

The article points out the reasons for the discrepancies between economic competitiveness and social competitiveness, the need for the agricultural policy to follow social competitiveness, but in such a way as not to undermine the autonomy of the market. This can be done by formulating the conditions for the market by the political factor. However, this poses significant and difficult challenges.

2.2. The concept of competitiveness

Competitiveness is not clearly and strictly defined, although it is of interest to the economy since the mid-eighteenth century[2], becoming one of the cornerstones of economic theory, which remains to this day. The concept of competition, just as the concept of sustainable agriculture is subject to varying interpretations, which seem to be justified in the light of their interactions and relationships with other elements of the socio-economic and environmental system. Competitiveness in the economic sense means the competition for access to scarce goods traded on the market. In general, the term "competitiveness" means an advantage in the market of goods and services. Benefits from competitiveness in perfect market conditions, which are a common base of

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[2] The notion of competitiveness was introduced into economic theory by Thomas Malthus; Adam Smith used the mechanism of competition in the concept of the invisible hand, which leads to the optimal allocation of resources, i.e. giving the same marginal increase in income (the latter optimum in the sense of Pareto).

modern economics (classical and neoclassical), are larger or smaller depending on the relationship of supply and demand.

Overall, the competition takes place when at least two entities compete for the same good, in the market and competing with each other, either in selling as many goods as possible (competitive retailers), or in the purchase of goods under the most favourable conditions (competition of buyers). These conditions generally include price, quality, delivery time, method of payment, form of delivery, etc. Sellers take different actions increasing strength of their offers (advertising, marketing) to win the competition. Competitive struggle can be ethical or unethical. Just like in sports. Ethical competition is based on the principle: *may the best one win*. This includes co-operation and it corresponds to a positive-sum game. Unethical competition is based on the principle: *the winner takes all* and corresponds to a zero-sum game. The advantage of the first is obvious, because it leads to the development – increasing prosperity by seeking more effective solutions. The second only divides the cake, losing forces and means to destroy a rival.

The mechanism of competition is effective in a market that meets the conditions of perfect competition. This is one of the fundamental assumptions of classical economic theory and the benchmark for neoclassical theory. In general, the following conditions of perfect competition are assumed: 1) sufficiently large number of buyers and sellers of a product on the market, so that none of them has effect on the market price, 2) the homogeneity of the product (commodity) offered by sellers, 3) perfect market information for all market participants, 4) no intervention of political factors in the market (complete autonomy of the market), 5) lack of transaction costs in market operations, 6) lack of barriers to entry and exit from the market; 7) perfect mobility of production factors enabling adaptation to changing market conditions, 8) manufacturers following the criterion of profit and consumers (buyers) following the criterion of utility (benefits), 9) non-increasing returns of scale. If the conditions of perfect competition are not met, we have a situation known as imperfect competition. Specific forms of imperfect competition are: monopoly (there is only one seller), oligopoly (several sellers), monopsony (only one buyer), oligopsony (several buyers).

Perfect competition is beneficial because it provides the most efficient allocation of resources in the sense of Pareto. The reason is that competition stimulates progress in the form of new technologies (innovations), new products and services and eliminates the less efficient producers. The effects of this are beneficial for the buyers who have more choice with better products and lower prices. As a rule, this happens if there are no deformations (imperfections) of the market, which lead to a violation of the conditions of perfect competition. In order to prevent this even the orthodox liberals allow state interference or *de facto*

allow certain role of this policy[3]. The theory of economic competition focuses on repealing all restrictions on free competition, assuming that the perfect market will provide optimum well-being in the sense of Pareto. We now know that economic realities do not support the validity of this assumption. Prices determined by the market ignore externalities – social cost (lost profits) and public goods associated with production of these market goods – and therefore do not tell the whole truth, i.e. ensuring the conditions of perfect competition is not sufficient to maximize social well-being (welfare)[4].

Promoting the competitiveness by the state is also important at present, especially in view of the role of innovation as a driver of competitiveness and the role of knowledge. It must be taken into account that, with socio-economic development the field of competition shifts from cost/price (less developed countries) to the quality of the products (developed countries) and innovation (highly developed countries).

Economic competition is guided by the sole criterion of market efficiency. It is determined by the balance price set by the demand and supply mechanism. The balance price does not include the externalities inherent in production of market goods. Omitting the negative costs of externalities, such as the costs of environmental degradation, leads to decreasing welfare. Criticism of limiting to (micro) economic competition is therefore justified. There is therefore scope for action and justification to make appropriate adjustments by institutional (political) factors. In this regard, Professor Augustyn Woś said: *Expansive competition leads to the destruction of the environment, and the costs of its restitution are borne by all of society (...). The concept of total competition, all with all, gives an advantage to narrowly understood "economism", at the expense of social structures and objectives. A reasonable balance needs to be sought between the two systems* [Woś 2003].

The inclusion of external effects is crucial for achieving important social and environmental objectives and thus to clarify the distinction between categories of economic competitiveness and social competitiveness. Therefore, this problem will be discussed further using the simplest possible argument relating to a manufacturer producing good Y, using the input X, while the transformation is integrally connected with certain negative externalities[5].

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[3] The law designed to protect competition goes back to Roman times. For example, the right to protect the freedom of the grain trade (Lex Julia of 50 BC) and the establishment of the death penalty for speculative activities in the market of consumer goods (Diocletian's edict of 301 AD). Modern competition law dates from antitrust law in the United States (known as the Sherman Act of 1890 and the Clayton Act of 1914).

[4] Several years ago, the so-called Lisbon Group concluded that: "The ideology of competitiveness does not see that the market is not the only thing that counts and which determines the economic and social well-being of people and countries" [Group 1996].

[5] Here we use paper [Zegar 2009].

Manufactured product price p should cover the marginal cost of production, i.e. in simple terms satisfy the condition:

$$p \geq K_p',$$

where K_p' – the marginal cost of the manufacturer (microeconomic), while $K_p' = f(X)$, where X – volume of input, f – symbol of function (transformation).

Price p determined by demand and supply mechanism (market price) expresses the utility (benefit) of this product to the consumer (buyer), while the cost K_p' expresses marginal cost incurred by the manufacturer to produce this product unit. The cost is the result of the valuation of input by the market. It is the (micro) economic cost. This case does not take account of other cost items and alternative costs expressing the negative externalities, i.e. the social costs. Taking into account the social costs requires that the price of the product covered the marginal social cost of production.

$$p \geq K_s',$$

where $K_s' = f(X) + g(X)$, where g(X) is the cost of the negative externality.

If $K_p' < p < K_s'$, we have the situation that the price p of the product covers the marginal cost of the producer (he is therefore competitive), but does not cover the marginal social cost. In the latter case it may be the result of either the high production costs, or high external costs. In this case, the implementation of the product at the price p causes damage to the good of society – for example in the form of unpaid natural resources, environmental degradation, or loss of benefits in other applications of input X. This situation is a typical academic example. It is illustrated graphically in Figure 1.

Figure 1. Supply and demand in the presence of externalities
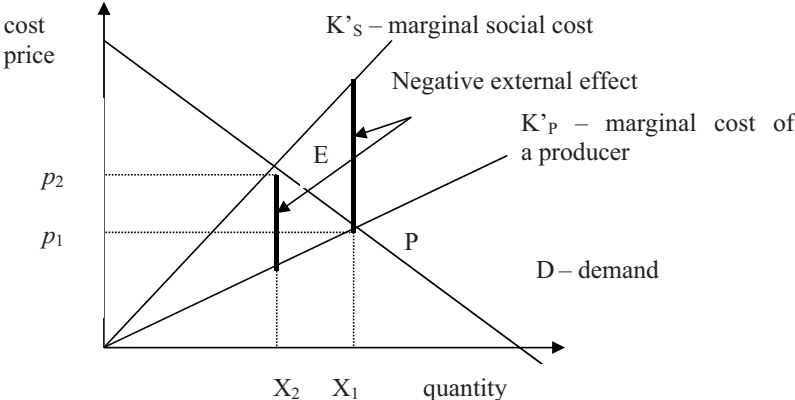
Source: [Zegar 2009].

Assuming that the price p_1 met the condition of (micro) economic competitiveness, the producer spends input X_1 for the production of market goods, which will be accompanied by a negative marginal externality of $K'_s - K'_p$. Taking into account the disadvantages resulting from the excess of this effect requires input of X good at the level of X_2, that is, de facto restricting its production. The new equilibrium is reached at a lower level of production which meets the demand due to higher price of market equilibrium, but covering the social costs.

The reasoning is particularly important in the case of agriculture, whose externalities are significant because of the many ecological and socio-cultural functions[6]. Omitting these effects leads to differences in (micro) economic and social optima, which express respectively the private rationality and social rationality [Zegar 2010a]. In economic theory, the cause of this discrepancy is generally attributed to the fallacy of composition. However, the roots of this discrepancy lie in ignoring externalities associated with agricultural activities, which by definition are not taken into account in the case of (micro) economic criterion of decision-making by farmers. They cause inefficiencies in the sense of Pareto in allocation of goods and are an important reason for government intervention. Thus, the mechanism of economic competition, which is the perfect tool to achieve private (microeconomic) optimum, needs to be complemented by a political (institutional) factor, which would stimulate market participants autonomous in their decisions to achieve the social optimum. As we shall see it is not easy.

Competitiveness can be considered in relation to the different levels, three of which are the most important: micro (company), macro (country) and global (world). In this paper we confine ourselves to the first two, focusing on the second level.

The competitiveness of businesses – farms – refers to private benefits, as determined by the price set by the market (or set by a political factor representing and constituting an external parameter). Competitiveness of a farm reflects its resources: physical, natural and human resources (including skills and abilities), which give it an advantage over other farms. The pressure to cope with the competitiveness forced or stimulated processes of concentration, specialization and intensification, leading to reduction in costs, and meeting the requirements of the food industry and other market participants in terms of qualitative, organizational and technical requirements. To some extent farms were able to meet these requirements through cooperation (horizontal). The process of integration (vertical cooperation) significantly stimulated these processes, contributing to the formation of large agri-food enterprises. Concentration in the area of agribusiness and the emergence of corporations changed the conditions of competition for agricultural producers. Under conditions of excess supply it forced ac-

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[6] In the case of positive externalities associated with agricultural production the figure will be the opposite, or it can also be recognized in the second part of the social cost (i.e. diminishing external costs).

celeration of the industrialization process and acceptance of the larger transfer of created added value to further links of the food chain and to consumers.

The competitiveness of corporations is a microeconomic one, but between the competitiveness of private businesses (especially farms, but also industrial companies) and corporations there is a significant difference. In the first case, which reflects the situation of ownership capitalism – the owner-producer is guided not only by immediate economic benefit, but also takes into account the benefits in the long run. This applies to both the capitalist – the owner of the company and to the individual farmer. For example, an individual farmer takes into account the renewal of soil fertility or the interest of his successors. In the second case, i.e. the corporations, which expresses the situation of corporate capitalism, corporate managers are guided by a shared theme of multiplying the capital made available to them by the owners (shareholders), because they are evaluated and rewarded for this by the latter. The pressure to multiply the economic benefits often leads to short-term benefits – in a financial year – at the expense of the environment, other entities or *values* and the future. In this case, the ethical motives, even if they appear are moved into the background. Owners of the capital under the control of corporations become anonymous, and the real economy is replaced by a symbolic economy in the form of cash and financial transactions. Under these conditions, in principle, nothing limits the microeconomic decision-making criteria, and the global market – fully anonymous – cancels ethical scruples of relying solely on these criteria. The so-called corporate social responsibility is so far a marketing trick rather than a real phenomenon.

Competitiveness at the macro level is revealed by competitiveness of entities (i.e. microeconomic competitiveness). However, this is not the only criterion, because at this level one needs to take into account the social and environmental component (interests of mute market participants), which in fact can be reduced mainly to taking account of externalities and public goods. Competitiveness at the macro level – of the economies of individual countries – is the ability of an economy to compete in global markets, which contributes to effective long-term economic growth. Competitiveness in this case goes beyond the measures appropriate to the microeconomic competitiveness, such as price, quality, efficiency, profit, market share, and more important are measures such as economic development, revenue, quality/quality of life (prosperity) [Porter, 1990]. This requires the inclusion of the political factor, which puts social goals on the forefront. Politics define the boundary conditions for businesses so that by competing in their own interests they pursue social goals at the same time. Therefore it is based on achievement of convergence of (micro) economic optimum and social optimum. In general, the boundary conditions are not sufficient and hence the need for compensatory measures and stimulus, which require a redistribution of the created added value.

2.3. Externalities in agriculture

Externalities are the essence of differences between categories of economic and social competitiveness. They represent certain unintended consequences that accompany business activity[7]. They can be desirable or on the contrary – not desirable. The first case concerns the positive externalities, and the second – the negative externalities. The main feature of external effects is that they are not subject to market transactions. Negative externalities cause particular disadvantages to other economic entities, consumers and future generations by belittling values of ecosystems. The positive externalities bring benefit to others who have free access to them.

The distinctive feature of agriculture is that the by-products (coupled products) of agricultural production have both negative and positive environmental effects. For example, in relation to waters – agriculture causes contamination with fertilizers and pesticides and at the same time limits the flow of water and protects against floods. With regard to air – on the one hand, agriculture contributes to the degradation – also by emitting greenhouse gases – on the other hand absorbs carbon dioxide and produces renewable energy. In relation to soils – on one hand it contributes to degradation and erosion, on other however, maintains fertility and prevents erosion. With respect to biodiversity – on the one hand reduces, on the other hand preserves, protects and enhances. The same applies to landscape – on one hand destroys it through odours and noise, on the other – creates agricultural landscape of great aesthetic values. It is important to note that agriculture on its own is not harmful for the environment, it is certain agricultural technologies that are harmful. The use of appropriate agricultural practices not only is without detriment to the environment, on the contrary – it can enrich it. This depends primarily on agricultural model which will be discussed later.

Most attention is given to the externalities in the natural environment. The main negative externalities of agriculture in this area consist in [EC 2002; OECD 2006c; BLI 2009a]:

- contamination of surface and ground water – caused by the use of chemical fertilizers, pesticides and excessive concentration of livestock production, lubricants and fuel leaks, improper management of waste and excrement; violation of water systems due to drainage or irrigation (source depletion, soil salinity);

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[7] In economic theory, the concept of externalities appeared in the late nineteenth century (Alfred Marshall), and then was clarified in the 1920s by Arthur Cecil Pigou, who introduced the distinction between private and social costs. The modern theory of externalities was presented by Paul Samuelson [1954, 1955], more recent works, see [Cornes, Sandler 1996; Baumol, Oates 1998; Cooper et al. 2009].

- soil pollution and degradation – caused by unbalanced fertilization, over-grazing, abandonment of crop rotation, the use of heavy equipment and erosion;
- air pollution – caused by improper use of chemical fertilizers and pesticides, and animal waste. Too many animals result in excessive emissions of ammonia and methane. Agriculture is the main source of methane emissions from livestock and nitrogen oxides from fertilizers;
- destruction of habitats and reduction of biodiversity, especially for many species of birds that nest and feed on arable land, as in the case of intensive agriculture, specialization and concentration of production, particularly negative effects are caused by the use of pesticides (spraying, washing the equipment, abandoning waste and residues);
- reduction of natural resources, especially the landscape, by destroying ponds, springs, swamps, waterlogged land, field margins, hedgerows, monoculture, etc., which has further consequences in terms of biodiversity, regeneration of air, water, and others;
- influencing climate change through greenhouse gas emissions, contributing to the so-called acid rain damaging forests and acidifying the water and the destruction of the ozone layer (methyl bromide used in agriculture);
- threat to animal welfare, particularly in industrial farms: large pig fattening houses and broiler and hen farms;
- odour emission from livestock farms;
- not fully recognized dangers posed by the introduction of GMOs.
On the other hand, the most common positive effects of the agriculture are:
- protection of agroecosystems: animals, plants and micro-organisms necessary for the functioning of these systems;
- regeneration of ecological systems or their components (water, air, soil, wildlife);
- protection of groundwater and reduction of the risk of flooding;
- protection of biodiversity – many species of plants and animals (birds, rabbits) are integrally related to agriculture, especially the cultivation of crops, grazing cattle, sheep and goats and farm premises;
- reduction of greenhouse gases from energy and transport through the production of biomass (renewable) and the uptake of carbon dioxide;
- creation of agricultural and rural landscape, which has intrinsic value, but also an economic value as it creates the conditions for obtaining benefits from tourism and recreation.

Agriculture generates externalities also in other areas, according to its functions. For example, its food function and the production of renewable raw

materials for needs not related to food, the economic function (place of work and source of income), the social function (the role that agriculture plays in social and civilization development, especially the maintenance of the social system in rural areas, creating and storing values, creating the conditions for recreation and relaxation, creating conditions for the development of other sectors). Particular attention is given to such desirable "products" as the contribution to food security (production of sufficient quantities of food) and safe food (quality), contribution to the development of rural areas, especially in the economic and socio-cultural viability of these areas, as well as the preservation of folk culture (peasant, rural) and the rustic landscape, creating rural landscape and conditions for rural tourism, the contribution to the functioning of the biosphere, etc. [Cooper et al. 2009; ENRD 2010]. These goods are becoming rarer and more valuable.

2.4. Internalization of externalities

External effects of agricultural activities by definition are generally not taken into account in the process of decision-making by farmers. They cause, as we have seen, ineffective allocation of goods in the sense of Pareto. Omitting the externalities causes a significant discrepancy between the economic optimum and social optimum. Microeconomic account corresponds to the former and social account to the latter. Microeconomic account is used for private rationality – within the meaning of the benefits of the managing entity (or consumer). The social account should lead to social rationality (macroeconomic), i.e. express at least social preferences, but also take into account the interests of "mute" market participants, i.e. future generations and ecosystems.

Externalities causing a discrepancy between economic competitiveness and social competitiveness can be divided into three groups, namely:
- negative externalities which entail costs (external costs) in the form of:
  - ➢ diminution of the value (welfare) of the natural environment,
  - ➢ diminution of the socio-cultural value (welfare),
  - ➢ diminution of the economic benefits of other participants in the economic process;
- positive externalities (public goods) that apply to:
  - ➢ the natural environment,
  - ➢ the socio-cultural environment,
  - ➢ food quality[8].

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[8] The separation of this factor is appropriate because of: the relationship between quality of agri-food products and the cost of production, b) the relationship of food quality and the economic activity of the population, c) the relationship of the quality of food and the welfare of the people, and d) the relationship of food quality and health *ergo* health care costs.

Internalisation of externalities requires their valuation. And here it gets difficult. Valuation of externalities is in its infancy in scientific research. Work is the most advanced in the field of environmental effects, which for many reasons poses particular difficulties. Firstly, there is still no full discernment as to the environmental services; this applies in particular to regulatory services in the field of geochemical processes, but is not limited to it (knowledge in this field is growing faster and faster, but making up for several centuries of focusing research according to a reductionist approach takes time, just like the reorientation of funding in research and development (R&D). Secondly, analysis of ecosystem services takes place at various levels: a) quality (effects difficult to measure – for example, the health benefits of high-quality food, clean water and clean air), b) quantitative (e.g. the value of the products, carbon sequestration) and c) monetary (e.g. reduced spending on flood protection or pharmaceutical benefits derived from natural products)[9]. Thirdly, the valuation of environmental services must also take into account intrinsic, existential value resulting from the existence of environmental resources, in other words, drawing satisfaction from the mere existence and availability of environmental goods. Fourth, the amount of the benefit depends on the biological resources of the agro-ecosystem – the amount of benefits of tropical forest measured by growth in biomass is undoubtedly greater than of the taiga. Fifth, the various methods of valuation of the environment, which are being formed – one might even say that they are at the embryonic stage[10]. Sixth, the ability to implement policy instruments also faces significant barriers only because of the understandable social sensitivity to the physical and economic availability of food.

2.5. Agricultural policy in view of external effects

Externalities associated with agricultural production are by definition not included in the prices of agricultural products and thus agriculture does not bear the costs of negative externalities, shifting them onto others, but also it does not implement pensions for creating positive externalities. The market itself leads to the formation of negative effects in excess, and the positive ones in deficiency. This is currently the major cause of criticism regarding the market mechanism dealing solely with the issues. This justifies the need to include institutional factors (the state) to minimize negative externalities and create stimuli to produce a sufficient supply of positive effects.

Leaving the course of events to the market mechanism only leads to achievement of true (micro) economic optimum – and the mechanism cannot be replaced in this sense. However, it does not lead to a social optimum. We must

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[9] See especially [Brink 2011].

[10] For the methods of valuation of environment goods and services, see especially [Winpenny 1995; Fiedor et al. 2002, MEA 2003; MEA 2005; Naeem et al. 2009; TEEB 2010; TEEB 2011; Brink 2011].

therefore internalize these effects through the use of policy instruments that would have led to the optimum value being determined in personal decision-making by farmers as the most close to the social optimum value. This assumes that the state has the potential to achieve the objectives according to social rationality. Otherwise, the intervention will remain an illusion. Undoubtedly, the state, democratic one of course, can better serve the common good than the market driven by the actual needs or imputed to consumer (buyer) by advertising. The following arguments are put forward in favour of this thesis. First, the market institutions are not able to express environmental assets, because they are not traded on the market. Second, the market institutions are not able to express social preferences if these include intangible values (which is in fact the case). Third, the market differentiates access to resources (money decides), ignoring the social outcomes of distribution, violating the principle of social justice. Only the state has such power [Eckersley 2004]. Therefore the state can create through policy instruments the boundary conditions for the operation of managing entities to produce external effects within acceptable or desired size, and thus that the result of these actions, optimal in (micro) economic terms, was the closest to the social optimum.

Therefore, there is the question of the manner – the instruments – of internalisation of externalities. Policy instruments are designed primarily to lead to compliance with the (micro) economic (personal) criterion with social criterion for decision-making by farmers.

With regard to the negative externalities (environmental) outside of agriculture there has been a significant internalisation of them through the implementation of the polluter pays principle (PPP), while in agriculture, this principle has not been practically applied, that is the agriculture in practice has not borne the results of environmental pollution or excessive use of its resources (e.g. from groundwater). Only in recent years it was introduced to the legislation on agriculture, directly, or through a code of good agricultural practices, which, if it is mandatory, limits the rights of farmers to use agricultural land so that the costs of avoiding environmental damage are borne by farmers (in accordance with the PPP). However, putting the requirements over these practices entails costs for farmers, which must be fully paid by the public. The problem of determining the level of negative external effects (so called reference level), for which the responsibility should be borne by the farmers through the implementation of PPP is very complex. This complexity is also apparent from the fact that it depends on many factors, including the richness and complexity of the ecosystem and even the cultural factors. The reference level constitutes the line which delimits responsibility of farmers *ergo* costs of farmers and costs of taxpayers in the form of pay to farmers for the public goods supplied over the reference level [Scheele 1999]. The implementation of the PPP is determined to prevent the situation described in the economy as privatization of profits and socialization of losses.

The state can internalize these effects using direct market-based instruments and legal and administration instruments, whether in the form of standards (standards) or financial transfers. This can be done for example by the introduction of a fee (Pigou tax) to compensate for the externalities.

In the case of the European Union, these instruments include the standards for the use of environment, cross-compliance requirements, requirements of animal welfare – through which occurs direct internalisation of external costs, full payment for the use of environmental resources (i.e. elimination of subsidies) as well as remuneration for created public goods by e.g. agri-environmental programme. Support for the creation of public goods by agriculture is direct and indirect. However, so far there is no quantification of links in this area, but the analytical work has been undertaken [Cooper et al. 2009; ENRD 2010]. Determination of the desired level of public goods in the future will allow the use of more precise – goals oriented – economic instruments, such as tradable permits, taxes and fees, purchase of land, quotas, etc. The point is that agricultural producers, similar to manufacturers in other sectors, suffered the effects they cause, aiming to achieve optimum of their economic benefit. These effects are the loss of well-being of others.

It is important in implementing political actions to ensure the autonomy of the market, to take advantage of its benefits, while internalizing externalities. It is a real challenge requiring going beyond conventional economic theory [Zegar 2010b]. There are two courses of action in this area. The first is to create the boundary conditions for the operation of the market both in terms of direct limits and equal start. The second is to use the market mechanism to reduce the gap between the private optimum and social optimum.

The first case imposes a limitation by analogy to the boundary conditions in mathematical programming, which delimit the area for the operation of market mechanisms – not diminishing competition between market participants. Particularly important in this regard – apart from the standards relating to products and side effects (product, technology, emissions standards, etc.) – are subsidies and taxes. Agricultural subsidies lead to excessive exploitation of ecosystems and increase in the consumption of scarce resources and inefficient allocation, as in the case of subsidies to the means of production (water, fuel and energy). It is also difficult to accept uncritically the validity of subsidies for biofuels and other renewable energy sources [IEEP 2010], unless it is associated with creating innovation. Elimination of agricultural subsidies is clear in theory. The same can be said of the tax instrument, although the issue here seems to be more complex. Apart from the complexity of the instrument, it is undoubtedly important in the context of approximation of private and social optima. The case is very current in general – in the context of the so-called green taxes – especially in Poland in connection with a discussion on the agricultural tax. The concept of green taxes in general is to provide state budget revenues through taxation of rare factors in place of the working income tax, if labour resources are not in

shortage. The point is on the one hand to reduce pressure on the environment by taxing environmental goods (with increasing rarity), on the other hand, to increase employment (or reduce unemployment of relatively abundant factor) by reducing labour costs. For this reason, a rather common view of the need to move to the taxation of income instead of the land seems to be wrong.

As part of this course of action the concept of home advantage put forward by Kenneth Arrow looks promising, amounting to the principle of equal opportunities for competition. K. Arrow sought a method to ease market tensions between market efficiency and justice. He proved that effective results can be achieved by adjusting the starting position using the competitive market: "in a world of perfect markets, the only thing needed to ensure both fairness and efficiency is to use the strategy of home advantage: the program of appropriate flat taxes and subsidies, which will ensure equal opportunities for all. Then the markets will find the perfect opportunity to improve the situation of everyone, starting with the revised starting positions"[Harford 2011].

In the latter case, it is about the concept of the so called green growth, which promotes growth in the sectors directly serving the protection of the environment, innovation and technology change in the direction of clean technologies. Focus on this increase is simply necessary due to the need to reconcile the imperative of growth and environmental imperative. Green growth increases the efficiency (productivity) of natural resources (innovation, reduction of losses, sustainable intensification), creates new jobs in the green sector, new markets for green economy and protects the environment at the same time (clean technologies, green infrastructure, green consumerism). Internalisation of externalities and the full value of natural capital make the economic account more suitable for social rationality. The concept of green growth has been gaining in importance for several years, either in the form of country specific strategies or economic and social organizations [OECD 2011; Green growth... 2011].

An important weapon in the hands of the state, and it will not be too much to assert that the duty of the State, is to protect citizens from explicit fraud often made by manufacturers and distributors of goods through advertising. It seems that the current terms and conditions of conducting business are markedly different from those of prior decades and it is difficult to agree with the apologists for unlimited freedom for the capitalists, which at one time was justified by the leading advocate of the free (pure) market Ludwig von Mises[11]. We now have

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[11] Here is what L. von Mises wrote about advertising: "Commercial propaganda must be intrusive and noisy. Its aim is to attract the attention of lazy people, revive hidden desires, encourage people to replace traditional habits with something new. If advertising is to be effective it must be tailored to the mentality of the recipients. It must match their tastes and use their language. Advertising is intrusive, noisy, vulgar and exaggerated, because people generally do not respond to subtle hints. If the campaign is expected to reach the society that adheres to bad taste, it must be equally bad taste (...) Restriction of the right of business people to advertise their products would be tantamount to restricting the freedom of consumers, con-

a greater awareness, but also evidence of the fact that advertising can significantly affect fair competition, creating an incomparably greater opportunities for corporations. The phenomenon of consumerism is well recognized, and consumer sovereignty in practical terms is limited. There is therefore no reason why not to prohibit harmful advertising and allow only the information about the product and its usefulness. Harmful advertising can be seen particularly if state institutions to protect the interests of citizens are weak[12].

Taking into account the external effects brings into light the problem of physical volume of production. These effects are in fact a function of the physical size of the manufactured products (scale), and not the prices set by the market (supply and demand relationship). The effects of the scale of production play an important role in the economics of agriculture – justifying the processes of concentration and specialization of production[13]. The need to take into account external effects caused by agricultural activity provides clear restrictions on the intensity of agricultural production, including the use of crop creating industrial means (particularly fertilizers and pesticides) and also many other "miraculous" means. Production of agricultural products in such conditions may prove to be more expensive.

The force behind these processes is economic benefit which is greater for farms if their production is more competitive in economic terms. This is different in terms of volume of production in macro-economic terms, especially in global terms, where we encounter a problem of absolute volume of production. This case, as described in the theory of ecological economics [Daly 2007], is not the subject of our interest in this work.

2.6. Model of agriculture and economic and social competitiveness

Reconciling requirements of competitiveness and environmental protection and other social values is not only a political goal, but a necessity. The area of convergence which reconciles multidirectional requirements depends on the form (model) of agriculture. Policies (ecological, agricultural, macroeconomic, etc.)

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sisting of the free disposal of income in accordance with their needs and desires. It would not allow them full access to information on the state of the market and the factors that might be considered important when making decisions about what to buy and what not to buy. They would not be able to form their own opinion on the fairness of the opinion of the manufacturer regarding his goods, so they could not make a choice on that basis. They would have to act in accordance with the recommendations of other people " [Mises 2011].

[12] One needs only to refer to the littering of public space, used by TV broadcasters, with advertising - of course at the expense of education, development of pro-social values and attitudes. The huge market for pharmaceuticals is largely a result of the advertising.

[13] The problem of scale is well known in the theory of agricultural economics [Hall, Leveen 1978; Feder 1985; Kislev, Peterson 1996; Chavas 2001; Eastwood et al. 2004], and the effect varies depending on the product: it is clearly higher in the case of cereals than in the case of milk or vegetables [Key, Runsten 1999; Swinnen 2009].

have a significant impact on the choice of a model of agriculture. In this context, two opposing models of agriculture are considered, namely the industrial model of agriculture (conventional) and a model of sustainable agriculture in its various forms. Economic competitiveness is generally higher in the first model, and social competitiveness in the second model. There are three basic questions here: 1) In which model, the discrepancy between the two categories of competition, that is between the economic optimum and the social optimum, is smaller; 2) Which model can effectively meet the challenge of food security; 3) Which model can be effectively implemented?

The first question, though apparently it seems to be purely rhetorical, in reality is not. The industrial model is supported by higher production and higher economic efficiency, which is synthetically recognized in the phrase *cheap and abundant food*, but at the same time it is accompanied by a relatively large negative externalities with relatively small positive effects in the field of environment. The model of industrial agriculture on the one hand made more and more use of depleting natural resources, on the other hand, put more and more waste to the natural environment. Industrial agriculture is hold responsible for the threats posed to the environment (such as loss of fertile soil, pollution of air and water, loss of biodiversity, dependence on non-renewable resources), socio-cultural environment and even the health of consumers, to bring even the most infamous diseases in recent years: BSE (bovine spongiform encephalopathy) and FMD (foot and mouth disease). The microeconomic theory of decision-making is not without fault here, it adopted maximizing economic benefit (profit) as the sole objective. To this must be added that industrial agriculture pushing people out of agriculture and rural areas contributed to diminution, and in many cases, the loss of economic and socio-cultural viability of rural areas. However, the cost of this success proved to be huge.

One should also take into account the social consequences, including the viability of rural areas, folk culture, as well as the quality of food and its impact on human health. Much of the public goods provided by agriculture is threatened by industrial agriculture system due to the intensification, concentration and specialization, but also the marginalization of agriculture in areas with lower agricultural valuation.

On the other hand, sustainable agriculture is supported by higher positive externalities, with lower negative externalities, but also lower and less cost-effective production. In other words, industrial agriculture wins in the market, i.e. in the economic sphere, and sustainable agriculture gains an advantage in the social sphere.

However, relationships are dynamic. Industrial agriculture makes a significant, notable progress in the increase in productivity of means of production, and reduction of the negative environmental externalities. This is achieved by the new technologies used in particular in the framework of integrated and precision agriculture and the application of good agricultural practices. There is

a significant progress in the area of environmental sustainability (ecological). This does not apply equally to the other external effects especially in the social sphere. It should also be borne in mind that the further development of agriculture, according to the model of industrial agriculture faces the limitations of natural resources (especially land, water and mineral fuels) and the environmental capacity of bearing the anthropogenic consequences. This has an impact on the economics of agriculture through changing price relationships associated with the rarity theorem rare[14] and – perhaps above all – the resulting pressure to take account (internalize) of externalities in the valuation of agricultural production, as well as the inclusion of "rights" of livestock, as well as the socio-cultural effects, including the effects on viability of rural areas.

The progress can be also seen in sustainable agriculture in reducing negative and enhancing positive externalities, but above all in increasing the productivity of agricultural production resources. This allows for being optimistic in approaching the economic optimum and social optimum in the search for the point (area) of balance in this regard. It is important that the economic equilibrium of autonomous market players reached at the level of maximum earnings takes account of the balance of the ecological system and the social system [Woś, Zegar 2002].

Noticing limitations of industrial agriculture and awareness of growing limitations of ecosystems in general and host ecosystems in particular has placed the issue of sustainability of agriculture on the agenda. "Discovery" of multi-functionality essentially brought a new look to the discourse on the development of agriculture. Multi-functionality of agriculture alters the traditional – production oriented – direction of activities of agriculture into new areas: new goods and services [Huelenbroeck, Durando 2003; Wilkin 2010; Zegar 2012]. Multi-functionality of agriculture (farms) has in fact two directions, which can be called extending and deepening. The former is expansion into new areas (such as agritourism, services, crafts, recreation, wind energy, transportation, food trade), diversification of production (biofuels, herbs, fibrous plants, horse breeding, water retention and fish farming), management of nature and landscape (water protection, preservation of rare species of plants/animals) and the creation of agro-industrial enterprises. The latter includes, for example, organic farming, production of high quality, direct delivery [Knizkel et al. 2004]. These features result in significant revaluation of agriculture in many areas of development. For example, one can see in different light the issue of progress in agriculture, which can no longer be unilaterally associated with conventionally conceived concentration, specialization and intensification. Today, this progress

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[14] The most spectacular and visible example is the rapidly rising price of oil and gas, leading to less favorable pricing system for agriculture. And the materials used for mechanization, irrigation and production of chemical fertilizers and pesticides were the primary factor in the success of industrial agriculture.

does not mean increasing the energy (power) but the increase of knowledge. At the same time we now have a far greater awareness of the opportunities and risks of mastering the nature or shortcomings of technical progress than at the beginning of industrialization, or even a few decades ago. It also turns out that overcoming environmental constraints is possible by multi-functionality of farms, and this is easier to achieve in family farms (usually multidirectional) than in a specialized agricultural enterprises. However there is no functional dependence, as both large specialized farms can be environmentally friendly, and small peasant farms can be very burdensome for the environment. It all depends on the technologies used and observance of the code of good agricultural practices. But undoubtedly in the family farm with multidirectional production it is easier to reconcile the environmental, economic and socio-cultural balance.

Multi-functionality has grown to the primary rank in the creation of agricultural development. It becomes a central feature of the new development strategy for agriculture, which today cannot be reduced to simple economics: maximizing efficiency and even more maximizing productivity. Agriculture now has more functions, including in particular the management of the environment – a commodity that is absolutely immobile, that cannot be imported or exported. The role of agriculture in maintaining the environment is indisputable. At the same time agriculture continues to play a significant role in rural development. In particular, multifunctional agriculture is essential for sustainable rural development and sustainable development of the economy [Daly 2007]. This is also reflected in the politics of many countries, including the European Union, where the economic sphere increasingly takes into account the fact that agriculture cannot be left without pay for delivered goods and services which are not evaluated and compensated by the market, but it also cannot be excluded from the obligation to bear the adverse effects on the environment. Social demand goes beyond products offer by the market. A time when city dwellers expected only supply of cheap food from rural areas has passed and today the demand includes new goods and utilities, especially related to the natural environment and landscape [Huelenbroeck, Durando 2003]. And this, together with the question of agricultural production, economic, social and cultural viability of rural areas recently determined the role of agriculture. In this context, sustainable agriculture turns out better, it is based on family farms, it is environmentally friendly, provides high-quality products, using marginal labour force and other factors of production that goes beyond the traditional agricultural products for food needs[15].

The second question is particularly important in the face of growing demand for food – estimated over the next four decades at around 70%, and in total with biomass for biofuels to 100% [FAO 2009]. In this case, two positions

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[15] It should be noted that not all socially desirable goods that can be provided by agriculture, are linked to agricultural production. Some of them are separated from the production and may even be competitive with it.

emerged. According to the first, the world food security can be ensured only through further dissemination of the industrial model, including further intensification of efforts and implementation of genetic engineering – genetically modified organisms (GMOs). This questions the alternative forms of agriculture, including organic farming in particular. The second position assumes that the sustainable (organic) agriculture can provide comparable agricultural production without the negative environmental and social impacts, on the contrary, with the increased biodiversity [Pretty et al. 2006, Pretty 2008; Badgley et al. 2007; Chappel, LaValle 2011].

One must acknowledge the undisputed success of industrial agriculture, through which developed countries and some developing countries increased agricultural production several times. This was made possible by increasing the use of off-farm production measures (fertilizers, pesticides and other plant protection products, agricultural technology), the achievements of biological progress (new plant varieties and livestock breeds), increasing irrigated and drained lands [WCED 1987]. But the golden era of farming, which took place in the period from the end of WW II to the first oil crisis, has passed forever, which was unequivocally demonstrated with more or less vigour in a number of fundamental papers [IAASTD 2009; GOS 2011; Brown 2011].

The third question concerns the main currents of the socio-economic thought and more specifically the role of the market and the state in controlling the development of agriculture.

In a market economy the main driving force behind the development of agriculture is the market mechanism. This mechanism has proven to be highly efficient in the development of capitalism, which included the farmer to the so called technological treadmill[16], consisting of a sequence of events:

increase in production (supply) over demand ⇒ reduction in agricultural prices ⇒ change in technology to increase production (process of intensification, concentration, specialization) ⇒ increasing supply (excessive production) ⇒ price reduction ⇒ (...).

In a competitive market, it forced the growth of labour productivity and concentration of the potential *eo ipso* of production in agriculture. This was also the task of specialization, driven by the principle of reductionism and fordism. The scale of production began to outgrow the framework of the traditional peasant farms, crushing its base, which began the evolution in the direction of family farms and agricultural enterprises [Tomczak 2005]. The main direction was therefore set by commodity production and private microeconomic benefit provided by increasing productivity. Labour productivity has become a major factor in competitive advantage[17].

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[16] A term coined by W. Cochran: „*technological treadmill*" [Cochrane 1979].
[17] Limited resources of arable land, or land that can be taken into cultivation without damaging other ecosystems, and at the same time increasing needs for agricultural products, make us

Directing production on the market included farms in the system of vertical integration. Farmers, in spite of increasing production capacity and the scale of farm production, were losing more and more their freedom of decision to enterprise and corporate agriculture environment. Processes of concentration and specialization in agriculture – aimed at maximizing the economic benefits for farmers – were stimulated (even enforced) by the agents and the food industry for the sake of their own interests. Dispersed and economically weaker farmers in conditions of overproduction had no chance to impose their conditions on the agricultural market and more and more were forced to submit to the stronger participants in the market.

Market forces, guided by economic competitiveness, favour the model of industrial agriculture. Preferences in this regard are strengthened by the process of globalization. Also the states, in the name of attracting capital to achieve economic benefits, create incentives for domestic companies and even multinational corporations through releasing various factors of economic competitiveness, such as a lower pay for labour, lower rents and ground rents, lower environmental standards and standards of quality. The case is not clear-cut, simple and easy to resolve. The outflow of capital would entail loss of employment, reduced budget and population revenues and diminish the wealth. But the launch of the above-mentioned factors of economic competitiveness also diminishes welfare. Also, for example, maintaining high environmental standards and quality of products on the one hand increases the cost of production, on the other hand, however, can paradoxically contribute to the improvement of competitiveness, because it is a new field with the potential for a business, the more so as the number of consumers who create the demand for high quality products is increasing, and globalization creates a virtually unlimited market for niche products. In wealthy countries, food is no longer necessary and it becomes a consumer good, which is expected to meet the highest quality standards. Farmers are faced with a choice: produce more at a lower price or less at a higher price. Farmers are not philanthropists and quality must pay off, just as production of not fully linked public goods. Consumer awareness of food quality as well as environmental friendliness of the production methods is very important – in the long run it is more important than support (subsidies) for such production. However, the consumer must be sure of the quality. Hence the importance of certificates, or even licensing, labelling, monitoring, etc. Price, however, plays a fundamental role in creating demand. Hence the importance of productivity and internalization of externalities.

Environmental factors must be taken into account in the examination of social competition and increasingly – of economic competitiveness. The second is the primary goal of the Lisbon Strategy, the first is the message of sustainable

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reflect on the legitimacy of the criterion of labour performance and turn back to the land performance, especially in the conditions of growing untapped human labour.

development strategies. With regard to agriculture, these strategies are reflected in the European Model of Agriculture (EMA), which also sets the direction for the development of Polish agriculture through the CAP solutions: the principle of cross-compliance, animal welfare, RDP, including agri-environmental programme, the gradual shift of the funds to the second pillar of the CAP. Reorientation of policy on the social competitiveness requires joint action by all countries of the European Union. Therefore, one has to form a coherent concept of the new strategic solutions compatible with sustainable development.

2.7. Summary

The new situation in the development of agriculture, in particular the challenges and developmental conditions, require the revision of the issue of competition, which requires also challenging some of the dogmas of mainstream economic theory. In this case it comes to the category of the competition, which proposes to separate and distinguish between economic competitiveness and social competitiveness. The first is guided by the criterion of economic efficiency, while the other by the criterion of social efficiency. The first one leads to a private optimum, while the other to the social optimum. Both economic and social competitiveness aims to gain competitive advantage. The main difference between them lies in the fact that the first includes only economic factors valued by the market (i.e. is driven only by the market game), while the second takes into account the external effects that are generally not and even cannot be valued by the market and often cannot be measured in monetary terms.

The internalisation of externalities is decisive for convergence of private (microeconomic) optimum, which is determined by the market in the process of economic competition, and for social optimum, which determines the essence of social welfare, including compliance of generated externalities with social demand. These effects are especially significant in agriculture. Agriculture can once again be used as a material to develop new economic ideas (theory), as was the case in the creation of classical economic theory. The internalisation of externalities requires the political factor or the second "leg", next to the market, the system for managing the development of agriculture. The important thing is not to lose the efficiency of the market system, and at the same time eliminate the imperfections and limitations of this system becoming increasingly visible in contemporary reality.

Reconciling economic and social requirements, including environmental, is easier in the model of sustainable agriculture. Therefore, the focus on the model should be the basis for government policy towards agriculture. In the era of globalization the possibility of implementing policy focused on social purposes and not just to "win the favour" of the markets is limited. This is one of the main challenges of the present.

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Prof. dr hab. Wojciech Józwiak
Institute of Agricultural and Food Economics – National Research Institute,
Warsaw, Poland

3. Competitiveness and progress in Polish agriculture and mid-term forecast

3.1. Initial remarks

Competitiveness is signified by income and investment activity. High or increasing income demonstrates current advantages (strong or increasing position on the market), whereas investment activity signifies adjustment to the changing environment, which is a precondition for sustainability of competitive advantages.

Analyses revealed that before 2004 about 25 thousand Polish farms demonstrated characteristics of competitive capacity [Józwiak 2003]. They generated 2-3% of national value of agricultural production. The situation improved after 2004. Competitive capacity started being demonstrated by farms of legal persons and natural persons, to the size of 8 and over ESU (Table 1). Only those farms ensured decent level of income per worker and outlays on investments, which together with credits and subsidies, ensured extended reproduction of fixed assets.

Table 1. Number and short description of Polish farms of natural persons according to size

Size of farms (ESU)	Number of farms[a] (thousand)	Average area of agricultural land[a] (ha)	Average income[b] (PLN)	Parity/disparity of income[c] (%)	Net value of investment[d] (PLN)
Up to 2[e]	1,623.7	2.0	1,470	25.0	-1,842
2-8	520.9	8.4	14,862	56.6	-4,840
8-16	146.1	17.3	36,801	98.8	1,831
16 and over	96.5	41.6	94,431	164.0	31,039

[a] CSO data of 2007.
[b] Numbers from Polish FADN and Economic Accounts for Agriculture, covering 2006-2009.
[c] Part of income of a farm intended for maintenance of agricultural producer and his family and converted into 1 family member fully employed in a farm held in relation to average national pay for hired labour.
[d] Gross value of investment (with land purchase) decreased by the amount of depreciation.
[e] Estimations based on Economic Accounts for Agriculture, Polish FADN monitoring results and agricultural cooperatives as well as farms based on former state farms property.
Source: own findings based mainly on CSO statistics, results of Polish FADN monitoring and Economic Accounts for Agriculture.

However, recent analyses[18] point to the necessity for revision of the above-mentioned opinion. Even in the case of farms to the size of 2-8 ESU (probably closer to the upper limit), there are about 27% (ca. 140 thousand) such farms which are able to operate in the long-term or may soon be able to do so. In the case of farms of 8-16 ESU the share is ca. 51% (ca. 74 thousand farms), whereas farms of 16 and over ESU – about 80% (ca. 77 thousand farms).

Therefore, there are currently 290-300 thousand farms of natural and legal persons in Poland, demonstrating competitive capacity or able to reach such capacity. It is estimated that they produce ca. 64% of national value of agricultural production. Farms of 8 ESU produce ca. 27% of value of this production, farms of 8-16 ESU – 19% and as much as 54% is produced by those of 16 and over ESU.

Therefore, the number of farms demonstrating competitive capacity increased about twelve times as compared to the pre-accession period. Table 2 provides premises to claim that increase of income of agricultural entrepreneurs was a strong reason behind this favourable phenomenon (total incomes of farms of natural persons and incomes of farms of legal persons). Table 2 also suggests that increase of the level of subsidies for farms was a significant reason for improvement of income in the post-accession period, as compared to the previous period. There had to be, however, also other reasons as the amount of subsidies explains only part of the income increase of agricultural enterprises. Improvement of agricultural production efficiency resulting from progress[19] could be one of these reasons. Its impact on income could also be great enough to balance the negative effects of climate change and unfavourable changes in relation of agricultural products prices and prices of means of production purchased by farmers. Occurrence of droughts in plant vegetation periods has been increasing for a couple of decades, which decreases harvest of cultivated plants. Meanwhile, prices of agricultural products increased between 1999-2009 by about 41%, while prices of means of production for agriculture by about 66%.

But why the forecast of Polish agricultural enterprises income for 2013 fails to point to a similar situation after 2009 to that between 1999 and 2003 as well as 2005 and 2009? Since the increase of enterprises income is smaller than increase of subsidies amount. Further part of this study attempts at answering this question.

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[18] W. Józwiak [Józwiak 2010] wrote that Polish farms of natural persons to the size of 16 and over ESU were competitive between 2004 and 2006, as compared to analogous groups of Hungarian and German farms. Polish farms generated profit allowing for similar level of income disparity and made profitable investments, which made it possible for them to increase and modernise property.

[19] Z. Floriańczyk [Floriańczyk 2011] demonstrated that total productivity of Polish agriculture evaluated by the Malmquist index was between 2002-2010 among the greatest in the EU MSs. In the opinion of the author of this study, it resulted from clear improvement of technical capacity, with simultaneous decrease of productivity resulting from changes to production technology.

Table 2. Income of Polish agricultural entrepreneurs[a] within five years between 1999 and 2003, as well as 2005 and 2009 and forecast for 2013

Specification	Average numbers (PLN million) of:		Forecast for 2013 (PLN million) in prices of that year
	1999-2003 in prices of 2003	2005-2009 in prices of 2009	
Gross value added	19,082	23,122	23,291
Subsidies to income	844	13,532	15,968
Depreciation	4,967	5,493	5,895
Taxes	1,336	1,664	1,752
Total external factors	4,372	5,414	5,816
Incomes of agricultural entrepreneurs	9,141	24,083	25,796

[a] Income of farms of natural persons and income of farms of legal persons.
Source: study of W. Józwiak, based on Economic Accounts for Agriculture and text of W. Józwiak and Z. Mirkowska [Józwiak, Mirkowska 2011].

3.2. Evaluation of situation between 1999 and 2009

Gross value added is a significant measure of agriculture achievements. Calculated in fixed prices, it was greater by 37% in the period of five years after the accession (2005-2009) than within five years before the accession (1999--2003). This positive phenomenon resulted from the increase of production value by 8.6% and decrease of indirect consumption value by 3.7% (Table 3).

Table 3. Gross value added of Polish agriculture between 1999 and 2003 as well as 2005 and 2009 (fixed prices of 2005).

Specification	Average numbers (PLN million) of:	
	1999-2003	2005-2009
Value of production (without subsidies)	52,617	57,157
Indirect consumption (costs of current assets and production services)	36,704	35,349
Gross value added	15,913	21,808

Source: own calculations based on Economic Accounts for Agriculture materials.

As mentioned above, progress in agriculture could be the reason behind this situation. Increases in crops of cultivated plants can be its measure in plant production. Calculated in per cent and referring to the period between 2000 and 2009, presenting cultivations according to decreasing pace of increase (year 2000 = 100):

Rape   148%
Sugar beet   137%

Wheat	121%
Fodder leguminous	115%
Triticale	114%
Rye	112%
Barley	112%
Potatoes	108%
Oats	107%
Spring cereal mixtures	103%.

The smallest crops increase took place in the case of plants cultivated on poorer soil (rye, potatoes, oats, spring cereal mixtures), characterised by small water capacity. This phenomenon was certainly affected by climate changes.

Increase of outlays on mineral fertilisers and chemical plant protection products had positive impact on crops. Consumption of the former ones, calculated in pure ingredient, amounted to about 130% of the level of 2000, and analogous indicator for chemical products, calculated by the mass of active substance, was ca. 217%.

In the old EU15 states, growth of harvest of cultivated plants was, however, parallel to the decrease of the level of further chemicals-based approach to agriculture. In Denmark, for example, the level of mineral fertilisation per unit of area decreased between 1996 and 2007 by ca. 28% and yet the harvest of cultivated plants increased. In Germany, France and Great Britain this phenomenon was even more evident. It is a clear symptom of technological progress outcomes allowing for substituting agri-chemicals with other forms of progress, e.g. biological progress.

Harvest could therefore grow faster in Poland, if all agricultural producers applied seeds and seed-potatoes substitution. Unfortunately, estimations demonstrate that e.g. substitution of seeds of ear-cereals was applied by only 31% of farms.

Limitation of areas of cultivation of certain plants contributed to harvest growth in Poland. The limitation, relating to the period between 2000 and 2009 and arranged according to the increasing pace of loss of area of cultivation of the respective cultures, is presented below (year 2000 = 100):

Oats and cereal mixtures	91%
Wheat	89%
Leguminous plants	87%
Rye	65%
Sugar beet	60%
Potatoes	41%.

It may be assumed with a high degree of certainty that small plantations were liquidated, thus the phenomenon occurred mainly in smaller farms. Small plantations had smaller harvest which corresponded to higher unit production costs and consequently to smaller income than in larger plantations (Table 4).

Table 4. Crops and costs of sugar beet production cultivated in various areas in 2005 per unit

Specification	Area of cultivation in ha per farm:		
	1-5	10-15	20-45
Average area of cultivation in ha	2.52	12.10	30.05
Crops in dt per 1 ha	437	459	478
Production costs in PLN per 1 dt of harvest	12.01	10.74	9.68

Source: [Ziętek 2007].

Unit efficiency increases were also noted in animal production. Average pace of milk yield increase in the years in question was ca. 82 litres per annum per one cow. Therefore, average milk capacity of cows in 2009 was ca. 22% greater than in 2000.

Increase of milk yield could be higher if the fact that only 60% of cows were inseminated was taken into account. This means that 40% of cow population was not covered by biological progress.

Table 5. Yields and milk production costs in herds of cows of various sizes in 2006 per unit[a]

Specification	Number of cows in a farm:		
	2-5	10-25	35-75
Average number of cows in a herd	4.0	16.8	48.7
Milk yield of cows in litres per cow	3,409	4,843	6,295
Costs in PLN per 1 litre of milk	0.96	0.73	0.82

[a] Numbers of this kind were not calculated for 2005.
Source: [Skarżyńska 2008].

Decrease of the number of cows contributed to the increase of their milk yield only slightly. The decreasing tendency had slowed down by 2003, and population stabilisation of this animal group was noted in the years to follow. However, numbers presented in Table 5 demonstrate that liquidation of small herds could be in progress, substituted by the increasing number of animals in farms with larger herds. This change contributed to continuation of increasing tendency as regards unit capacities of cows also after 2003.

Production of live pigs per one unit of average size of pigs grew at the pace of 1.98 kg per annum. Consequently, livestock production of one unit of average size was about 13% higher in 2009 than in 2000.

However, improvement in capacity failed to protect against losses in the case of small production of live pigs (Table 6). Only net production of 200-1000 dt of

livestock produced income to a farm amounting to PLN 8-40 thousand. There-fore, improvement of capacity of pigs breeding could have occurred mainly in farms with the greatest scale of production.

Table 6. Economic efficiency measures for pigs breeding on variable scale in 2005

Specification	Production of net live pigs[a] in dt per farm:		
	5-20	50-100	200-1000
Total costs in PLN per 1 kg of livestock	4.86	4.63	3.92
Income in PLN per 1 kg of livestock[b]	-	-	0.04

[a] Gross production decreased by purchase of animals for breeding.
[b] Breeding of pigs in farms with livestock production of 5-20 dt and 50-100 dt produced losses.
Source: [Skarżyńska 2007].

Unprofitability of pig production at small production scale resulted in fast decrease of the number of animals of this species. Average annual pace of de-crease in the period in question was 280 thousand pigs.

To sum up the analysis of examples referring to the most important prod-uct groups in Polish agriculture, it may be stated that the increase of gross value added in the post-accession period, as compared to the situation of 1999-2003, was mainly affected by chemicals-based approach to plant production, aban-donment of costly small-scale plant and animal production and, to an extent, substitution of costly small-scale animal production with less costly greater-scale production. There were, therefore, "traditional" methods to improve the efficiency of agriculture, yet they brought about the improvement in efficiency of agriculture. Polish agriculture incurred costs of indirect consumption (current assets and services) to the amount of ca. PLN 62 per PLN 100 of the value of production in the post-accession period (2005-2009), therefore they decreased by ca. 8 percentage points as compared to the period between 1999 and 2003.

Benefits from changes in Polish agriculture could have, undoubtedly, been greater if not for the negative impact of climate changes.

It should be underlined that in the period in question agriculture of the "old" EU (EU15) noted progress consisting in the change of production technol-ogy. For example, in plant production, production growth stimulated by the in-crease of chemicals-based approach to agriculture was substituted with other forms of progress.

3.3. Changes of the situation between 2005 and 2013

The period in question is divided into two parts. The first one covers the period between 2005 and 2009, while the other that of 2010-2013. In the first period, analysis uses real data, while in the other, data are based on a forecast.

In order to produce the forecast, analysis of phenomena and processes utilising CSO materials, covering 1990-2009 (for materials expressed in money – years of 1994-2009[20]) and numerical data of Economic Accounts for Agriculture[21], were used. The products of the above covered, primarily, models of tendencies on time series of statistical data, utilising various types of regression[22]. 50 models were selected from about 180, characteristic of the coefficient of determination $R^2 \geq 0.36$. Whenever several models met this condition, model with the highest coefficient was not necessarily selected. This related to several cases, when it contradicted the results of other tests.

The selected tendency models were utilised to produce forecasts of changes regarding prices of agricultural products and means of production, crops of cultivated plants and areas of cultivation, changes to the number of animals and their unit capacities, as well as outlays of significant working capital of production. As a next step, it provided basis for producing a forecast of gross value added of the whole Polish agriculture for 2013. Consequently, it produced a preliminary image of Polish agriculture in the year preceding the next planning and settlement period of the European Union (2014-2020).

Table 7. Value added of Polish agriculture between 2005 and 2009 and forecast for 2013 (fixed prices of 2009).

Specification	Numbers (PLN million) of:	
	2005-2009 (annual average)	2013
Value of production (without subsidies)	66,531	68,495
Indirect consumption (current assets and services)	43,409	45,438
Gross value added	23,122	23,147

Source: own findings based on numerical data of CSO and Economic Accounts for Agriculture.

Table 7 contains numbers facilitating the comparison of gross value added which will probably be generated in 2013 against the background of the period between 2005 and 2009. It turns out that value of production and indirect consumption will increase by PLN 2 billion each, which stabilises the value of this

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[20] This resulted from doubts as to the price changes pertaining to certain means of production purchased by agricultural producers between 1990 and 1993, thus before monetary exchange.
[21] Economic calculations for agriculture made by IAFE-NRI for the needs of the Commission in Brussels.
[22] Details of methods are described in the text of W. Józwiak and Z. Mirkowska [Józwiak, Mirkowska 2011].

measure calculated in actual prices. This signifies the increase of indirect consumption per unit of value of production by 1 percentage point, from 65 to 66%.

The features and processes contributing to this unfavourable phenomenon are presented below in the same order as in the previous chapter of this study.

Crops of plants, the cultivation area of which was limited in the previous period, will increase in the majority of cases and changes of crops will reach the limits from minus 15% to plus 70%. Obviously, increase in crops signifies the improvement in production capacity of goods of plant origin with simultaneous smaller area of cultivation.

What is worse, harvest of cultivated plants, the area of which increased between 2005 and 2009, will increase to an insignificant extent or will stagnate. Grain maize provides an example. Its area of cultivation in 2013 will be by ca. 60% greater than in the period of comparison.

The phenomenon noted above will occur despite further increase of outlays of mineral fertilisers and chemical plant protection products. The situation as regards outlays on certified seeds of basic cereals (wheat, rye, barley, oats), covering ca. 2/3 of total sown area, is different. The decreasing tendency is clear. This partially results from shrinking cultivation area of wheat, rye and oats, but there are other also reasons. Agricultural producers are increasingly more often allowed to purchase small quantities of certified seeds to multiply it on their own and use as seeds on the whole area of cultivation or its considerable part in the subsequent year.

Numbers presented in Table 8 demonstrate that the area of agricultural land will decrease in 2013 by about 0.9 million ha as compared to their average area in the baseline period. Impact of the multi-annual tendency, consisting in abandonment of agricultural use of agricultural land with unfavourable conditions of production, will be one of the reasons. This is connected with outcomes of climate change, and additionally with fragmentation of land parcels, which makes production more expensive. Converting arable land for other purposes (motorway construction, extension of housing estates, etc.) will be another serious reason of losses. It will be unfavourable because the part of this agricultural land has average and good quality soil.

Change will occur in the structure of agricultural land, where the dominating position is occupied by sowing on arable land. Its area will most probably increase mainly due to ploughing certain permanent grassland. Farms without animal production fail to obtain subsidies, and climate drying makes ploughing possible in certain cases.

Table 8. Area of agricultural and sown land between 2005 and 2009 as well as forecast for 2013

Specification	Area in thousand ha in:	
	2005-2009 (annual average)	2013
Agricultural land	16,063	15,191
Including sowing	11,472	13,286
Including: cereals	8,449	9,283
Leguminous for Grain	123	226
Potatoes	562	576
Plants Industrial	996	1,251
Fodder plants	911	1,519
Other cultivations	431	431

Source: as in Table 7.

Changes will also affect the sown area. Projection for 2013 provides for:

- Increase of the area of cereals cultivation, e.g. due to the increase of cultivation of grain maize,
- Fast increase of area of grain cultivation of leguminous plants,
- Stagnation in the area of potato cultivation,
- Dynamic increase in the area of cultivation of industrial plants, above all of rape, with simultaneous decrease of area of other cultivations, mainly sugar beet,
- Very fast increase of cultivation area of fodder plants, which may result from the increase in the number of cattle for fattening as well as ploughing of certain permanent grassland.
- Stagnation of area of other plants cultivation, where significant position is occupied by cultivation of field vegetables. The forecast demonstrates, however, that their area will decrease, resulting from the tendency noted since 1990.

It is worth paying attention to the phenomenon of limitation of cultivation areas for labour-intensive plants (requiring extended means of production outlays per area unit). They produce large income per unit of cultivation area, yet insignificant per unit of labour outlays. Cultivation area of field vegetables, sugar beet and other cultivations of this kind will decrease in 2013 by 220-230 thousand ha (ca. 21%) as compared to the average of 2005-2009. Simultaneously, the cultivation area of less labour-intensive plants (cereals, rape, leguminous plants, etc.) will increase. This phenomenon started in the period between 2005 and 2009.

Orchards are another important type of agricultural land. Their area between 2005 and 2009 was by 64 thousand ha (ca. 21%) greater than on average in the previous five-year period. The 2013 forecast demonstrates that it will in-

crease further by 78 thousand ha (ca. 25%). Increase of new plantation area will result in costs increase, while outcomes will be partially noted only after 2013.

It should be indicated that the increase of orchards surface will not compensate in terms of area for limitation of the surface of one-year labour-intensive cultivations on arable land. The reason behind this is probably that plant cultivation area is being limited, while these plants generate large income on unit of area, yet smaller as per unit of labour outlays for the advantage of plants of small income per unit of area and greater per unit of labour outlays. In 2007, incomes of horticultural holdings (mainly with vegetable cultivation) and with multi-annual plantations (mainly orchards) per unit of area of agricultural land were 3 to 10 times greater than that with typical field cultivations (to a large extent with cereals and rape cultivation). Income of the latter per unit of own labour outlays were greater by 39-74%, though.

This provides basis for the conclusion that maximisation of income per unit of outlays of own labour and that of family members forms the point of reference in the period in question for agricultural producers, and not the use of land irrespective of income on own labour outlays. It is therefore a qualitative change reflecting the initiation of "farmer" attitude among the national agricultural producers.

Considerable changes will also occur in animal production. The figures presented in Table 9 reveal that the number of animals will increase at least by 2013. The increase does not only refer to increase in volume of production and this to income of agriculture, but also to improvement in the level of organic fertilisation. It is to fulfil several important functions. It is a harvest-yielding factor, it limits fluctuations of harvest from one year to another (under conditions of increasing droughts this cannot be overestimated) and it has positive impact on the environment. Unfortunately, animal production is carried out in ca. 60% of farms and there are no grounds to believe that the share will increase. Therefore, certain farms will have organic fertilisers in excess, while others will at best apply their substitutes.

Table 9. Number of livestock between 2005 and 2009 and forecast for 2013 (thousand of livestock units)[a]

Specification	Number of animals:	
	2005-2009 (annual average size)	In 2013
Cattle	4,577	4,993
Other ruminants	169	136
Pigs	3,892	3,531
Poultry	1,745	2,897
Horses	311	294
Total	*10,694*	*11,851*

[a] It was assumed that one LU = livestock unit of average size is in the case of: bovine 0.8 LU, other ruminants 0.1 LU, pigs 0.23 LU, poultry 0.0138 LU and horses 1 LU.
Source: as in Table 7.

54

Changes occurred in the structure of animal population. Cattle had the greatest share. The decreasing tendency in the number of animals of this species reversed between 2005 and 2009 and this tendency will increase by 2013.

However, reversal of the decreasing tendency of cattle population failed to cover dairy cows, but other groups of this species, mainly slaughter animals. Tendencies describing both breeding lines (dairy and fattening) will probably continue up to 2013.

Analogy of this situation with what will occur in the case of plant production should be underlined here. Breeding of cattle for fattening is a less labour-intensive form of bovine animals breeding than of dairy cows. Tendencies described reveal therefore that agricultural producers have become increasingly involved in the maximisation of income per unit of own labour outlays and that of family members on their farms also in this case.

Pig livestock occupies the second place in terms of population calculated in livestock units, yet the size of this population in the period in question will shrink at linear pace (in annual average terms by ca. 0.24 million units), similarly to the previous periods. Forecasts for 2013 also demonstrate that pig breeding (and milk production) will not involve changes of the pace of improvement of animal capacity. These symptoms point to the lack of qualitative changes to lead to progress in breeding of two very important animal groups. This suggests that pig livestock and dairy cows breeding will not experience any significant turning point, it will rather be a continuation of what took place in the pre-accession years and in the years to follow.

Decrease of population in the perspective of 2013 will also affect other ruminants (mainly sheep) and horses. This results from tendencies of the period between 1990 and 2004.

Meanwhile, exceptional situation will be experienced by poultry breeding. Its population will increase as fast as between 1990 and 2004 (in average annual pace of 4-5%). Ever greater changes are expected to take place in live poultry production. In 2005, the increase of volume of this type of production was ca. 50 thousand tonnes, and in 2009 it was as much as ca. 85 thousand tonnes and it is probable that the increasing pace will continue up to 2013.

3.4. Conclusions

In the five years before the accession (1999-2003), economic conditions were not favourable for Polish agricultural producers. Prices of agricultural products increased by ca. 8%, while production prices of means they purchased for the purposes of current production by as much as ca. 34%. Budgetary payments were minimal (1.5-2% of the value of production) and were paid only to producers selling means of production of the so-called biological progress.

No wonder that agricultural producers implemented projects improving efficiency of production, yet certain outcomes became visible only in the years

to follow. Calculations made in fixed prices for 2005-2009 pointed to the increase of gross value added by PLN 5.9 billion as compared to the situation between 1999 and 2003, while costs of indirect consumption per unit of value of production decreased by ca. 8 percentage points. This resulted from increasing chemicals-based approach to agriculture, abandonment of costly larger-scale plant and animal production.

This positive phenomenon overlapped with the positive outcomes of accession, which brought about the multiplication of the level of subsidies to agriculture. About 2/3 of income increase for agricultural producers between 2005 and 2009 (calculated in fixed prices) is attributed to this source, as compared to the five years of 1999-2003.

Meanwhile, forecast for 2013 demonstrates that gross value added (also calculated in fixed prices) will not increase as compared to the situation of 2005--2009, and costs of indirect consumption per unit of production value will increase by more or less 1 percentage point. This will have various reasons. Harvest of certain plants cultivated will increase, but substitution of labour-intensive cultivations (with high values of production per unit of agricultural land area) with cultivations of lesser production value from unit of area, yet with greater income per unit of own labour outlays of agricultural producers and their family members, will increase. Both processes will be accompanied by further increase of chemicals-based approach to agriculture and limitation of volume of certified grain purchased.

Simultaneously, the gap between the level of chemicals-based approach to Polish agriculture and what is occurring in the old EU-15 member states, where outlays of agri-chemicals are substituted by inducers of other types of progress, will deepen.

The number of cows in animal production will not increase, while the number of pigs, other than cattle and horses, will decrease. Moreover, pace of improvement of cow and pig productivity will not change in the period in question.

However, increased interest in cattle for fattening and increase of pace of poultry livestock production growth should be noted. Together with the increase of harvest of certain plants, it will contribute to balancing the negative outcomes of climate changes and decrease of effects in other branches of agricultural production.

One may get the impression that sudden increase of the level of subsidies initiated in 2004 decreased the interest of Polish agricultural producers in improvement of productivity of agriculture. However, it is not characteristic of our agriculture only, since similar phenomenon was noted previously in French agriculture.

The above mentioned fact demonstrates that direct payments will be the sole source of improvement of income of Polish agriculture up to 2013, and it will carry this "burden" to 2014 and the next planning and settlement period of the European Union. Therefore, income of Polish farms will depend on the level

of subsidies, including those which currently reveal competitive capacity. Decrease of the level of subsidies obtained will probably lead to the decrease of their number, and at least will hinder the increase of their number.

The forecast of the situation of Polish agriculture in 2013 is only a plausible scenario. Any change of farming conditions as compared to those based on tendency models may change the situation as well, even for the better.

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Dr Robert Mroczek, Dr Iwona Szczepaniak
Institute of Agricultural and Food Economics – National Research Institute, Warsaw, Poland

4. Development trends and competitiveness of Polish food industry

4.1. Development of Polish food industry in changing market environment

The last decade was a period of intensive development of the Polish food industry. In 2000-2010 sales value of food and drinks and tobacco products in base prices increased from PLN 92.9 to 165.4 billion. Sold production of food industry (in fixed prices) increased by 55.7% (4.5% per year). At the same time commercial output of agriculture increased by 27.6% (2.5% per year), and consumption of food, drinks and tobacco products – by 18% (1.7% per year), with total production growth of the entire Polish industry by 73.2% (Table 1). It means that production growth in food industry was twice as high as commercial output of agriculture, and three times as high as internal demand for food, but lower by ¼ than production growth for industry in general.

Table 1. Comparison of production growth of food industry with development of agriculture and detailed food sales (fixed prices)

Years	Increase in production sold compared to the previous year in %			Increase compared to 2000 in %			
	Food and drinks	Tobacco products	Food industry in total	Production of food industry	Commercial output of agriculture	Consumption of food, drinks and tobacco products	Industrial production
2001	4.9	-15.2	4.6	4.6	2.9	1.5	0.6
2002	-0.3	1.5	0.2	4.8	7.2	3.1	1.7
2003	7.9	2.6	7.7	12.9	12.8	3.8	10.2
2004	3.7	0.7	3.6	16.9	16.5	6.2	24.1
2005	7.1	5.3	7.0	25.1	11.1	8.2	28.9
2006	6.2	.	6.3	33.0	15.8	12.0	44.0
2007	6.8	9.4	7.0	42.3	17.6	15.0	59.6
2008	1.1	.	1.0	43.7	24.7	17.8	65.3
2009	3.8	11.3	3.9	49.3	28.2	18.2	57.9
2010	4.4	-3.5	4.3	55.7	27.6	18.0	73.2

Source: Authors' own compilation based on the data of the Central Statistical Office (CSO).

Development tendencies for main directions of food processing have been continued so far (Figure 1). An important factor for the development of food in-

dustry in the last decade was constantly growing demand for highly processed foods, and the development of the branch of food industry which produces for other sectors of economy. Production of these foods (for instance, feeds for breeding livestock and pet food, ethyl alcohol and denaturated alcohol, esters, glucose and isoglucose) increased by 7.5% per year.

In the last decade secondary food processing, including production of cans, dishes, convenience food and other compound products, as well as diverse snacks, desserts and non-alcoholic drinks developed relatively fast. Its development pace was 5.8% per year and was higher than that of the entire food industry. Production of highly processed food in 2000-2010 increased by 75%.

High production growth was achieved also in the so-called primary processing of agricultural products, i.e. industrial slaughtering, milk processing or milling of cereals. The value of primary processing in the last decade increased by half, and average growth rate was slightly higher than of the entire food industry and amounted to 4.6% (Figure 1).

Figure 1. Dynamics of growth of main directions of industrial
agri-food processing (2000 = 100)
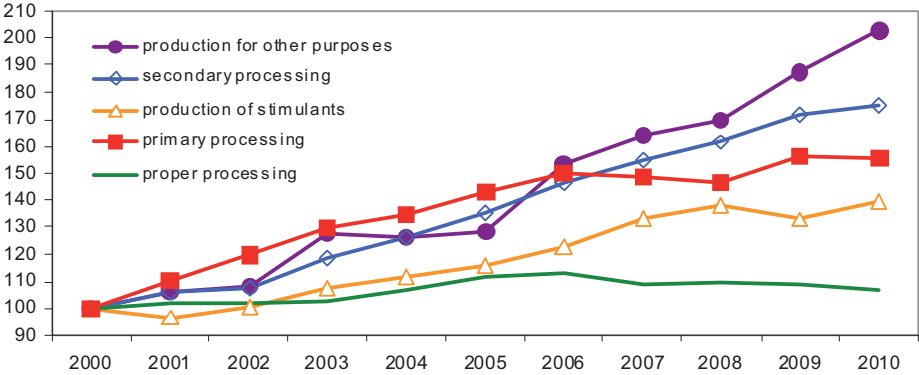
Source: Authors' own calculation according to the CSO data.

In 2000-2010 value of production of stimulants increased by almost 40%, i.e. by 3.7% per year, slightly slower than of the entire food industry. A new phenomenon after the accession to the EU was acceleration of the development of production of spirits and tobacco products, with significant decrease in the wine sector (by more than a half).

The slowest growth was observed in production of standard food products, i.e. in the so-called proper processing. In the analysed period production

value of this direction of processing in fixed prices increased by 7% (i.e. less than 1% per year) (Figure 1).

Export of food industry products in the last decade was the main factor for development of food production in Poland (or even an engine for its growth). In 2000-2010 export of food industry products increased by four and a half times, i.e. from 9.8 to 44.1 billion PLN, and its share in sold production of food industry increased from 10.5 to 26.6%. Growth in export amounted to 34.3 billion PLN, which, in relation to growth of sold production of food industry amounting to 72.5 billion PLN, constituted as much as 47.3%. It means that export took over almost half of the growth of sold production of food industry. Internal demand affected the development of food production to a much smaller extent. Its real influence, taking into consideration import growth of food imported to Poland, may be estimated at 10-12%[23].

Poland's accession to the European Union resulted in investment revival in the Polish food industry. While in 2009-2010 the investment activity in the sector slowed down, this was due mostly to the world economic crisis of 2008-2009. In the past year investment in food industry amounted to a similar value as in 2009 (ca. PLN 6.6 billion). In fixed prices this amount was ca. 20% lower than the peak price of 2007 and ca. 6-7% lower than the average from 2003-2008, but, at the same time, more than 25% higher than at the beginning of the decade. Drop in investment in the sector was significant, but their level in 2009-2010 was still higher than directly before the accession (Table 2). The reason for the decrease of the investment activity was not lack of proper funding, but fear of entrepreneurs related to the world crisis, which was the reason for cautious assessment of development perspectives for our economy.

Table 2. Investments in food industry

Years	Investment value in PLN million		Share of expenditure on building goals in %
	In current prices	In fixed prices of 2003	
2001	4,710	4,820	31.6
2002	4,750	4,865	26.0
2003	5,708	5,708	29.9
2004	6,757	6,595	33.4
2005	6,190	5,990	30.2
2006	7,149	6,815	30.2
2007	7,205	6,820	30.7
2008	7,932	7,335	30.3
2009	6,618	5,956	30.6
2010[a]	6,660	6,176	.

[a] preliminary data
Source: Authors' own compilation based on the CSO data.

[23] In 2000-2010 import of food products to Poland increased from 2.2 billion EUR to 7.7 billion EUR.

Growth of prices of agricultural products in Poland preceding our accession to the European Union and covering the Polish agriculture by the Common Agricultural Policy resulted in making gross added value of agriculture higher than of food industry. This is contrary to the opinion that the industry takes over profits due to agricultural producers. According to the data by the CSO, gross added value in food industry (food, drink and tobacco production sector) in 2000-2009 increased from 22.3 to 37.5 billion PLN (by over 15 billion PLN), and in agriculture from 19.5 to 39.7 billion PLN (by over 20 billion PLN).

Creating added value in the food industry may be presented as a process consisting of adding new value created in processing services, which, if accompanying agricultural product, facilitate access to food, comfort of use or growth of satisfaction in its use. Gross value added (GVA) is a sum of remuneration cost with liabilities, depreciation, taxes included in costs (without VAT and excise) financial costs and gross financial output.

In 2000-2009 the number of active companies producing food and drinks (without tobacco) decreased by almost 29% from 22 thousand to less than 15.7 thousand. At this time, the amount of employees of food industry decreased by 10%, from 500.1 to 452.2 thousand people. Efficiency of work in food industry measured with the value of production sold increased in this way from 186 to 350 thousand PLN, and measured by gross value added from 44.5 to 82.9 thousand PLN/employee. In both cases the increase means almost twice as high efficiency of work.

Increase in labour efficiency in the Polish food industry was generally observed in all its sectors. The dynamics of efficiency changes was different, though. In food industry enterprises covered by financial reporting in 2000--2010, the fastest growth of labour efficiency measured in sold production value (fixed prices from 2010) took place in sugar industry (12.6% per year on average). High growth in labour efficiency took place also in oil-mill industry (by 10.2% annually) and significant (7 to 9% annually) in sectors: distilling, wine, fish and dairy. A slightly weaker growth of labour efficiency (by ca. 5% annually) was observed in poultry, non-alcoholic beverages, and fodder and sugar sectors.

Labour efficiency measured by added value was growing fastest in following sectors: sugar (13.5% per year), juice (12.7%) and wine (10.1%). High improvement of labour efficiency was observed in fish sector (by 8.6% per year on average) and distilling, beer, milk, confectionary and non-alcoholic beverages (6 to 8%).

Financial situation of food industry in Poland has been constantly on increase in the last decade. In food industry enterprises subject to financial reporting to the Central Statistical Office, net profitability grew from 1.2% in 2001 and 1.6% in 2003 to 4.7% in 2010 (in such sectors as beer or sugar even over 12%). The return on equity grew from 5.3% in 2003 to 14.3% in 2010. Higher than average ROE was also observed in such sectors as: beer (42.3%), baking

(25.7%), distilling (18.4%), meat (16.7%), sugar (16.2%) and fodder (16.0%) (table 3). These results are much higher than the return on safe forms of financial investment, for instance, deposits or state obligations.

Table 3. Food industry efficiency measured by return on equity (ROE)

Branches	2003	2010
Meat	5.14	16.72
Poultry	6.64	12.92
Milk	5.44	9.46
Milling of cereals	8.28	13.57
Oil-mill	8.54	1.85
Sugar	-20.43	16.26
Potato	3.27	8.36
Fruit and vegetable	3.79	9.71
Non-alcoholic beverages	11.36	9.36
Fodder	14.60	15.96
Baking	4.80	25.72
Concentrated products	12.04	13.89
Distilling	4.06	18.43
Brewery	13.32	42.29
Wine	-2.10	9.10
Tobacco	3.82	7.50
Food industry	5.31	14.26

Source: Authors' own compilation based on the unpublished CSO data.

In the efficiency assessment of food industry two following categories of sector activity were presented:

- Gross value added (GVA),
- Economic surplus or total welfare (ES).

The first category of effects is of macroeconomic type, since it describes profits from sector activity for the entire economy, the second is microeconomic, as it manifests effects for an enterprise or owners of equity capital.

The effects were compared to following categories of equity or investment:

- Sum of material costs, which in global economic conditions are known as intermediate consumption (IC), manifests the value of cumulated labour investments in food processing, provided by other sectors of national economy, producing raw products, energy, supporting equipment and other substantial services for the industry;
- Sum of labour cost (LC) indicating the value of labour inputs in the assessed activity type.

On this basis following efficiency indicators were established:

- Efficiency of material input (intermediate consumption),
- Efficiency of labour inputs (staff costs).

The ratio between material inputs (intermediate consumption) on the scale of the entire food industry, despite a slight decreasing tendency, was relatively stable in the previous decade. In 2000-2010 it decreased from 0.304 to 0.285 PLN/PLN. In this regard, efficiency increase did not take place. At the same time, sectors were differentiated both with respect to the efficiency level and its development tendencies (Table 4).

In the whole investigated period meat, milk, fodder, oil-mill and cereal milling industries were characterised by the lowest material input efficiency measured by added value. In these industries the ratio of added value to inter-mediate consumption in the last period varied between 0.132 and 0.233 PLN/PLN.

The highest efficiency of inputs was achieved in sugar, baking, tobacco and beer industries. In this group three sectors were characterised by the highest concentration of production, in one sector this concentration was very low. In these sectors the ratio of added value to inputs was higher than 0.50 PLN/PLN (Table 4).

Table 4. Efficiency of material inputs in food industry

Specification	2000	2010	2000	2010
	Added value/material inputs		Economic surplus/material inputs	
Food industry Including:	0.304	0.285	0.124	0.144
Meat	0.189	0.206	0.047	0.083
Milk	0.221	0.190	0.068	0.083
Fodder	0.201	0.178	0.109	0.101
Cereal-milling	0.285	0.233	0.157	0.125
Sugar	0.674	0.660	-0.036	0.487
Fruit and vegetable	0.287	0.322	0.005	0.144
Confectionary	0.357	0.341	0.141	0.173
Non-alcoholic beverages	0.299	0.309	0.108	0.168
Beer	0.594	0.528	0.327	0.368
Tobacco	0.463	0.574	0.233	0.297

Source: Authors' own compilation based on the unpublished CSO data.

In eight sectors investigated constant efficiency decrease of material inputs measured by added value was observed. It was the highest in oil-mill indus-try (over 50%), cereal-milling (ca. 20%), milk, distilling, beer and fodder (ca. 10%). In the last decade the biggest progress was observed in fish and tobacco industries (30% each), and smaller also in meat, baking, fruit and vegetable, non-alcoholic beverages and concentrated products.

Among the efficiency indicators analyses, labour efficiency improved in the greatest degree. In the last decade labour input results measured in added value grew significantly (by 1/5) and economic surplus (by 1/2), and measured by return, as many as five times. These phenomena were observed in almost all food industry sectors. Efficiency measured in the ratio of added value and surplus decreased only in cereal-milling industry. In this regard no significant progress was achieved in oil-mill, fodder, concentrated products and tobacco industries either (Table 5).

Table 5. Efficiency of labour inputs in food industry

Specification	2000	2010	2000	2010
	Added value/ labour costs		Economic surplus/ labour costs	
Food industry Including:	1.80	2.19	0.73	1.11
Meat	1.46	1.75	0.37	0.70
Milk	1.54	1.89	0.48	0.83
Fodder	2.34	2.46	1.27	1.36
Cereal-milling	2.50	2.34	1.38	1.25
Sugar	2.59	5.44	1.45	4.02
Fruit and vegetable	1.38	1.94	0.31	0.87
Confectionary	1.72	2.12	0.68	1.07
Non-alcoholic beverages	1.65	2.35	0.58	1.28
Beer	2.45	4.38	1.35	3.05
Tobacco	2.14	2.29	1.08	1.19

Source: Authors' own compilation based on the unpublished CSO data.

Efficiency of labour input was the highest in sugar, beer and distilling industries. In these industries 1 PLN of labour input generated in 2010 added value amounting to: 5.44 PLN, 4.38 PLN and 3.06 PLN, economic surplus of: 4.02 PLN, 3.05 PLN and 1.89 PLN respectively, and gross return: 2.93 PLN, 2.18 PLN and 1.06 PLN. These indicators were relatively high also in fodder, cereal-milling, non-alcoholic beverages, tobacco and confectionary industries.

Changes in the Polish food industry go in the right direction and are even more apparent, if compared to the changes that took place in other Community Member States at the same time, in particular, to the most developed states known as the EU-15. Growth in production value of the Polish food industry in 2000-2008 amounted to 5.7% (fixed prices) and was eight times higher than in the developed EU Member States. Labour efficiency of the Polish food industry increased by 5.8% per year at that time, compared to over 3.5 times lower growth of labour efficiency in the EU-15. The difference was even more apparent in concentration of production, as in Poland the process took place at the rate of 9.8% per year and was five times faster than in the "old" EU Member States (Table 6).

Table 6. Labour efficiency and concentration of production in food industry in the European Union and in Poland

Countries	Annual growth in % in 2000-2008		Annual growth in production value in % in 2000-2008		Annual changes in %	
	Employ-ment	Number of enterprises	Current prices	Fixed prices	Labour efficiency	Concentra-tion
EU-15 Including:	-0.5	-0.8	3.0	0.7	1.6	2.0
Germany	-0.4	-3.3	3.0	1.1	1.7	5.7
France	-0.3	-0.7	3.3	1.1	1.4	1.9
Italy	0.3	0.4	3.2	0.7	0.4	0.3
Spain	0.5	-1.8	5.8	2.4	1.9	4.6
Great Britain	-2.0	-0.7	0.0	-1.9	0.4	-1.1
Netherlands	-1.7	-2.1	2.6	0.2	2.2	2.7
Portugal	0.2	2.6	3.1	0.1	-0.1	-2.0
Greece	1.6	1.7	2.1	-1.3	-2.4	-2.5
EU-12 Including:	-0.8	-1.0	7.9	1.9	4.3	5.0
Poland	-0.1	-2.3	8.6	5.7	5.8	9.8
Czech Republic	-2.1	1.7	5.1	2.3	5.0	0.7
Hungary	-1.2	0.8	6.1	0.2	1.5	-0.6
Romania	-1.0	-0.1	19.5	4.7	-1.3	-2.1
Bulgaria	0.7	-2.3	13.0	5.8	5.1	8.9

[a] in fixed prices, i.e. corrected with inflation indicators
Source: Authors' own calculation according to the Eurostat data.

The increase of labour efficiency in the Polish food industry in the last decade made it possible to shorten the distance between Poland and the most developed EU Member States. Labour efficiency in the Polish food industry, calculated in fixed prices is ca. 60% lower than in the "old" EU Member States, but in comparable prices is only 30% lower. Concentration of production in food industry calculated in fixed prices is about 1/5 lower than in the EU-15.

The current structure of the food industry in Poland shows many similarities to the EU structures. In Poland and in the EU meat industry (over 20%) has the largest share in the industry turnover, followed by other food and drinks producers (15-18%), and the smallest – fruit, vegetable and potatoes processing industries and bread producers (6-9% each). In other sectors of food production smaller and bigger differences are observed. Similarities are apparent not only in the structure of the sector, but also in its identity (Figure 2). In the last decade, the share of big enterprises (employing over 249 persons) in sales increased from 45.3% to 53.4%. The share of other groups of enterprises decreased:
- Medium (50-249 employees) from 29.6% to 26.3%,
- Small (10-49) from 16.3% to 14.4%,
- Micro (up to 9) from 8.8% to 5.9%.

Changes in structure and number of food industry enterprises with regard to the sold production indicate growing processes of concentration of production.

Figure 2. Structure of food industry in Poland and the European Union in % sales of the entire sector
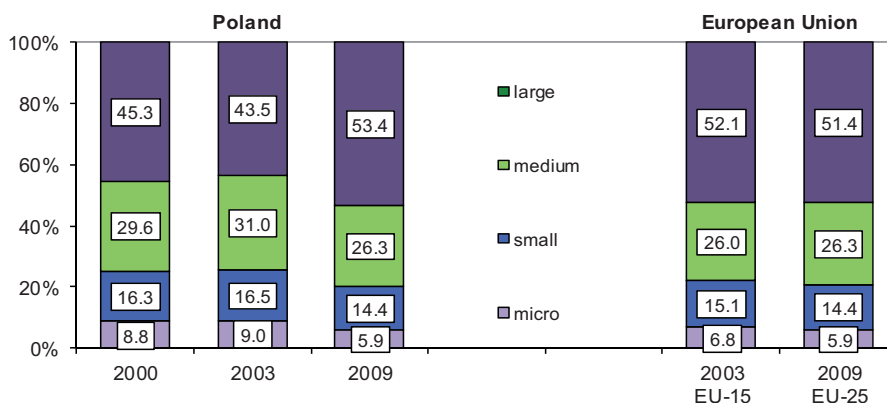
4.2. Assessment of changes in competitiveness of the Polish agri-food sector

Due to international dimension of competitiveness of Polish food producers, one of the most significant phenomena that manifest the shaping of the competitive position of Polish food producers were results in foreign trade in agri-food products. Despite different conditions, they confirm good preparation of the sector to the activity on the Single European Market and on the majority of other markets. In over seven years of the EU membership, a rapid growth of export of Polish agri-food products was observed, which compensated for a slower growth of import of these commodities. Polish food producers significantly improved their position on the market of the enlarged European Union.

Revival in Polish foreign trade of agri-food products was observed already after the accession to the EU (Table 7). In 2004 the value of export of agri-food products grew by ca. 31% year on year. The growth of import was smaller and amounted to almost 24%. Such a dynamic growth of export in 2004 was not a one-time surge, resulting from the integration impulse. In next years growth in foreign exchange of agri-food products continued. In 2005 export grew by over 34%, and import – by almost 22%, in 2006 respectively by 21 and 19%. In 2007 our trade further developed, but for the first time import grew faster than export, i.e. 25% and 17% respectively. This ratio continued in 2008, and indicators for growth dynamics of export and import amounted to: 15% and 27%

respectively. Such changes in trade streams improved the positive exchange balance in the first years of the integration (from 0.5 billion EUR in 2003 to 2.1 billion EUR in 2006), and decreased it in the following years (to 1.3 billion EUR in 2008). These tendencies changed due to the global economic crisis (albeit the reaction to the crisis was delayed in this area), which resulted in food trade in a decrease of export value by 1.3% in 2009, and of import value by 9.7%, which resulted in another improvement of turnover balance (of 2.2 billion EUR).

Table 7. Results of the Polish foreign trade in agri-food products

Specification	Value in EUR million				Dynamics (2003=100)		
	2003	2007	2009	2010	2007	2009	2010
Export of agri-food products	4,010.4	9,942.5	11,277.6	13,507.2	247.9	281.2	336.8
Including: to the EU-25/27[a]	2,616.7	8,001.4	9,066.9	10,705.7	305.8	346.5	409.1
To the EU-15	2,041.6	5,941.2	6,698.8	7,992.6	291.0	328.1	391.5
To the EU-10/12[a]	575.1	2,060.2	2,368.1	2,713.1	358.2	471.8	471.8
Import of agri-food products	3,556.9	7,972.3	9,111.0	10,921.1	224.1	256.2	307.0
Including: from the EU-25/27[a]	2,175.9	5,347.4	6,320.4	7,481.9	245.8	290.5	343.8
From the EU-15	1,848.5	4,484.6	5,448.9	6,421.4	242.6	294.8	347.4
From the EU-10/12[a]	327.4	862.8	871.5	1,060.5	263.5	266.2	323.9
Balance of foreign trade in agri-food products	453.5	1,970.2	2,166.6	2,586.1	434.4	477.8	570.2
including: to the EU-25/27[a]	440.8	2,654.0	2,746.5	3,223.8	602.1	623.1	731.3
To the EU-15	193.1	1,456.6	1,249.9	1,571.2	754.3	647.3	813.7
To the EU-10/12[a]	247.7	1,197.4	1,496.6	1,652.6	483.4	604.2	667.2

[a] in 2003 data for the EU-25, since 2007 for EU-27 (EU-10 and EU-12 respectively)
Source: Authors' own compilation based on the Analytical Centre of the Customs Administration (CAAC) data.

Results of foreign trade in agri-food products in 2010 were also very good. Value of trade in food increased by almost 20%, i.e. export grew to a record value of EUR 13.5 billion, and import to EUR 10.9 billion. Further improvement of balance in exchange of these products was observed. In 2010 it amounted to almost 2.6 billion EUR, which, compared to the previous year means growth by over 19%. In 2011 growth of trade in agri-food products was continued, and in the first six months of 2012 the pace of growth of both export and import has been lower than a year before. The growth of import was slightly quicker than of export, which resulted in a slight decrease in turnover ratio by 1.8% compared to the similar period of 2010.

In the entire period of Poland's EU-membership export of agri-food products grew by almost 3,5 times, import – by three times and foreign trade balance – over 5,5 times. Average growth pace of export in 2003-2010 amounted to 18.9%

per year and was 1.5 pp higher than of import (17.4%). Turnover balance increased annually in this period by 28.2% on average.

Poland's commercial liaisons with foreign states are not symmetrical – EU Member States are still dominant partners in this exchange. Trade in agri-food products with these countries grew after accession much more dynamically than with third countries. Food deliveries from Poland to the EU in 2003-2009 increased by almost three and a half times, whereas imports to Poland increased by almost three times. Positive trade balance with these countries improved from 0.4 billion EUR to 2.7 billion EUR, more than six times (Figure 3). 2010 was marked by further development of our commercial trade with the EU Member States. Both the value of export and import of agri-food products increased by over 18%, and trade balance of these products increased to over 3.2 billion EUR. Increase in trade balance with third countries was much slower at that time. Total trade balance in agri-food products remains negative with these countries.

Figure 3. Results of the Polish foreign trade in agri-food products
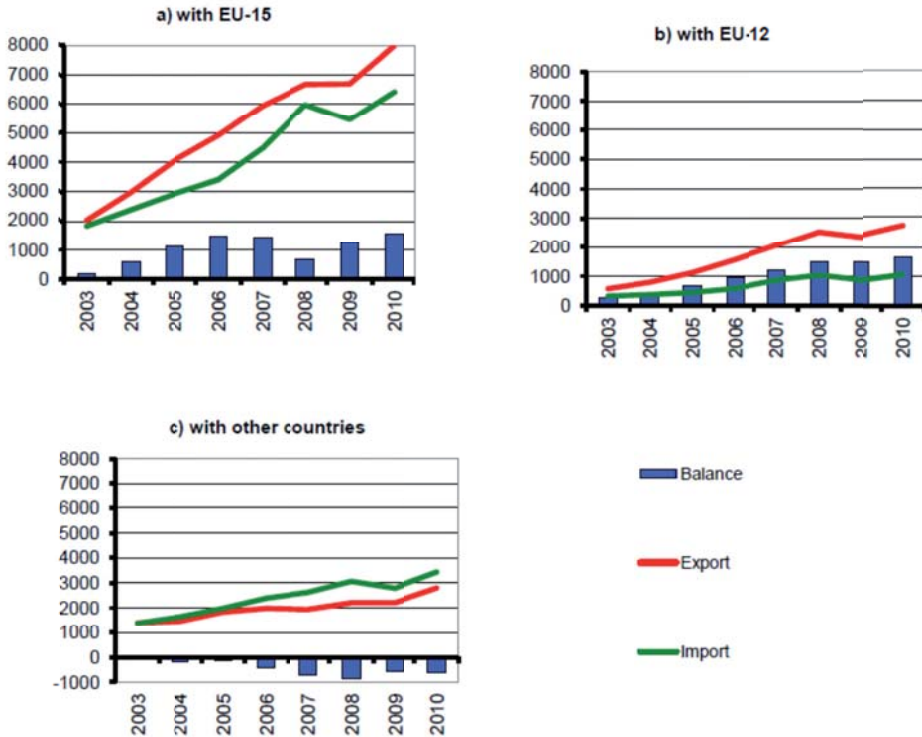
Source: Authors' own compilation based on the CAAC data.

Due to this lack of symmetry in Polish foreign trade, the Single European Market became the main supply market and the outlet for the Polish agri-food sector already in the first year after the accession. In following years of our EU membership, the share of the EU in export of this group of goods grew rapidly – from ca. 65% in 2003 to almost 74% in 2005 and to over 80% in 2007-2009. The share of the EU in import of agri-food products was more stable and in 2003-2006 varied at 61-63%, to exceed 67% in 2007 and reach 70% in 2008-2009. 2010 witnessed only a slight decrease in the EU share in our export (to 79.3%) and import (to 68.5%). These data show a still strong dependence of the Polish agri-food trade on single European market.

Polish foreign trade in agri-food products is dominated by food products. According to the estimates by the IAFE-NRI the share of food industry products in total agri-food export amounts to ca. 80-85%. The share of food products in agri-food import is lower and amounts to 65-70% (Figure 4). The balance in food products trade since 1997 has been positive and since 2004 grew rapidly, while deficit in foreign trade in agricultural products has always been very deep.

Trade structure thus preserved of trade in agri-food products is advantageous for the Polish economy. By exporting processed products we realise much more added value than by mere exporting raw products. Import of raw products, on the other hand, and their processing in the country contributes to the improvement of foreign trade balance and makes it possible to create more added value and generate new jobs. Import of such products on the one hand is of supplementary nature for the market supply, on the other, has a processing nature, as some products are processed in home businesses and re-exported. Processing import, oriented toward export, develops mostly due to lower cost of production in the Polish food industry, which confirms the thesis on cost/price competitiveness of the food sector.

Figure 4. The share of food industry in agri-good trade (in %)
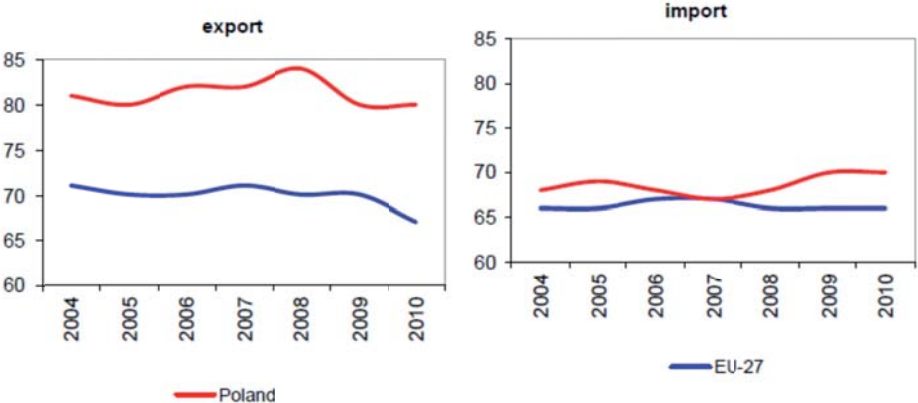
Source: Calculations by M. Bułkowska on the basis of the Eurostat data.

It transpires from the comparison of average growth pace of export of agri-food products of Poland and the EU Member States (intra EU and extra EU) that in the period of the EU Membership the pace amounted to 19.4% in Poland and was much higher than in the entire European Union (6.1%), in particular compared to the EU-15 (5.1%). The growth of the Polish agri-food export was nothing exceptional, if compared to the rate of growth of export of other new Member States (EU-11), which amounted in 2004-2010 to 17.8%. As far as the development of agri-food import after Poland's accession to the EU is concerned, the situation is similar. Average growth rate of the Polish import (18.4%) was significantly higher than in the EU-15 (5.0%) and slightly higher than the EU-11 (15.4%). In all the groups of countries the import growth rate for agri-food products was slightly lower than the export.

The development of agri-food export in the period of Poland's EU Membership contributed to the doubling of our share in total agri-food export of the EU (intra EU and extra EU) – from 1.7% in 2003 to 3.7% in 2010 (Figure 5). The analysis of the value of trade balance in EU agri-food products (intra EU and extra EU) shows, that Poland, with the turnover of EUR 2.6 billion was on the sixth place among the nine European Member States with positive trade balance (other EU Member States are net importers of food). Despite apparent progress Poland made in this regard in the last seven years, it is hard to count our country among the biggest agri-food exporters.

The assessment of competitiveness of the Polish food industry after the accession to the EU was based upon two indicators: trade coverage (TC), i.e. ratio of the value of export of food industry to its import value and export orientation indicator (EO), i.e. the share of the export value of the food industry products in the sales value of these products. These indicators relate to pro-export specialisation of a country in a given sector, for a product, or a group of products.

Figure 5. Poland's share in agri-food export of the European Union
(intra EU and extra EU, in %)
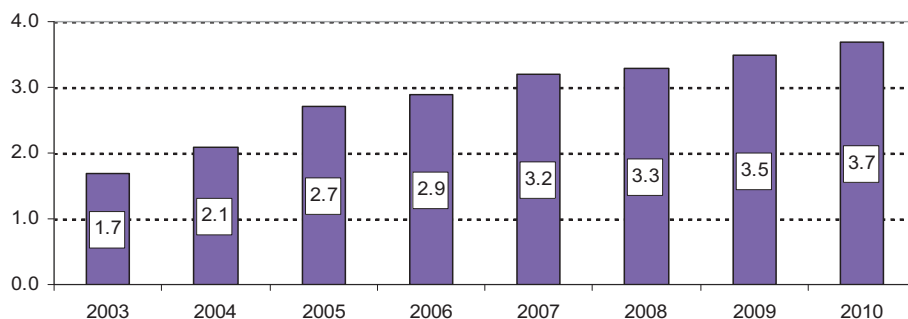
Source: Calculations by M. Bułkowska on the basis of the Eurostat data.

The analysis results concerning the index of trade coverage (the proportion of food industry products import to the export of these products) during the Poland's membership in the EU showed multi-directional fluctuations of the index, but all the time its level was higher than one (Figure 6). This implies that Poland's specialisation in the food industry production and makes it possible to conclude that Polish producers have a relative advantage over their partners from other countries. In 2004-2006 the TC index increased from 1.23 to 1.46, and then it dropped as much as even to 1.26 in 2009. In the last two years the index once again showed an increasing tendency and in 2010 it amounted to 1.32. This means that within the same period the export value of food industry products exceeded the import value of products from this sector by as much as 32%.

The analysis results concerning the ratio of export of food industry products to sales thereof in the 2003-2010 showed that the share of foreign sales in the total sales of food industry increased in this period by almost 13 percentage points and in 2010 it reached even 26.6%. As compared to 2001 this means that index of export orientation for food industry increased by over two and a half times (Figure 6). Such a considerable improvement of this factor, most certainly, results from greater export intensity in individual branches of food industry and a fixed orientation of some branches at foreign recipients. These phenomena are an evidence of a clear growth of export specialisation in the entire food sector and its increasing international competiveness.

Figure 6. Competitiveness indices for the food industry
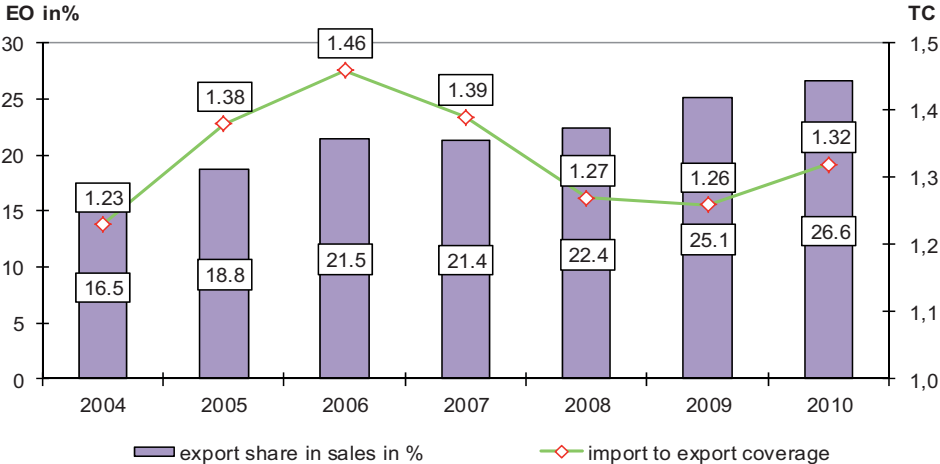
Source: Authors' own compilation based on the CSO and CAAC data.

The food industry branches demonstrating the highest export specialisation and in this aspect – most competitive ones, were the following: meat (with poultry), dairy, fruit and vegetable, secondary processing of cereals, con-

fectionary and manufacture of tobacco products. The role of export was least significant in branches such as: wine, beer brewing, pasta, bakery and fodder.

In order to assess the changes in the competitiveness of the Polish agri-food trade two indicators were used, i.e. the B. Balassy index of Revealed Comparative Advantage (RCA) in export and the Lafay's index (LFI). The Revealed Comparative Advantage study consists in establishing whether the share of a given product in export of a given country is higher (lower) than the share of this product in the global export to a certain market. A product is competitive if a given country has revealed comparative advantage in its export to a certain market, which is evidenced by a higher share of a certain group of products in the given country's export from the share of this group of products in the global export to a certain market. The Lafay's index is, on the other hand, an index of foreign trade competitiveness based on the export and import flows of a given country and in particular – the character of the trade turnover balance. The surplus in trade of a given product is identified with comparative advantage in export of this product, whereas a deficit – with lack of such advantage.

As for the Polish export of agri-food products to the global market the RCA index takes on values greater than 1 in case of 2/3 of product groups, i.e. the share of this groups in the export from our country is higher than their share in the global export to this market (Table 8). Thus Poland has significant comparative advantages in agri-food export to the global market. In 2010 the RCA index in the total Polish export of agri-food products to the global market amounted to 1.41 (while in 2003, i.e. before Poland's accession to the EU it reached 1.08), and as much as 85% of this export was characterised by revealed comparative advantages.

In the period of our membership in the EU the majority of revealed comparative advantage indices improved (this improvement pertained to about 73% of the Polish export of agri-food products to the global market). In case of competitiveness assessment with the use of the Lafay's index the fact of having or lacking revealed comparative advantages in foreign trade is predetermined by the character and size of the trade turnover balance for a given product (Table 8). When the values of the index are higher than zero, this means that the examined country has a comparative advantage in the export of a given product or group of products in relation to foreign countries. For the Polish trade of agri-food products this was the case for about 1/3 of product groups.

The competitiveness of individual groups of agri-food products in Poland measured with both the RCA index and the Lafay's index was, however, very differentiated (Table 8).

Table 8. Competitiveness indices for the foreign trade in agri-food products in Poland (according to the HS chapters)

HS	Chapter name	RCA index			Lafay's index		
		2003	2010	Change in 2003-2010	2003	2010	Change in 2003-2010
01	Live animals	2.29	1.41	-0.88	1.36	-0.24	-1.60
02	Meat and edible meat offal	1.58	2.62	1.04	4.91	2.88	-2.03
03	Fish and crustaceans, molluscs and other aquatic invertebrates	0.53	1.17	0.64	-2.04	-1.98	0.06
04	Dairy products; birds' eggs; natural honey	1.48	2.22	0.74	3.49	2.80	-0.69
05	Products of animal origin	3.68	2.34	-1.34	-0.48	-0.38	0.10
06	Live trees and other plants	0.71	0.72	0.01	-0.60	-0.67	-0.07
07	Edible vegetables	2.08	1.63	-0.45	2.96	0.46	-2.50
08	Edible fruit and nuts	1.64	1.12	-0.52	-2.27	-1.73	0.54
09	Coffee, tea, mate and spices	0.52	0.79	0.27	-1.95	-1.11	0.84
10	Cereals	0.25	0.47	0.22	-0.72	-0.02	0.70
11	Products of the milling industry; malt; starches	1.00	1.06	0.06	-0.41	-0.31	0.10
12	Oil seeds and oleaginous fruits	0.22	0.36	0.14	-1.10	-0.48	0.62
13	Vegetable saps and extracts	0.23	0.13	-0.10	-0.40	-0.31	0.09
14	Vegetable products	0.94	0.53	-0.41	0.01	-0.10	-0.11
15	Animal or vegetable fats and oils	0.10	0.47	0.37	-2.86	-1.08	1.78
16	Preparations of meat and fish	1.60	2.21	0.61	1.83	1.73	-0.10
17	Sugars and sugar confectionery	1.63	1.07	-0.56	1.31	0.12	-1.19
18	Cocoa and cocoa preparations	1.48	2.17	0.69	-1.21	-0.09	1.12
19	Preparations of cereals; pastrycooks' products	1.33	1.93	0.60	1.23	0.94	-0.29
20	Preparations of vegetables, fruit	2.40	1.77	-0.63	3.20	0.39	-2.81
21	Miscellaneous edible preparations	1.69	2.30	0.61	-0.73	0.41	1.14
22	Beverages, spirits	0.26	0.61	0.35	-0.81	-0.59	0.22
23	Residues; prepared animal fodder	0.60	0.84	0.24	-4.82	-3.11	1.71
24	Tobacco and manufactured tobacco substitutes	0.53	4.07	3.54	0.10	2.44	2.34
	Total for agri-food products	1.08	1.41	0.33	×	×	×

Source: Calculations of Ł. Ambroziak based on WITS-Comtrade database.

According to the assessment conducted on the basis of these two indicators, in 2010 the following groups of products were competitive (RCA>1.0 and LFI>0.0): meat and edible meat offal, preparations of meat and fish, dairy produce, sugars and sugar confectionery, preparations of cereals; pastrycooks' products, preparations of vegetables and fruit, tobacco and manufactured tobacco sub-

stitutes and the so-called other food preparations. However, we had no competitive advantages (RCA<1.0 and LFI<0.0) as regards trade in: coffee, tea, mate and spices, cereals, oil seeds and oleaginous fruits, animal or vegetable fats and oils, beverages and spirits, and residues; prepared animal fodder. The trade in other groups of products was competitive only based on the assessment carried out with the use of only one from the two indices.

In 2003-2010 the competitive position of Poland, according to the assessment based on the RCA and Lafay's indices, visibly strengthened in trade of tobacco and manufactured tobacco substitutes and the so-called other food preparations (table 8). In some groups of products, despite the drop in the aforementioned indices after the accession, we managed to keep the previously reached comparative advantages – this refers to the trade in vegetables, preparations of vegetables and fruit, sugars and sugar confectionery.

The actions undertaken by enterprises aim at increasing competitiveness, which is expressed in better competitive position on the market and winning of competitive advantages in a long-term perspective. So far, the main source of competitive advantage on the EU and global market were, above all, cost and price advantages. Reaching the advantages was possible due to lower prices of agricultural products, lower costs of labour and other production factors, as well as lower processing margins.

The analysis of producer prices for basic food industry products and highly processed products in Poland and the prices of these products in Germany points to the fact that in case of the majority of goods Polish producers remain competitive. However, the level of our price advantage is differentiated both between individual branches and within them. On the market of basic food industry products we have the highest competitive advantages in the poultry and bakery sectors. As regards meat processing and fresh or chilled meat of bovine animals, as well as primary processing of cereals our competitiveness is also significant. Moreover, we are still competitive on the market of certain dairy products, fruit and vegetable products and margarine. Only the oil sector remains uncompetitive in respect to prices as compared to Germany, both on the market of oil-cake, as well as crude and refined rapeseed oil. We have no price advantages on the market of fodder for farm animals, apple concentrate, raw pork hams and processed and fresh cheese, and more recently also frozen fish fillets and sugar.
A comparison of prices of highly processed products on the Polish and German market shows that the greatest price advantage on the market belongs to the producers of fruit juices and fruit drinks intended for drinking and beverages. Significant price advantages are recorded by Polish producers of sweets and durable pastrycooks' products, as well as some dairy products, such as ice cream and yogurt. Also the producers of other highly processed food products, such as: yeast and pickles, and recently also chips, are still competitive as regards prices. Po-

land is not competitive on the market of potato preparations and some other highly processed goods.

The process of food prices equalisation on the Polish and German market is still ongoing. It follows from both the growing prices of this products in Poland, and lowering prices of many food products in Germany. This process is one of the factors that forces the Polish food producers to seek for other than price sources of competitiveness. Such non-price sources of competitiveness cover, for instance: quality (quality and uniqueness of products, the ability to identify and meet the individual needs of customers, wide-ranging promotional activities, as well as the ability to create a company's brand based on trust in the quality and reliability of products and quality of customer service), innovation (product, process, organisational and marketing innovations), entrepreneurship as well as knowledge and intellectual capital.

4.3. Conclusions

The last decade was a period of intensive development of the Polish food industry. In 2001-2010 production in food industry (fixed prices) grew by almost 56%, while commercial production of agriculture grew by 28%, and food consumption by 18%. The most important factors of production growth of food industry in the last decade was growth of national demand for processed food and growth of export, which took over almost 50% of food industry production growth.

Poland's accession to the European Union resulted in investment revival in the Polish food industry. While the global economic crisis resulted in a slow-down of investment activity in the sector in 2009-2010, still the activity was over 25% higher than in the pre-accession period.

Processes of concentration of production are observed in the food industry. In the last decade the share of big enterprises in sales increased from 45% to 53%, to the detriment of other groups of enterprises. At present the structure is similar to the structure in the European Union.

Food industry observed the improvement of labour efficiency measured both by sales value and added value. The increase in labour efficiency was a generally witnessed phenomenon, albeit its scale differed in the industry sectors. Financial situation of food industry in Poland has been constantly on increase in the last decade. In 2003-2010 net profitability grew from 1.6 to 4.7%, and return on equity from 5.3 to 14.3%. The increase of labour efficiency in the Polish food industry in the last decade made it possible to shorten the distance between Poland and the most developed EU Member States. Labour efficiency in the Polish food industry, calculated in fixed prices, is "only" 30% lower than in the EU-15.

Adaptation processes in the Polish food industry have had a positive impact on the industry's condition, including its resistance to crisis.

The development of foreign trade in agri-food products and the improvement in the majority of competitive indices for the Polish agri-food sector are an

evidence of a relatively high level of competitiveness of the Polish food producers on the global market and point to an increase in the comparative advantages in the period of Poland's membership in the European Union.

At the same time, the conducted analysis proved that Polish food producers were well prepared to the membership in the EU, they managed very well on this difficult market and, consequently, over the more than seven years of Poland's membership in the Community they have strengthened their position on the Single European Market. The most competitive branches of the Polish food industry include the following sectors: meat, dairy, fruit and vegetable, secondary processing of cereals, manufacture of tobacco products and confectionary. The least competitive branches cover the following sectors: cereals production and primary processing of cereals, oil, sugar, fodder, production of beverages and spirits.

A rapid growth of agri-food export and a significant improvement of the turnover balance are, most certainly, a huge success of the Polish food economy, but the Poland's position on the EU market is still much weaker than it would result from the production potential of the Polish food economy. Although Poland is among the six countries with the positive turnover balance, its total share in the EU export amounts to only 3.7%.

The improvement of the position of Polish food producers would not have been possible if they had not achieved competitive advantages over producers from other EU countries, i.e. if they had not offered to the EU consumers the products corresponding to their expectations, but at the same time better and cheaper than the offer of their competitors. So far, the main source of competitive advantage on the EU and global market were, above all, cost and price advantages. Under the conditions of European integration and economic globalisation the non-price competitiveness determinants gain in importance.

The next years should witness further development of the Polish food industry and an improvement of our competitiveness, but at a pace much slower than in the period of Poland's integration with the European Union. The pro-export attitude of the Polish agri-food sector and its strong connection with one outlet market (the EU), in fact, makes it more sensitive to changes in factors affecting the agri-food trade, such as: business downturn or economic crisis on the large customers markets, currency fluctuations, price changes on the global market, or the consequences of the expected liberalisation of global trade.

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Dr Marek Wigier
Institute of Agricultural and Food Economics – National Research Institute, Warsaw, Poland

5. Impact of CAP instruments on Polish agro-food economy

5.1. Introduction

At present, the global experiences prove that the market and the state have to co-exist and state intervention should be always limited to market support and not replacement thereof. The state should only interfere when it has a clear advantage over the market mechanism; hence only when the market fails to protect the general interests of the society [Woś 1995]. In the agricultural sector, intervention is manifested by state involvement in the shaping of agricultural prices, awarding different types of investment grants or through the establishment of norms and standards.

"State interventionism" as defined by J.M. Keynes implied a system of state influence exerted on the economy with the aim to achieve specific goals. Rejecting the theory of perfect competition and general economic equlibrium, with the full utilisation of production factors, he justified the necessity for the state to intervene in actions aimed to enhance the willingness to invest and consume [Keynes, 1956]. In simpler terms, one may thus assume that interventionism follows from the willingness of the state to exert influence on economic life and social order with a view to altering the relationships in respect of the effectiveness of production factors and their remuneration. Intervention policy thus comes down to the state exerting active influence in the areas of production, division, allocation, exchange and consumption through both direct and indirect instruments. The superior goal of state interventionism is to create circumstances which would compel economic entities to implement specific objectives of state policy and counteract any phenomena and processes that adversely affect the possibility for the tasks adopted to be achieved.

State intervention tends to address market structure, the behaviour of its actors, market components, etc. For example, the state supports the establishment of new "competitive" entities or encourages the elimination of "uncompetitive" entities from the market, stimulates market actors to implement the arbitrarily set policy goals, exerts influence on the increases or decreases in supply and demand, as well as on the level of prices and relations between them. The arguments in favour of the active role of the state in the economy include the following:

- the necessity to guarantee the legal order necessary for regulating, *inter alia*, property rights, the conclusion of contracts between market entities present in the economy, and security;

- market imperfections, manifested in the lack of perfect competition (market actors naturally aim at achieving a privileged position, which gives rise to monopolies of groups of interest), limited access to information (which affects the rationality of market actors' behaviour);
- the existence of public goods, i.e. those the private production of which, due to the "free rider" problem (where someone makes use of particular goods but does not bear the costs of their production) and the effect of non-excludability (i.e. fact that many people use a particular good and it is impossible to exclude any of them from doing so without incurring considerable costs) is not profitable from the micro-economic point of view. Examples of such goods include spatial order, clean natural environment, infrastructure;
- the occurrence of externalities, i.e. effects that arise outside the market in relation to the transfer of part of the costs (or benefits) that arise from the operation of one entity to other market actors, e.g. pollution, exploitation of nature beyond its capacity for self-rebuilding capacity, noise;
- existence of merit or demerit goods, i.e. those the individual assessment of which (on the part of the consumer, economic entity, etc.) may differ from the evaluation on the part of the market (society in general, etc.). What may be useful from the point of view of the individual (e.g. the use of tobacco, drugs, alcohol) may be valued negatively in general and inspire social protest;
- the polarisation of the level of income or quality of life in conflict with the acceptable system of social values;
- the occurrence of business cycles in the economy, which are especially dangerous in agriculture due to the lengthy production cycle.

R.E. Lucas and S.T. Sargent (authors of the theory of rational expectations of the 1970s) argued that economic entities and people are flexible in adjusting their actions and expectations to state policy, taking advantage of all the benefits it can bring. They are also able to draw conclusions from past events, which allows them to forecast possible scenarios for the future. In their opinion, however, the effectiveness of economic policy getting involved in making economic growth more dynamic was dubious, since the state has no influence on the sustainable growth of employment or of a product. Thus the state should aim at maintaining price stability and act on the supply side of economy with a focus on stabilising the rules of its functioning. Making economic policy based on changes generated by the government is disadvantageous for the economy as it entails changes in the real values, which leads to increased uncertainty within the economy. The disputes of modern economists thus come down to two theses [Fischer 1988]:

- private economy suffers from imperfect coordination. This causes excessive fluctuations in the area of real activity (Keynesians and Neo-Keynesians)
- private economy reaches such balance as is attainable given the particular state policy (classical economists, monetarists).

Without a doubt, the best mechanism for increasing the effectiveness of management is the market mechanism. It is responsible for the pro-effective selection of economic entities by awarding strong producers who lower the costs and are flexible in adapting to new market conditions. The contemporary global economy often rejects the thesis of the perfect market [Czyżewski 2007], thereby justifying the role of state intervention. The market in its essence is characterised by certain imperfections (as mentioned above).

By reacting to the above-mentioned market imperfections, governments try to apply intervention policy that prevents the development of crises. However, such policy is implemented with some delay in relation to the market effects that have already arisen, which sometimes augments unfavourable macroeconomic phenomena. It also disturbs the logic of market functioning, as it gives rise to inevitable contradictions in regulatory mechanisms, weakens the motivation of market actors to engage in effective action, most often only generating adaptability effects manifested in the pressure on further interventions, more and more favourable to those actors, or finally, generates high costs of intervention, borne by the consumer and the tax-payer.

Intervention policy should thus be applied *ex-ante* rather than *ex-post*. The state should anticipate and engage in early intervention rather than confine itself to the role of the "fire-fighter". State intervention should comply not just with the criterion of utility, but also with that of effectiveness. This follows from the relatively high direct costs of implementation of specific intervention programmes. One of the fundamental paradigms of neo-classical economy is that the state should interfere only when it has a clear advantage over the market mechanism; hence only when the market fails to protect the general interests of the society [Woś 1995]. Interventions are only legitimate when total intervention costs do not exceed the amount of losses and lost benefits which follow from the functioning of the market mechanism. In practice, it is extremely difficult to estimate both sides of the balance.

When explaining the main reasons for intervention in the modern global agriculture, J.E. Stiglitz [Stiglitz 1987] and J. Wilkin [Wilkin 2002] point to the high level of risk linked to agricultural activity and lack of efficiency as regards prevention of this risk. This risk results from e.g. changing climate conditions, lack of sufficient information and underdevelopment of agribusiness structures, including also consultancy. The need for interventions in the agribusiness sector is justified also by: the phenomena of external costs and effects, low price elasticity of supply, lower level of labour productivity than in other sectors of the

national economy, low mobility of the workforce employed in agriculture, the need to provide public goods, implementation of the sustainable development concept. The instruments of interventionism in this area may be market-based (e.g. related to regulating supply, influencing demand, price intervention) or not (subsidies and grants, both direct and indirect, structural policy instruments) [Pohorille 1964]. The CAP is an example of state interventionism in the food sector, with instruments of either type. The market-based instruments, related to price support, favour the biggest producers, in particular the most productive ones and producers of goods. Thus they fail to meet the criterion of fairness and providing support to the weaker as the reason for intervention [Rembisz 2010]. The rural development programmes are an example of non-market instruments. As an instrument of state intervention policy they provide an opportunity to stabilise the policy in several production cycles. They stimulate changes as regards production structures, competitiveness improvement, environmental protection and multi-functional development of rural areas. Thus they constitute the basic instrument supporting the process of food economy and rural areas modernisation.

For many years now, agricultural policy in Poland has supported the functioning of agriculture based on the traditional and industrial model, organic farming and agriculture based on induced development and sustainable development [Woś 2004]. CAP objectives and mechanisms, as well as individual characteristics of Polish agriculture indicate that in the long run its pattern should be based on the dual model. Certain farms, while maintaining the basic requirements of environmental protection, should implement production methods ensuring high economic viability (industrial agriculture); other farms should base their development on methods more ecosystem friendly, which enable the use of the environmental and social and cultural assets at hand (sustainable agriculture).

Integration with the EU created new conditions in Poland for the development of agriculture and food industry. Rural development programmes, launched upon accession to the EU, are an example of non-market instruments. As an instrument of the state intervention policy they create chances for the stabilisation of structural policy conditions over the period of several production cycles, thus stimulating the desired changes in the area structure of farms, the improvements in the competitiveness of production, environmental protection and multi-functional development of rural areas. Thus they are a fundamental instrument which supports the process of modernisation of Polish rural areas and agriculture.

The total value of financial aid programmes (together with direct payments) for the agri-food sector and rural areas from the beginning of 2002 until the end of June 2011 exceeded PLN 113 billion. This comprises SAPARD payments – ca. PLN 4.5 billion[24], SOP "Agriculture" – ca. PLN 6.4 billion,

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[24] The amount includes PLN 468 million of payments financed from the RDP 2004-2006.

RDP 2004-2006 – ca. PLN 11.1 billion[25], RDP 2007-2013 – PLN 27.5 billion[26] and almost PLN 63.5 billion from direct payments (Figure 1). The implemented programmes are characterised by a certain continuity of general objectives, at the same time gradually extending the forms of aid and changing the scope and value of provided support. The SAPARD programme aimed at preparing the Polish agri-food sector to the accession, especially as regards the adjustments to the sanitary, hygienic and environmental protection requirements of the EU. After 2004, the strategic objectives of agricultural policy have covered: improving the competitiveness of the agri-food sector, sustainable development of rural areas, improvement of the condition of the natural environment, improvement of the quality of life and diversification of economy in rural areas. A majority of measures implemented between 2007 and 2013 are a continuation of measures implemented in the previous periods. This proves policy continuity as regards implementation of the set objectives, but it does not mean that agricultural policy itself is cohesive in the long-term perspective. Because of the multiplicity of measures and objectives some of them are mutually exclusive and cancel each other out.

Figure 1. Support for agriculture and rural areas between 2002 and June 2011 (%)
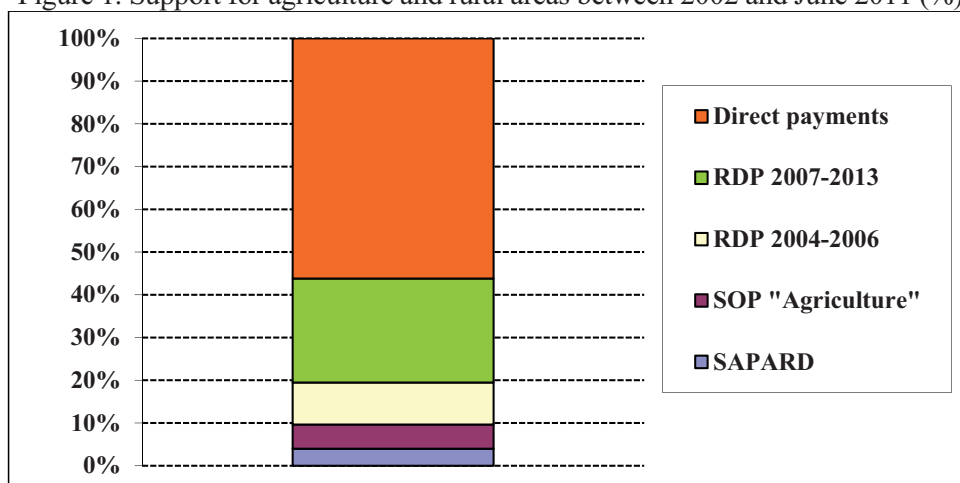
Source: Own calculations based on data from monitoring by Agency for Restructuring and Modernisation of Agriculture (ARMA).

In the future, innovations will remain the main source for economic growth and competitive advantage generation. Their establishment and diffusion constitute an important growth factor for quality and efficiency. Although the competitiveness of the Polish agri-food sector can be assessed as rather high, in

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[25] The amount does not include payments from SAPARD commitments and the payments of commitments moved to be financed from RDP 2007-2013.
[26] Together with the commitments of the RDP 2004-2006 – ca. PLN 9.2 billion.

the long-term perspective its low innovation can pose a significant threat not only to the improvement of the competitive position, but also to maintaining it. Thus, agricultural policy should prioritise measures that strengthen competitiveness and innovation of the agri-food sector. These measures gain even greater importance if we look at them in the light of the forecasted global population growth (and thereby also demand for food) and natural constraints (especially as regards fresh water supplies).

Sustainability and multi-functionality will also form important priorities for development in the future. This pertains to the activation of economic and social activity of rural residents, differentiation of activity to ensure alternative sources of income, shaping agricultural production patterns in line with environmental requirements while keeping the landscape assets and biodiversity. Cohesion in three dimensions: economic, social and territorial, will be a key to sustainable development.

5.2. Changes in agriculture

Polish agriculture has been going through modernisation processes rather slowly. Changes that take place on farms are generational in nature and are closely related to the pace of the country's economic development and the possibility of financing structural transformations from public funds [Józwiak 2011]. However, the characteristic features of agriculture are still the following: a relatively high (as compared to western European countries) employment rate, low productivity of land and labour, unfavourable agrarian structure (Table 1) and low revenues on agricultural activity. These problems exert a direct influence on the living conditions in rural areas [Sikorska 2011].

Table 1. Agricultural holdings by area group

Area group	Number of agricultural holdings			Structure (%)	
	2002	2010	2010/2002	2002	2010
Less than 1 ha	977	715	0.73	33.30	31.39
1-5	1 147	863	0.75	39.09	37.88
5-10	427	352	0.82	14.55	15.45
10-15	183	152	0.83	6.24	6.67
15-20	84	72	0.86	2.86	3.16
20-50	96	97	1.01	3.27	4.26
More than 50 ha	20	27	1.35	0.68	1.19
Total	2 933	2 278	0.78	100.00	100.00
Average	5.76	6.82	1.18	×	×

Source: Own study based on data from the general agricultural census of 2010, CSO.

Concentration processes of agricultural production take place very slowly. Although between 2002 and 2010 the overall number of agricultural holdings

decreased by more than 20% (the greatest – 25% - in the group of holdings of 1-5 ha of agricultural land), while the number of the largest holdings increased considerably, these changes are not enough for other farms in the market to earn a living on commercial agricultural production. The results of the general agricultural census of 2010 (GAC 2010) indicate that the average area of an agricultural holding (with agricultural land area of more than 1 ha) increased by 13% (as compared to 2002) to just 9.5 ha of agricultural land. Most resources are held by small and medium-sized holdings (more than 20 ha agricultural land).

Figure 2. Changes in the number of farms and acreage of agricultural land between 2002 and 2010 (2002 – 100%)
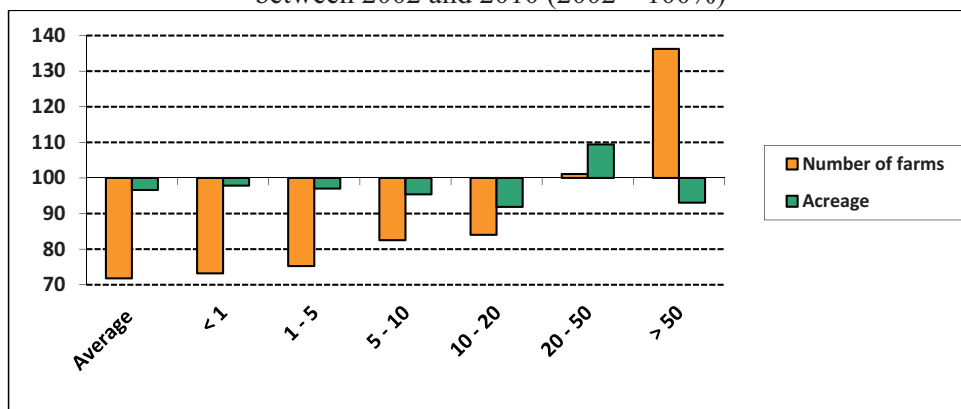
Source: Own study based on data from the general agricultural census of 2010, CSO.

EU funds have had a significant share in the financing of transformations in agriculture. These resources may be divided into four groups according to their impact on growth and structural changes, i.e. [Kowalczyk 2007]:

- entirely direct impact: modernisation of agricultural holdings, early retirement and diversification of agricultural activity,
- entirely indirect impact: infrastructure, land drainage, land reparcelling, afforestation, agri-environmental schemes,
- partly direct impact: direct payments, support for agricultural activity in less-favoured areas (LFA), market intervention expenditure, setting up of young farmers,
- partly indirect impact: PHARE programmes, the LEADER programme, village renewal, training, technical support.

Considering the value of financial flows directed between 2002 and 2010 to Polish food economy and to rural areas (together with direct payments) one may say that a majority of public funds (ca. 70%) co-financed actions related to creating the industrial sector (Figure 3). In general, this shows that the most important priority of agricultural policy was to increase the competitiveness of the

sector. However, a range of activities within that priority were also related to supporting farmers' income.

Figure 3. Financing of agricultural models
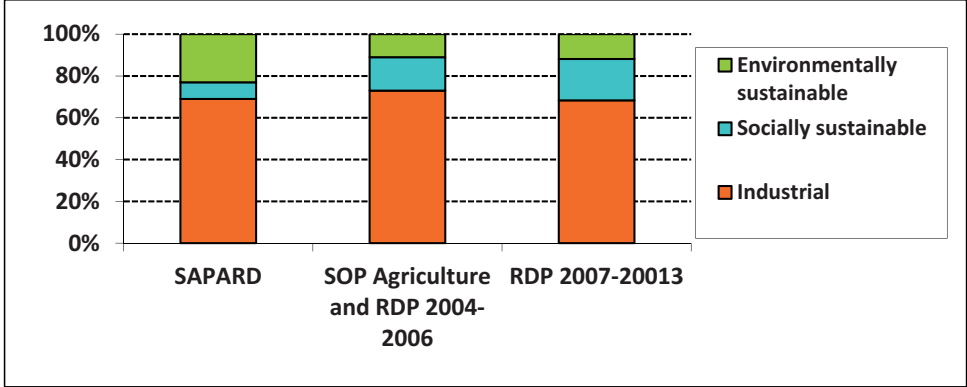
Source: Own calculations based on data from ARMA monitoring.

Direct payments are the most common type of support for agriculture in Poland. They are received by ca. 1.4 million farmers every year. The value of payments received every year by farmers between 2004 and 2011 increased systematically from ca. PLN 6 billion to PLN 14 billion per year. When calculated per one farm it reaches an average of ca. PLN 9 thousand, and this form of support is used by 87% of farms with an area of more than 1 ha (cf. Figure 1).

Figure 4. Direct payments - amount of payments and share in the number of farms
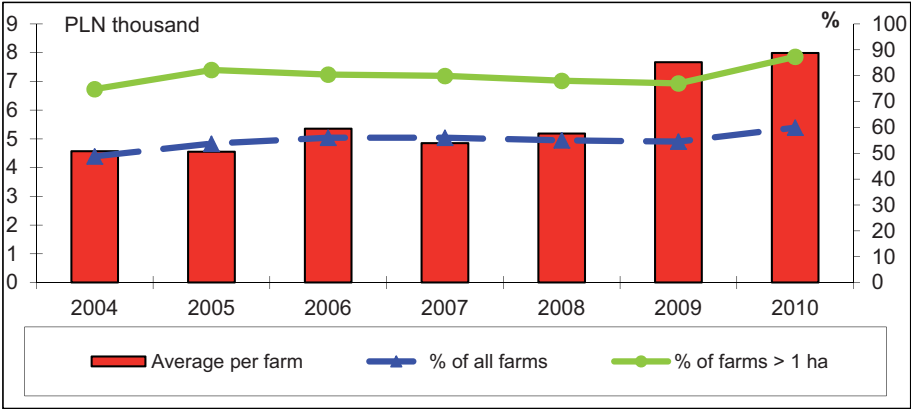
Source: Authors' own compilation based on the data of the Central Statistical Office (CSO) and ARMA.

An equally important source of income (independent of production and only based on the farm's location) are payments for less-favoured areas (LFA). Each year these payments benefit ca. 700 thousand farmers, i.e. half of those who receive direct payments. The land surface covered with LFA payments amounts to ca. 6.9 million ha.

The share of direct payments in the farms' income amounts to ca. 30%[27]. If we also consider other forms of direct payments, such as livestock payments or LFA, the share will be even greater. These payments are made to farmers on an annual basis. The manner of spending the resources is not subject to settlement. Smaller farms usually allocate the granted payments to current needs and means of production (fuel, fertilisers), while the bigger ones also make investments.

The resources earmarked for investments are also an important source of aid for farms. In order to obtain them, a farmer has to prepare a business plan and have it approved by a body that manages the programme. So far, the financial resources for investments in farms available under SAPARD, SOP "Agriculture", RDP 2004-2006 and RDP 2007-2013 have been used in their entirety. Since 2002, a total of 15% of farms have benefited from measures aimed at improving the competitiveness of farms (see Table 1). The greatest share, i.e. 6% benefited from the measure "Modernisation of agricultural holdings", 5% from "Early retirement", 2.7% from "Setting up of young farmers" and 1.3% from "Diversification of agricultural activities". The value of grants is rather considerable (see Table 1), and in the current RDP 2007-2013 their average value as calculated per one beneficiary is even higher. In measure "Modernisation of agricultural holdings" it exceeded PLN 140 thousand, in measure "Diversification of agricultural activities" – PLN 84 thousand, and in "Setting up of young farmers" – PLN 66 thousand.

Table 1. Selected results of measures implementation under SAPARD, RDP 2004-2006. SOP "Agriculture" and RDP 2007-2013 in total

Measure	Beneficiaries	Resources paid in PLN million	% of farms in total	Amount of support per 1 beneficiary
Modernisation of agricultural holdings	80 794	7 188	5.95	88 967
Setting up of young farmers	42 310	1 736	2.71	41 030
Early retirements	73 924	7 136	4.73	96 531
Diversification of agricultural activities	17 846	1 136	1.34	63 656
Total	214 874	17 196	14.73	80 028

Source: Authors' own compilation based on CSO and ARMA data.

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[27] Own calculations based on FADN data.

Covering farms by the CAP mechanisms has improved the income of most farmers (Figure 5). The grants (mainly in the form of direct payments) were of basic significance for the rise in the income of farmers. In real terms, income from production factors per person employed full-time in Polish agriculture increased between 2005 and 2010 by over 45%, and by 11.1% for all agriculture in the EU-27. The growth rate of income in the households of farmers was higher than in other socio-economic groups. Real income at the disposal of framers increased by 64.3%, and by 38.7% in total.

Figure 5. Income in the agricultural sector between 1999 and 2010

Between 2005 and 2010, programmes co-financed from EU and national funds contributed to the nearly double increase in the value of investments (Figure 6). Owing to them, the value of fixed assets in agriculture increased from ca. 8 to ok. 15%. The out-of-date machinery was renewed. The overall number of tractors increased by nearly 10%, the number of combine harvesters by one-fourth (Table 2).

Table 2. Fixed assets in agricultural holdings

Specification	2002	2010	2002=100
Tractors (in thousand)	1339	1471	109.9
Combines (in thousand)	123	152	123.6
Per one household			
Tractors	0.46	0.65	141.8
Combines	0.04	0.07	159.5

The technical supply of labour improved. Apart from the greater traction output of new tractors, farms were equipped with modern accompanying machinery and field generators.

Figure 6. Value of investments and change in the value of fixed assets in the agricultural sector between 2000 and 2009
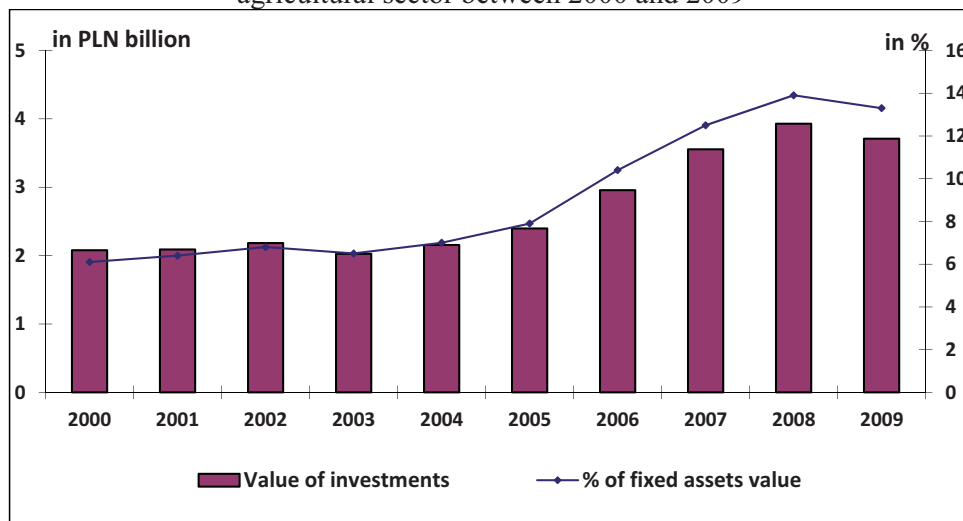
Source: own compilation based on CSO and ARMA data.

Despite favourable investment trends, easy access to aid funds and relatively substantial public funds earmarked for investment in fixed assets, their net value has been decreasing systematically. Also the percentage of its consumption increased (Figure 7). In 2009 it already exceeded 75%. This affects small and medium-sized agricultural holdings to the greatest extent. Due to their financial potential and opportunities for obtaining grants and investment loans, large farms renew their fixed assets on a greater scale.

The extent of influence of CAP programmes is relatively little as compared to the vastness of investment needs. In 2011, the number of applications (call for proposals) reached 34.7 thousand (in previous years it was much smaller, ca. 20 thousand), which is an insignificant number when compared to the vast number of holdings in Poland. Nevertheless, thanks to the support under the CAP one can clearly see the increasing investment activity of farmers (increase in the value of investments and their share in fixed assets). However, a very small group of farms engage in investments. A vast majority of them are rather large commercial holdings. There are ca. 150-250 thousand of them. In others one may observe decapitalisation of fixed assets. While machinery has been renewed, decapitalisation of buildings and facilities is progressing fast. CAP investment programmes indirectly influence changes in the agrarian structure and support the concentration of production as well as the specialization of holdings.

Figure 7. Value of fixed assets in the agricultural sector and their utilisation rate between 2000 and 2009
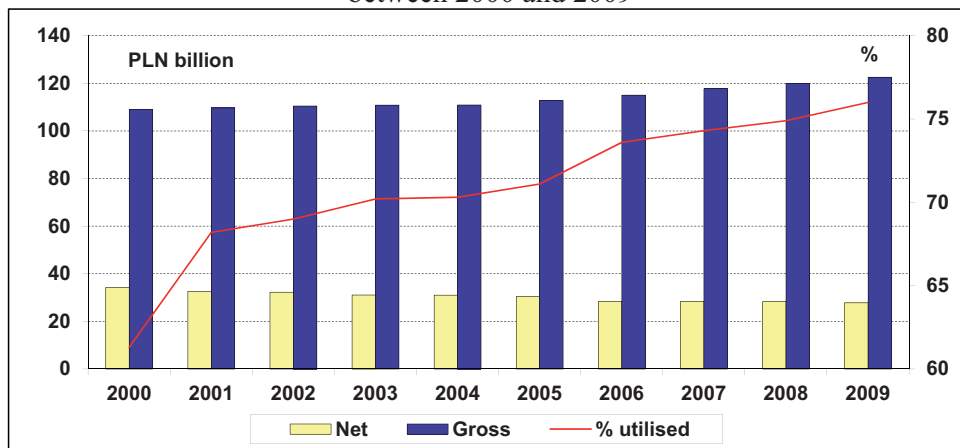
An improvement in the competitiveness of agriculture depends on structural changes (that predetermine the efficiency of production factors used) and on the development of the entire national economy, especially in the context of the capacity to create new jobs outside agriculture. Rural development programmes, direct payments and changes in the entire economy have accelerated structural transformations in agriculture, which consisted e.g. in the concentration of production. This is evidenced by a drop of over 20% in the number of farms between 2000 and 2010; the greatest decrease, i.e. by 25%, pertained to the smallest farms in terms of acreage (1-5 ha agricultural land), while the number of the largest farms increased significantly. The average area of a farm (with agricultural land > 1 ha) increased by 13% ha, i.e. up to ca. 9.5 ha agricultural land. However, the greatest part of agricultural land still belongs to the small and medium-sized farms (of less than 20 ha agricultural land), and the distance between Poland and the main food producers in Europe remains huge in this respect.

5.3. Changes in the food industry

For the food industry, the period of Poland's membership in the EU is related to recovery in production, investment and trade. Between 2004 and 2010 industrial food production developed at an average rate of 4.6% per year (6.3% until 2007). This growth rate is slightly higher than the GDP increase (4%), and almost twice as fast as that of commercial production of agriculture (2.5% per year), 2.5 times greater than the increase in the consumption of food, beverages and tobacco products (1.7%) and slightly smaller than the growth rate for industrial production in Poland (5.6%). At the same time, the growth rate of the value of food industry sales in Poland was among the highest in the EU (0.7% per year

in the EU-27 countries). These changes helped to strengthen the Polish position on the European market. The value of food sector production in Poland (ca. EUR 67 billion according to the Purchasing Power Parity of currencies) accounts for ca. 7% of the food and beverage production in the EU-27 countries. The fact that the Polish food industry is an important partner and competitor for the EU food and beverage producers is also evidenced by the comparison of other indicators such as employment (in Poland: 458 thousand persons, i.e. 10.6% of EU-27 employment); value added (in Poland: EUR 9.4 billion, i.e. ca. 7.0% of the EU-27 level); total number of companies including the sector of micro-enterprises (in Poland: 15.6 thousand, i.e. 5.0% of companies in the EU-27 countries).

The changes result in sector consolidation (Figure 8). In 2000-2010, the number of active food industry plants producing food and beverages was gradually decreasing (by ca. 30%). The greatest decrease in the number of companies was recorded in the micro-enterprises sector (by 36%), and the lowest among small and medium-sized companies (13% in each group). At the same time (although on a smaller scale), a drop was observed in employment (by ca. 10%). The greatest decrease in employment concerned micro-enterprises (by 22%), while in the sector of small companies the reduction was minimal or even showed an increasing tendency in some periods (in 2003-2008).

Figure 8. Number of enterprises and employment in Polish food industry between 2000 and 2010 (in thousand)
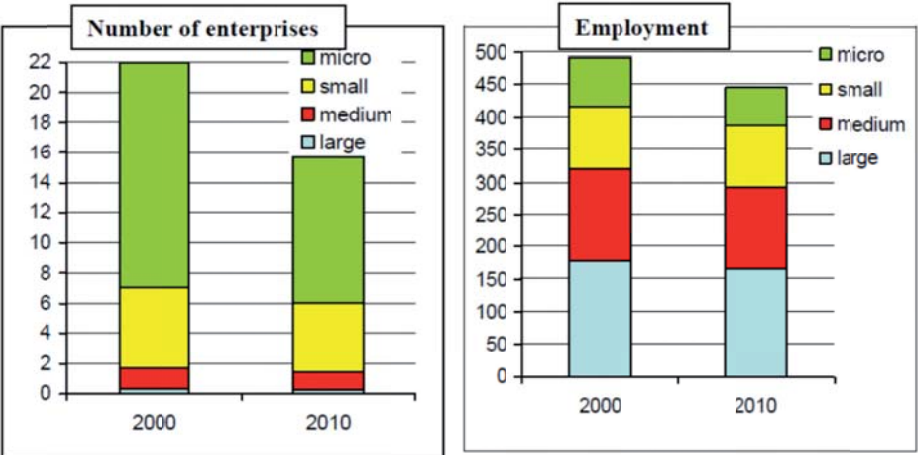
Source: Own calculations based on unpublished CSO data and [Urban 2005-2011].

Accession to the EU opened up new possibilities, e.g. unlimited access to the EU market (more than 502 million consumers in 2011) and EU funds (which supported the process of modernising enterprises and adaptation to market conditions). At the same time, opening the domestic market for EU producers was associated with enormous challenges, including strong international competi-

tion, which necessitated investments and the related processes of consolidation and restructuring of industries. The processes of horizontal integration (between processors) and vertical integration (along the farmer – processor – seller chain) were enhanced as well.

In 2010, the value of food industry sales (food, beverages and tobacco products) exceeded PLN 165 billion and was nearly 60% higher than in the year that preceded Poland's accession to the EU (Figure 9) and 5% higher than in 2009. The value of exports amounted to ca. PLN 44 billion and was higher by as much as PLN 34 billion (in current price terms) as compared to 2000, while its share in the value of sales increased from less than 11% to more than 26%.

Figure 9. Value of sales and exports of food industry products
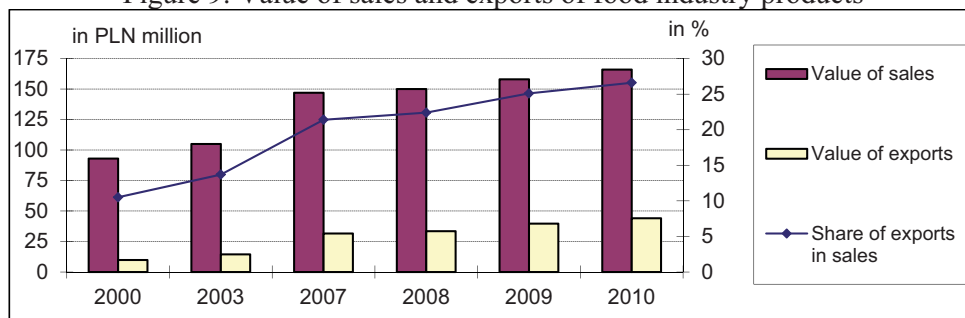
Sources: Calculations of the IAFE-NRI (R. Urban) based on data from the CSO and the Ministry of Agriculture and Rural Development (MARD).

EU countries are the largest outlet market of Polish agri-food products (an increase from 63% of the total export value in 2003 to ca. 80% in 2010). From the moment Poland became a Member State of the EU, Polish export of agri-food products grew almost 3.5 times, import – three times, while foreign trade balance for these products increased more than 5 times (Table 3).

All trade in agri-food products was characterised by a higher growth rate of exports rather than imports. This resulted in an increase in the positive trade balance, from EUR 0.5 billion in 2003 to EUR 2.6 billion in 2010. Also the forecast for the results for 2011 is very good. The value of trade in food is likely to increase by another 6%, i.e. export will grow to a record level of EUR 14 billion, import – to EUR 11.7 billion, while the positive trade balance will amount to EUR 2.3 billion.

The privatisation of the sector, structural changes as well as investments in modernisation and adjustment of processing plants to EU veterinary and sanitary norms and standards are the sources of their success on the domestic and foreign markets. The total value of investments in 2000-2010 exceeded PLN 68.5 billion. However, the share of EU aid resources in this amount is slight and totals less than PLN 3.8 billion , and by the end of 2013 the value of payments will reach ca. PLN 7 billion. Yet the value of aids is relatively small as com-

pared to the overall budget of EU aid programmes. Its share in the overall budget of SAPARD, SOP "Agriculture" and RDP 2007-2013 decreased from ca. 34% to slightly more than 5%. This shows that the competitiveness of the food industry is growing (in the opinion of agricultural policy makers), while the need to support it is decreasing.

Table 3. Foreign trade in agri-food products (EUR million)

Specification	2003	2005	2007	2008	2009	2010[a]	2010 2003
Export of agri-food products	4 010.4	7 028.0	9 942.5	11 421.6	11 277.6	13 263.1	330.8
of which: to the EU-25/27	2 616.7	5 190.8	8 001.4	9 218.1	9 066.9	10 465.3	399.9
where: to the EU-15	2 041.6	4 063.0	5 941.2	6 676.4	6 698.8	7 792.6	381.7
Import of agri-food products	3 556.9	5 373.5	7 972.3	10 088.7	9 111.0	10 693.5	300.6
of which: from the EU-25/27	2 175.9	3 388.1	5 347.4	7 023.0	6 320.4	7 277.6	334.5
where: from the EU-15	1 848.5	2 938.0	4 484.6	5 985.0	5 448.9	6 253.8	338.3
Balance of foreign trade in agri-food products	453.5	1 654.5	1 970.2	1 332.9	2 166.6	2 569.8	567.7
of which: from the EU-25/27	440.8	1 802.7	2 654.0	2 195.1	2 746.5	3 187.7	723.2
where: from the EU-15	193.1	1 125.0	1 456.6	691.4	1 249.9	1 538.8	796.9

[a] preliminary data
Source: A study by IAFE-NRI based on unpublished data of the Customs Administration Analyses Centre (CAAC).

Investment support addressed at agri-food industry enterprises based on resources co-financed from the EU budget is continuous in nature, although over the years its objectives, scope and the amount of aid have been subject to modification. The objectives of the SAPARD programme were focused on: improving production safety and food quality; increasing the number of plants compliant with EU sanitary and veterinary requirements in respect of food processing; enhancing the competitiveness of plants along with adjusting them to operate in the Single Market, strengthening farmer groups and limiting the adverse impact of processing plants on natural environment. The SOP „Agriculture" was primarily meant to achieve: improved hygiene conditions of production, adjusting production to market requirements, including the detection of production niches, establishing new outlet channels, improving the quality of products, increasing its value added, developing new production technologies as well as better environmental protection and conditions for the transport and slaughter of animals. RDP 2007-2013 is aimed to enhance competition in the sector of processing and wholesale trade by increasing value added, improving the quality of production, lowering its costs, introducing new products, applying new processes and technologies, implementing new production standards and perfecting previous ones, perfecting the processes for environmental protection.

EU financial resources also are a significant catalyst for investments. In order to obtain co-financing, an entrepreneur has to activate their own resources which, consequently, increases the final value of the investment by three-four times. In 2011, grants were used by almost all food industry branches (including wholesale trade), but the main aid beneficiaries are still: meat, dairy, and fruit and vegetable sectors. The value of co-financing calculated per one investment project ranged from PLN 1 million to PLN 1.5 million (Figure 10). From the launch of the SAPARD programme until the end of June 2011 almost 3.5 thousand investment projects were implemented in more than 2.1 thousand processing plants. Aid effects as measured with the indicator of company's survival on the market are very satisfactory. The majority of entities that benefited from EU aid have continued production activity.

Figure 10. Average value of grants and state aid structure
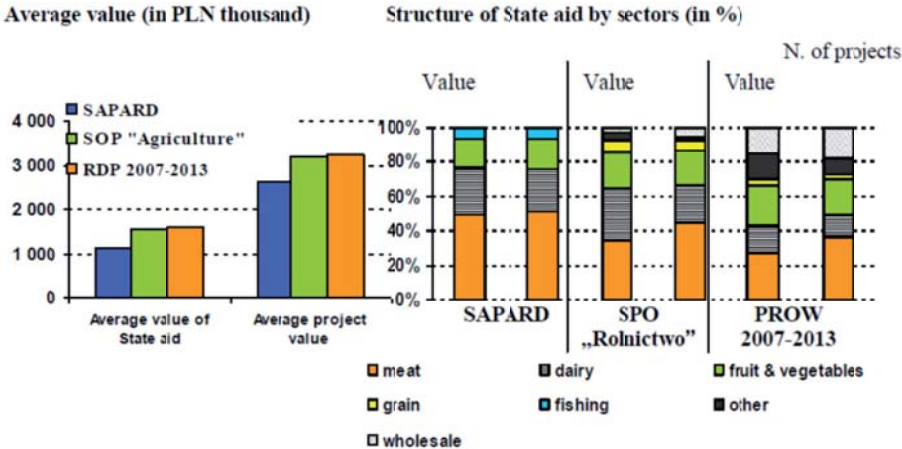
More than 40% of companies that take advantage of investment aid are medium-sized enterprises which employ 50 to 249 workers. Between 2002 and 2006, investments focused mainly on adjustments to EU sanitary and veterinary requirements (ca. 80% of investment value in the meat and dairy industry). In 2004-2008, a majority of investments (45% of their value) already concerned the improvement of production quality and bringing new products to the market, while in the 2007-2013 programme they focus, above all, on increasing value added (45% of the value) and introducing new products onto the market. Such a change in the type of investments proves that processing plants give preference to measures that enhance their competiveness. Environmental investments are marginal.

State aid plays a significant, but less and less prominent role in the shaping of the pace and direction of investments in the food industry. Undoubtedly, it helped to strengthen the competitive position and increase export in the Polish food sector. EU countries are the largest outlet market of Polish agri-food products (an increase from 63% of the total export value in 2003 to ca. 80% in 2010). From the moment Poland became an EU Member State, Polish export of agri-food products grew almost 3.5 times, import – three times and foreign trade balance for these products – more than 5 times. This resulted in a positive increase in the trade balance from EUR 0.5 billion in 2003 to EUR 2.6 billion in 2010. The structure of foreign trade in agri-good products is dominated by food industry products. The results of trade in these products have a decisive impact on the trade surplus generation. The share of intermediate products and ready products in exports exhibits a tendency for growth. In 2010, the income on their sales constituted 84% of exports of the Polish of agri-food sector. By way of comparison, the share of processed products in the agri-food import amounts to ca. 70% of the trade value.

However, the effect of substitution and income, generated by state aid programmes, leads to lowered efficiency. In terms of location of the enterprise (urban/rural areas) the distribution of enterprises which took advantage of aid was fairly even, thus it is impossible to demonstrate a straightforward impact on removing disproportions in development. It is natural that urban agglomerations are the basic outlet markets for food industry enterprises. Rural areas are being activated through access to labour markets and the purchase of agricultural raw materials. Beneficial effects of investment policies have been observed in areas such as improving the competitiveness of some entities in the agri-food sector, adjusting to EU sanitary and veterinary requirements, and support for structural transformations as well as environmental protection. However, state aid does not guarantee equality and social equity. The type of „environment” (urban or rural municipalities) is a factor that strongly differentiates projects in terms of the value of the investment and the amount of co-financing. Investments implemented in towns are definitely much greater than those implemented in rural areas. Engaging public funds in private activity gives rise to the "crowding out" effect.

5.4. Summary

In the last decade the structural changes that take place in Polish agriculture, the food industry and in rural areas became more dynamic. The most important among them are the drop in the number of farms with simultaneous growth in the share of the largest farms, which directly influences the increase in the average area of farms, drop in employment in agriculture and progressing concentration and specialisation of production. Structural changes are slow, however, and cannot be effectively accelerated due to non-agricultural circumstances.

EU aid programmes have made it possible to modernise a number of farms and processing plants, improve food safety and quality, increase the value added and innovation of production, as well as to improve competitiveness in international markets. Changes in agriculture and the food industry do not follow merely from including Poland under the CAP, but also from changes in market conditions. The impact of individual instruments is different and ranges from the greatest impact – that of direct payments – to the slight significance of programmes supporting semi-subsistence farms or early retirement (minimal coverage). Owing to the investments made (including those co-financed from EU funds), the Polish food industry is counted among the most-modern ones in Europe, and our companies can successfully compete with producers from other EU countries.

In the clash with globalisation, agriculture seems to be the weakest link, being technically and technologically backward, with low concentration of production, low labour productivity, etc. Considerable funds received from the EU and directed to agriculture accelerated its modernisation, yet it still remains uncompetitive as compared to global agriculture. Increased grants for agriculture have diminished the pressure to improve efficiency of farming, intensify agricultural production or to transform agricultural structures. Open competition in the global market, as a manifestation of globalisation, gives rise to more threats than development opportunities for Polish agriculture. Obviously, the threats are neutralised by integration with the EU, yet EU agriculture itself is rather unable to cope with open competition in the global market. This is where we can look for benefits for ourselves which follow from common action related to the protection system for all agriculture in EU Member States [Chechelski 2011].

Quick response to crisis situations is becoming the greatest challenge of the modern world. As regards agriculture, this mainly concerns reacting to fluctuations of agricultural products in global markets and to natural disasters. Thus, EU agricultural policy should have such instruments as will, on the one hand, facilitate flexible adaptation on the part of farmers to the market situation, while enabling EU or national institutions to intervene quickly, on the other. The ability to compete in global markets is becoming another priority in the development of EU agriculture. While Asian and South American countries are developing dynamically, the European Union is pushed outside the circle of the most important global actors. Dwindling natural resources (soil, water, minerals) make it necessary to look for new solutions. The debate on the future of the Common Agricultural Policy (CAP) and decisions regarding the structure and priorities of the EU budget in the next financing perspective for the years 2014--2020 will be decisive for the ability of EU agriculture to cope with the challenges it faces. Innovation in economy and its individual sectors is deemed as one of the fundamental determinants which condition the retention of competitiveness [Grochowska 2011].

The future development strategy for Polish agriculture should take into account global processes and the process of farms polarisation into agricultural and non-agricultural activity. This polarisation concerns population, households and economic entities (including farms) that operate in rural areas. The tendency for different areas of economic activity to intermingle becomes more and more intense. In Poland, support for the economic development of rural areas, provided in the form of public resources, should be based on the endeavour to ensure implementation of the concept of shaping the internal balance of these areas. The latter consists in maximising net benefits from economic growth while protecting natural resources and ensuring restoration of their usefulness in the long-term perspective – the concept of sustainable development.

The debate which is unfolding in the EU forum with regard to the future of the CAP after 2013 indicates that this policy will play a key role in ensuring food safety, sustainable development of agriculture and rural areas, as well as in natural resources management. It will focus on new Community challenges, for instance, those related to: resources protection, climate change, water resources management, biodiversity, renewable energy or risk and crisis management. Still, food safety will remain the key challenge for the food sector not only in the EU, but all over the world. By 2050, global population will grow to 9 billion, making it necessary to increase food production by 70%, while the availability of scarce resources, particularly water, energy and land, will be limited. This implies a growing pressure of the global markets on increasing food production, a risk of price fluctuations in agri-food markets, and a greater pressure on natural resources. Food, just like in the past centuries, will be of strategic importance. These challenges should be accounted for in the future agricultural policy in Poland.

However, in the future state aid should play a less significant role in the shaping of the pace and direction of investments. Taking over the role of the regulator, the state will force specific patterns of behaviour on economic entities. The beneficiaries who take advantage of public funds will, by definition, be in a more favourable position as compared to those who do not receive such grants. But the resulting substitution and income effects can entail a drop in efficiency and thereby competitiveness in the long-term perspective.

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Dr Barbara Wieliczko
Institute of Agricultural and Food Economics – National Research Institute, Warsaw, Poland

6. The CAP financing in 2014-2020. Consequences for Poland

6.1. Introduction

The next financial perspective of the European Union is approaching fast. Thus in June 2011 the European Commission published its own proposal of the Multiannual Financial Framework for 2014-2020. The changes suggested by the Commission and the structure of Community expenditure need to be assessed also in respect to the Common Agricultural Policy (CAP) functioning in Poland.

This study aims at demonstrating the research results pointing to the fact that the support for the Polish rural areas and agriculture awarded from the EU forms the fundamental element of the financial aid granted to this area of the Polish economy. The significance of the European resources clearly shows what would be the consequences of its restriction or considerable change in the support structure.

The first part of this paper discusses the budget proposals of the Commission with special emphasis on agriculture. The second – presents the research results pertaining to the scale of support for agriculture from the Polish national budget and the amount of resources obtained by the rural areas and agriculture under the CAP. The third part refers to the potential consequences for the Polish agriculture of adopting the proposals of the CAP financing in 2014-2020 presented by the Commission.

6.2. Multiannual Financial Framework for 2014-2020

An important part of the Commission's proposal is the very context in which the works on the Multiannual Financial Framework will be carried out. The current crisis in the euro zone and efforts to establish common fiscal policy related thereto are, undoubtedly, the key factors determining the final shape of the future EU budget for 2014-2020. We should also remember about the significance of the "Europe 2020. A strategy for smart, sustainable and inclusive growth" (COM(2010)2020) adopted in 2010. It defined the main development priorities of the Community and thereby the prominent spending tendencies, which are the following:

- Smart growth: developing an economy based on knowledge and innovation;

- Sustainable growth: promoting a more resource efficient, greener and more competitive economy;
- Inclusive growth: fostering a high-employment economy delivering social and territorial cohesion.
- The instruments implemented by the EU under the individual areas of the Community activity are to be re-formulated so as to ensure:
- Better results directly related to the „Europe 2020" strategy. This is to imply concentration on key priorities and merging of separate programmes or their modification in a manner enabling to support them with the same implementation, reporting and control mechanisms;
- Conditionality of obtaining resources, which is to be also recognised as an element of enhancing the scale of obtained results. This is to be translated into *ex-ante* evaluation of the macroeconomic policy of a given country and its consistency with the EU priorities; the results of the study are to condition the allocation of the resources for the implementation of programmes delivered with the Community co-financing;
- Simplification of regulations, which over the years became so complicated that they are difficult to implement and control. Now they constitute a considerable administrative burden for both the public authorities (the Commission and Member States), as well as beneficiaries of the support, which can not only discourage from benefiting from the Community programmes, but also delay their implementation;
- Leveraging investments owing to the cooperation with the private sector and the use of innovative financial instruments thereby ensuring greater impact of the EU budget caused by the increase in the number and size of investments.

The EU budget in 2014-2020 is to amount to EUR 971.5 billion in payments (1% of the GNP of the Community) and EUR 1,025 billion in liabilities (1.05% of the GNP of the EU). The suggested payments and liabilities would be higher by ca. 5% as compared to the current financial perspective, and the percentage of future liabilities in the GNP of the Community would decrease from 1.11% to 1.05%.

Almost half of the public resources allocated to the implementation of the EU tasks constituting the Multiannual Financial Framework is to be used for the smart and inclusive growth (Figure 1). The second rank is taken by the expenditure on sustainable growth. It is the part of the budget that is to fund the CAP expenditure.

Figure 1. The structure of spending resources
under the 2014-2020 financial perspective
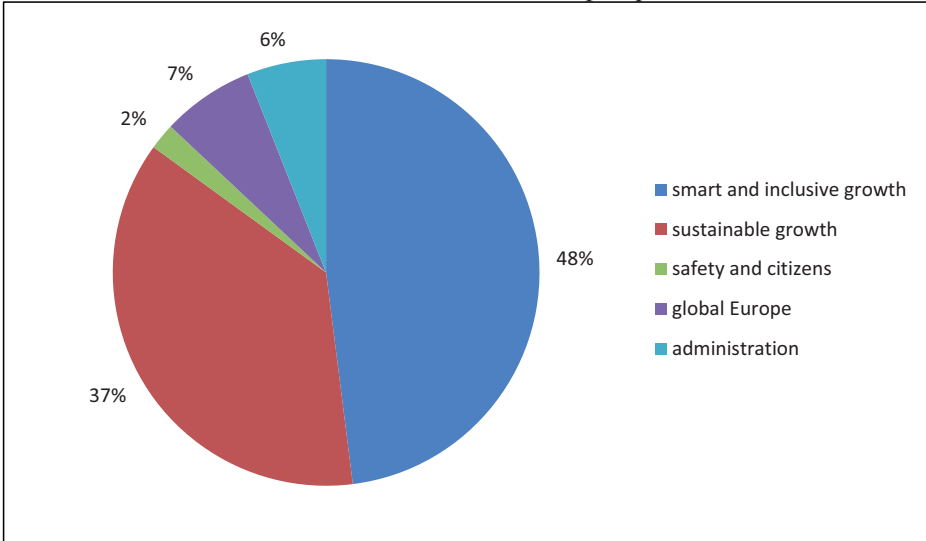
Certain EU expenditure have to be executed from the resources not covered by the Multiannual Financial Framework. This concerns a small amount as compared to the financial perspective: it is only ca. EUR 60 billion throughout the entire 2014-2020 period, i.e. about EUR 8 billion per year. These resources are to be used for the implementation of tasks such as European Globalisation Adjustment Fund, Solidarity Fund or the ITER programme[29].

However, in the face of the crisis it seems that during the negotiations the income side will be equally important. The structure and sources of financing Community expenditure remains unchanged for many years now. At the same time, it is more and more evident that it is necessary to adjust the structure of income to the current challenges and demands. According to the Commission we have to ensure that the EU income is transparent, independent and fair. The Commission suggested new sources of own income in order to be able to resign from some of the current ones, which resulted in numerous claims for reimbursement of funds paid by individual EU states.

Moreover, the differentiation of the structure of resources transferred by individual Member States to the EU budget needs to be recognised (Fig. 2). The

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[29] ITER *(International Thermonuclear Experimental Reactor)* is an international research project designed to demonstrate the feasibility of a full-scale fusion power reactor to produce energy.

overall amount of resources allocated to the reduction for the United Kingdom, the Netherlands and Sweden constitutes over 5.5% of resources transferred by France, the Czech Republic or Poland. Only in Germany, whose transfers for the EU have a clearly different structure than in other examined countries the deductions do not exceed 2% of the resources forwarded to the Community, although almost 76% is the amount transferred under the national contribution related to the Gross National Income (GNI).

Figure 2. The structure of transfers made by selected EU states to the Community budget in 2011 (%)
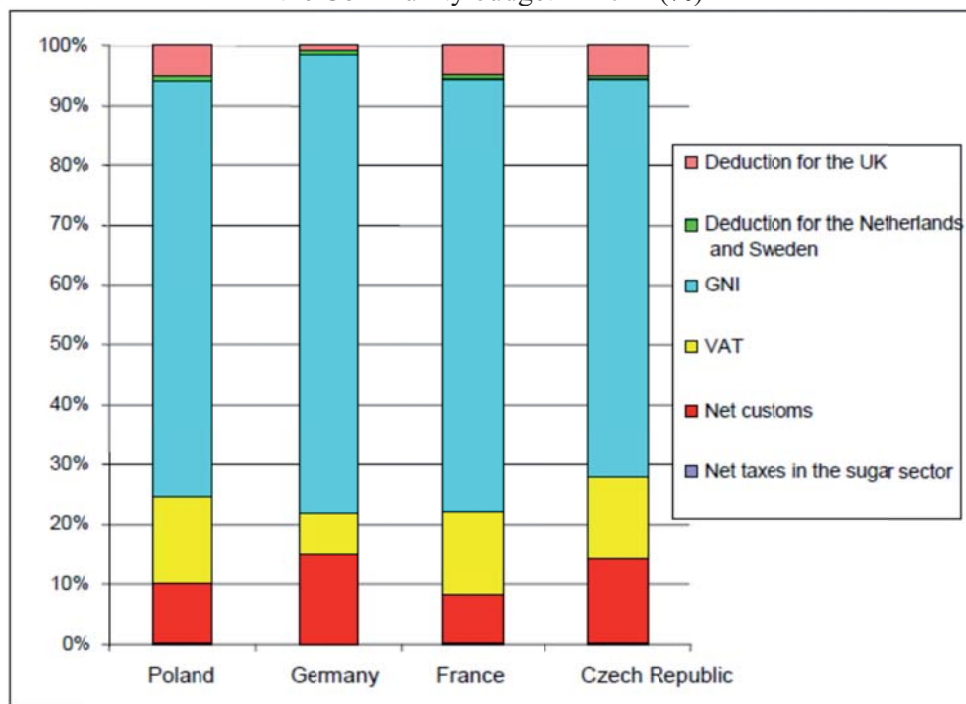
The most important change on the income side among those proposed by the Commission is the Financial Transaction Tax on transactions executed in the EU, which would be paid by the banks and other financial institutions. According to the Commission introduction of such a tax constitutes a solution ensuring simplification of the system of obtaining income by the EU budget. Moreover, such a solution would ensure uniformity of the European financial market thereby eliminating the possibility of different taxes and tax rates in this sector in individual Member States. The suggested rate amounted to 0.1% for bonds and shares and 0.01% for derivatives, which would enable to obtain

over EUR 30 billion per year and if the currency transactions should also be taxed – even EUR 50 billion.

Another element of the income of the reformed EU budget is to be formed of the new VAT, which is to replace the former income from VAT constituting an element of the contributions paid by the Member States. Contrary to the VAT income in the past, the new VAT income would not have a predetermined and limited level, but it would be based on the level of budgetary inflow from this tax. The new VAT would constitute a tax with an uniform rate across the EU and it would refer to all products and services currently covered by the standard rate in the EU states. However, the income from that tax would go to the EU budget only as regards the goods, which are not covered by the reduced rate in any of the Community states. The inflows to the EU budget would be made by way of transfers of resources collected at the level of individual states. This new method of establishing the level of VAT transferred by individual states would replace the former solutions.

As a result of the suggested changes the structure of the EU budget income will undergo a complete re-modelling (Figure 3). The percentage of national contributions based on the GNI will be reduced from almost 3/4 to 2/5, and the income on that account will be replaced mainly by the Financial Transaction Tax and the new VAT.

Figure 3. The structure of the EU budget income in 2012 and 2020 (%)
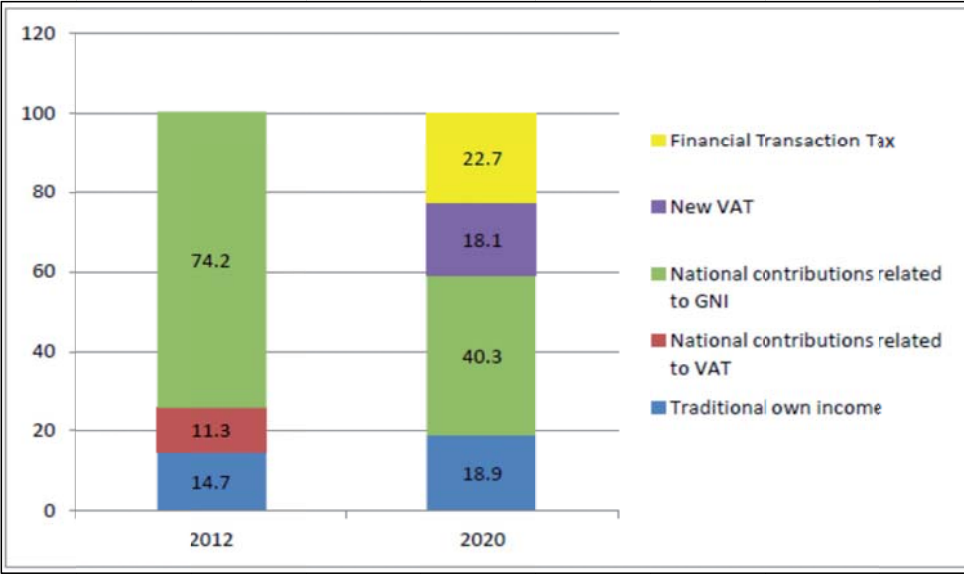
As for expenditure on agriculture and rural areas development, it is planned that under the CAP a total of EUR 417.9 billion will be spent, where EUR 317.2 billion - for Pillar I and EUR 101.2 billion - for Pillar II. Additionaly, resources outside the Multiannual Financial Framwork are expected, which are to amount to a total of EUR 17.2 billion (COM(2011)628). Such a structure of expenditure planned for agriculture means that, still, a predominating part of resources will be transferred to agriculture by way of instruments of Pillar I (Figure 4).

Figure 4. The structure of expenditure on agriculture suggested by the Commission for 2014-2020
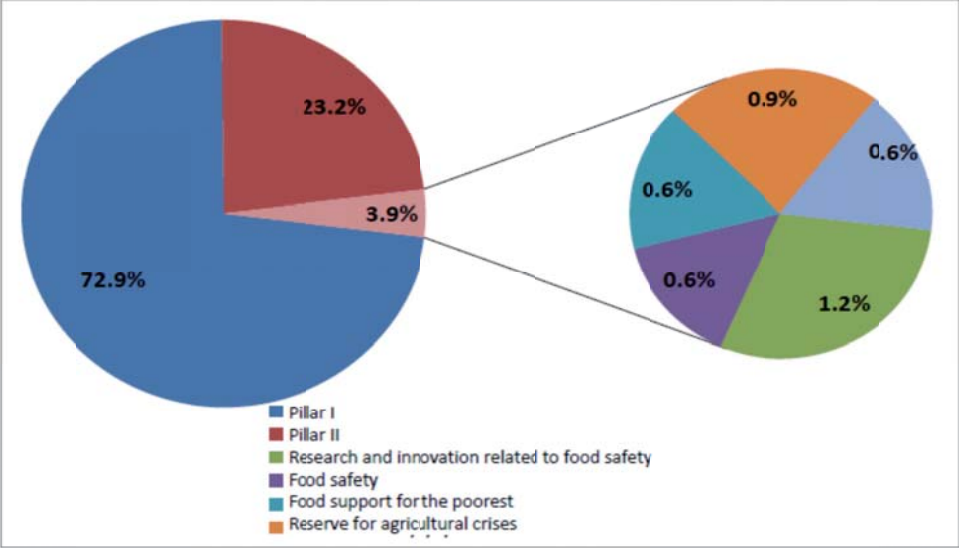
Source: Author's own elaboration based on: COM(2011)628.

The split of resources suggested by the Commission for the implementation of the CAP tasks in 2014-2020 assumes an annual spending at the level of ca. EUR 60 billion (Fig. 5). 72% of these resources would be allocated to direct payments, 24% to rural development instruments, and only 4% is to be spent on market intervention instrtuments.

The Commission's proposals mean that the past trend of reducing the percentage of resources allocated to the CAP in the Community budget will be continued. Also the scale of overall EU expenditure for all areas of its activity in the Gross National Income will fluctuate around 1%, just like in the past decade (Figure 6).

Figure 5. The structure and amount of expenditure on the CAPsuggested by the
Commission for 2014-2020

Figure 6. The percentage of overall EU expenditure and expenditure on the CAP
in the gross national income of the EU in 1968-2013 (%)
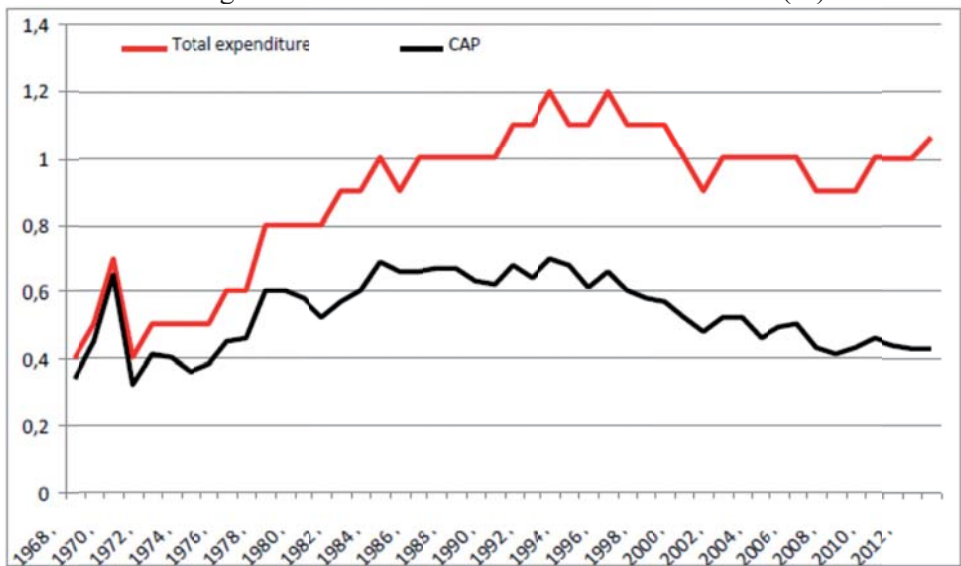
6.3. Support for the Polish rural areas and agriculture from the national and Community resources

In 1996-2011 the budgetary expenditure in Poland allocated to the support for rural areas and agriculture underwent substantial changes. Also their share in the total expenditure of the Polish budget fluctuated considerably. The budgetary expenditure for agriculture, excluding the resources allocated to the subsidies for the Farmers' Social Security Fund (KRUS) until 2001 exceeded 2% of the overall budgetary expenditure (Figure 7). After a drop to 1.9% in 2001, in the subsequent years it gradually increased, especially from the moment of Poland's accession to the EU. It reached the highest share in 2007. A sudden drop of this relation in 2010 resulted from the amendment of the act on public finance and transfer of the EU resources earmarked for rural areas and agriculture to the budget of the EU resources.

Figure 7. The percentage of expenditure on rural areas and agriculture in the Polish budget in 1996-2011 (%)
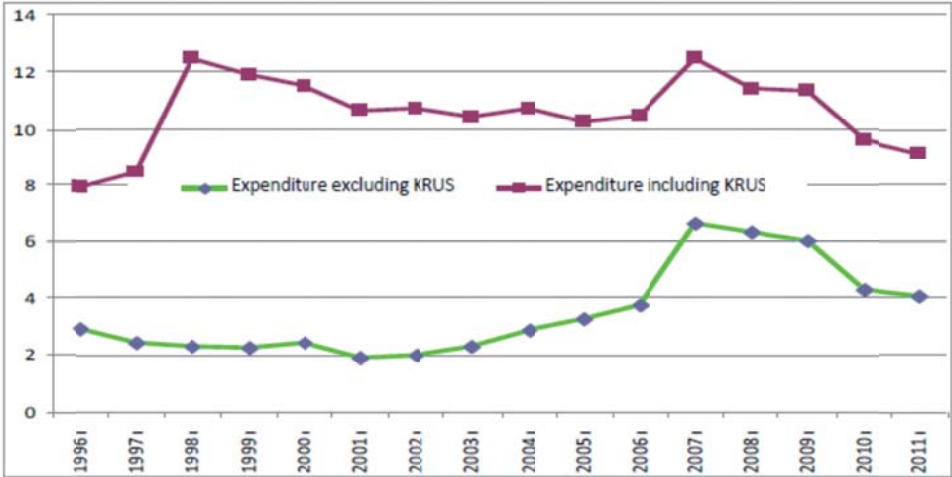
Source: Author's own elaboration based on A. Czyżewski, A. Matuszczak, op. cit., Table 1.

Moreover, the expenditure on agriculture, including KRUS, were subjected to considerable fluctuations. The results of a research conducted by A. Czyżewski and A. Matuszczak show that "expenditure on KRUS formed a kind of balancing element for the expenditure on the agricultural sector (perhaps this was linked to their relatively large envelope). This balancing function consisted in "accelerating" the pace of spending at times of weaker growth (especially in 1996-2003) and "slowing down" when the increase was more dynamic (2004-2009) [Czyżewski, Matuszczak 2011]".

Moreover, the change of the structure of budgetary expenditure on agriculture also needs to be noted. This happened because Polish agriculture was included in the Common Agricultural Policy. The resources from three budget parts are mainly allocated to rural areas and agriculture, these are: 32. Agriculture; 33. Rural development and 35. Rural markets. The changes in the structure are especially visible when we compare the data for the period before 2007 and after that year (Figure 8). The significant increase in the share of the "Rural development" part at the expense of "Agriculture" follows from the fact that in 2007 the new EU programming period started, which for the agriculture meant that new regulations concerning the CAP entered into force and the implementation of instruments and programmes based thereon was commenced. The expenditure on the budget part "Rural development" had to increase since Poland was granted significant resources for the implementation of a relevant programme and the national contribution is necessary when implementing the instruments from Pillar II. In case of the Polish "Rural Development Programme 2013-2013" this contribution is to amount to ca. PLN 17.1 billion (while the overall expenditure on this programme are to exceed PLN 54 billion).

Figure 8. The structure of budgetary expenditure on support for rural areas and agriculture in 2000-2011
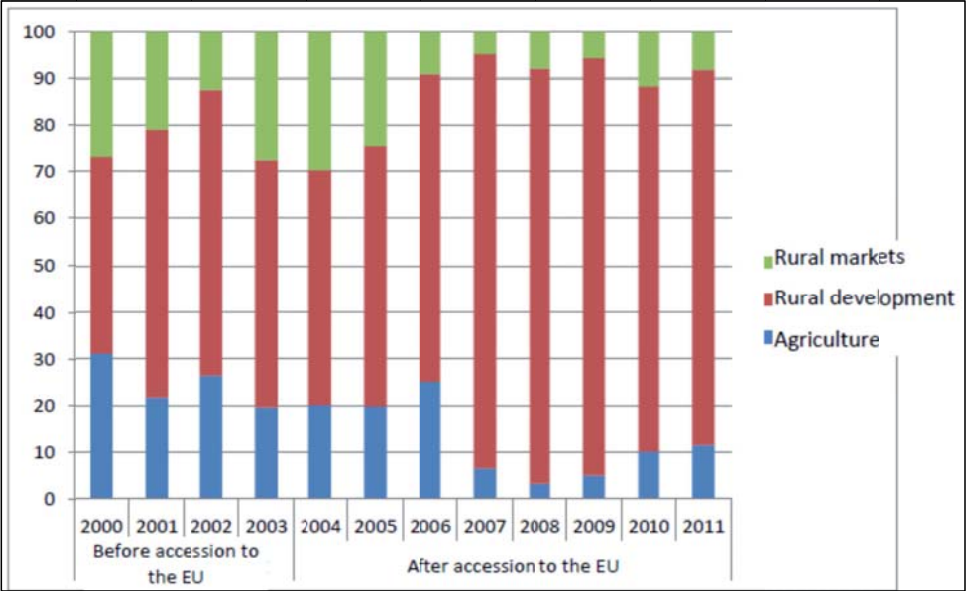
When assessing the results of the proposal concerning the EU Multiannual Financial Framework for the next programming period we have to take note of the relationship between the contribution paid by Poland and resources that are transferred to our country under all of the available instruments of the EU activi-

ty and the very CAP (Figure 9). From each zloty of the contribution paid from the Polish budget, Poland received back from the EU only few zloty. In 2008, that is in the final year of the 2000-2006 programming period settlement, each zloty of the contribution brought back to Poland PLN 3.77 from the EU resources and in 2011 as much as PLN 4.56. Even the sole transfers for agriculture and fisheries give Poland the status of a net beneficiary since in each of the examined years the amount inflowing to these sectors exceeded the amount of the contribution paid by Poland.

Another important issue is the share of the national public resources in the CAP instruments implementation in Poland. From the beginning of the Poland's membership in the European Union the national contribution to the CAP funding was very differentiated. This is related to the differing scale of using the resources allocated to the instruments of Pillar II in Poland in the subsequent years. Depending on the level of resources paid to the beneficiaries of the policy instruments linked to the rural areas development and the scale of the national contribution required for a given instrument, the commitment of the Polish budget in the co-financing of rural development ranged from 17% to 31% (Figure 10).

Figure 9. The amount of resources transferred from the EU budget per PLN 1 of the Poland's contribution to the Community budget in 2006-2011 (PLN)
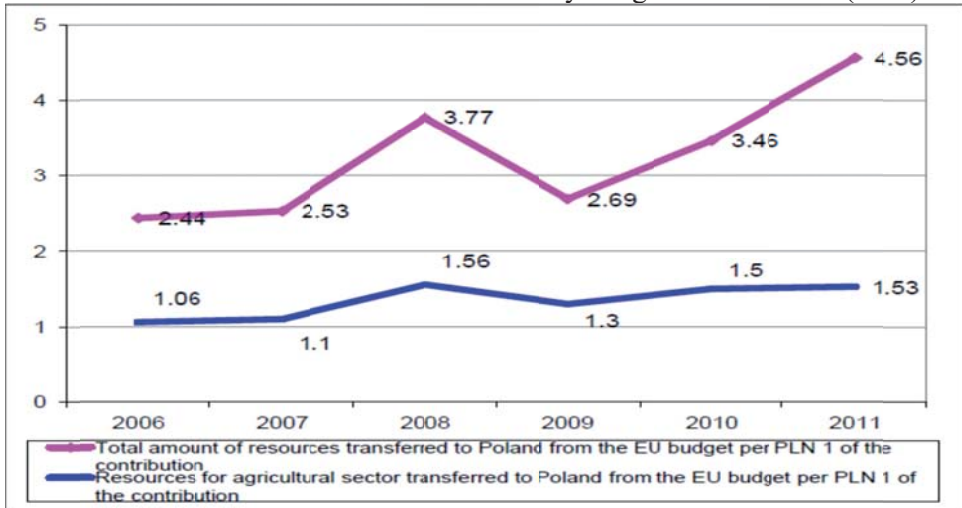
Source: Author's own elaboration based on A. Czyżewski, A. Matuszczak, op. cit., Figure 17.

Figure 10. The percentage of national resources in the public expenditure for the CAP in Poland
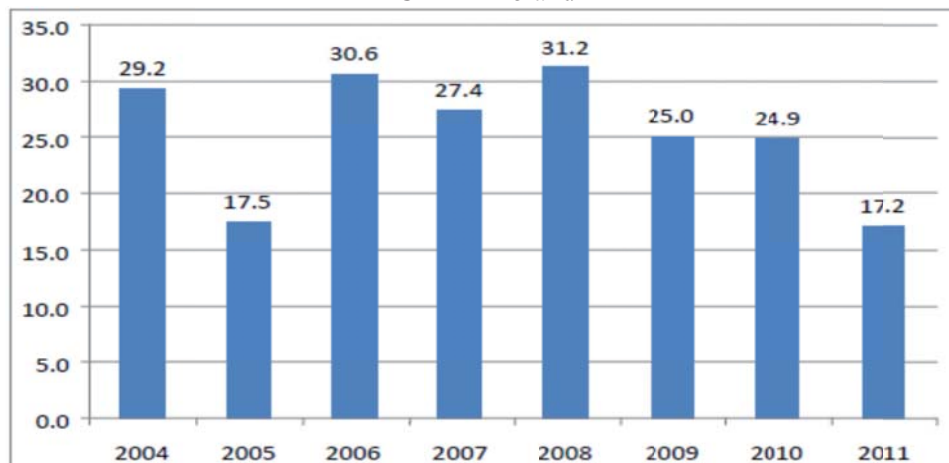
Source: Author's own elaboration based on A. Czyżewski, A. Matuszczak, op. cit., Table 9.

The scale of resources coming to the Polish agriculture under the CAP depends not only on the decision concerning the Poland's share in the total expenditure for the agricultural policy of the Community. The level of the Polish zloty to euro exchange rate is also an important factor because payments due to the beneficiaries are paid in the Polish currency. In 2004-2011 the rate of the Single Area Payment Scheme (SAPS) expressed in euro grew steadily under the mechanism of gradual achievement of the full payments provided for in the Treaty of Accession. In 2004 it amounted to less than EUR 45 and in 2011 it already reached over EUR 161 (Figure 11).

Whereas the Polish zloty to euro exchange rate constantly fluctuated. The highest price of EUR 1 was paid in 2004   PLN 4.7, and the lowest in 2008 – only PLN 3.4.

This considerable zloty exchange rate fluctuations had a great impact on the amout of payments received by the Polish farmers. Figure 12 presents the amount of the actually paid SAPS rates and their level if in each campaign the highest or the lowest euro exchange rate of 2004-2011 would have been binding. According to the performed calculations, if in 2008 the rate of SAPS conversion had been the same as in 2004, the payment per 1 ha of agricultural land would have been by almost 30% higher. For a medium-sized agricultural holding this would mean over PLN 1 thousand higher revenue on SAP.

Figure 11. The level of Single Area Payment Scheme rates (EUR) and the Polish zloty to euro exchange rate (PLN) in 2004-2011*
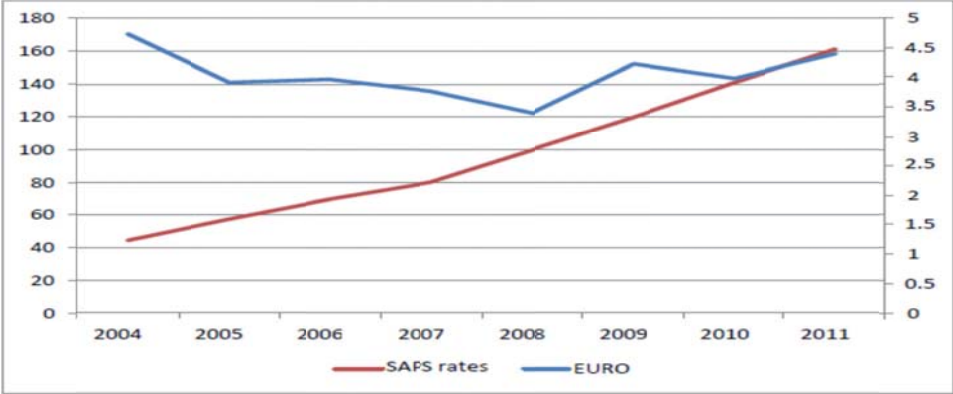
* the chart presents the exchange rate according to which the payments paid to beneficiaries were calculated
Source: Author's own compilation based on the data from:
http://www.gospodarz.pl/aktualnosci/finanse/dotacje-i-doplaty/stawki-doplat-bezposrednich.html and http://funduszeue.info/blog/ tag/stawki/.

Figure 12. The level of Single Area Payment Scheme rates calculated for different levels of the Polish zloty to euro exchange rate (PLN) in 2004-2011
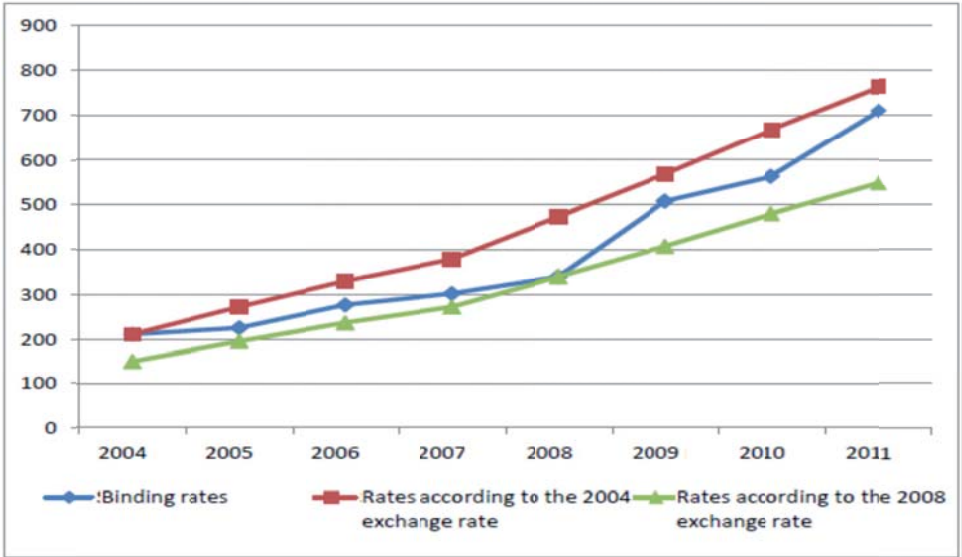
Source: as Figure 11.

Agriculture is not only the beneficiary of the national or Community support. Agricultural goods, especially in the processed form, constitute a significant element of the Polish trade with foreign countries. The balance of trade in goods in case of agri-food products in 2008-2010 was positive

(Figure 13). This made it possible to reduce the negative balance of the total trade in goods in Poland. Thus this carries a certain weight for the new external balance and financial stability.

Figure 13. The balance of the Polish trade in goods and trade in agri-food products in 2008-2010 (EUR thousand)
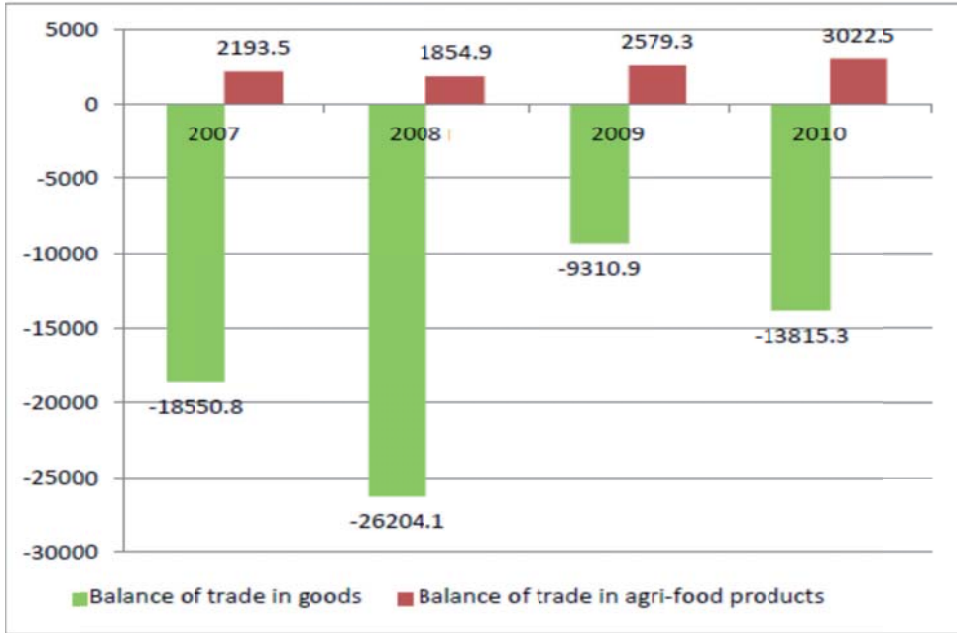
Source: Author's own elaboration based on [CSO 2011].

The significance of support received by the Polish agriculture is certainly very great. This can be evidenced by the numerous research showing the considerable increase in agricultural income from the moment of obtaining the membership in the Community by Poland. However, what we lack are comprehensive analyses on the impact of support and especially the instruments of the CAP Pillar II at the level of employment and GDP. But we can assume that the scale of impact of the resources received by Poland under the CAP is close to that exercised by each euro of resources coming to our country through other support instruments implemented in the remaining areas of the European Union activity (Figure 14).

Figure 14. The impact of the National Development Plan 2004-2006 and the National Strategic Reference Framework 2007-2013 on employment and GDP in Poland (%)
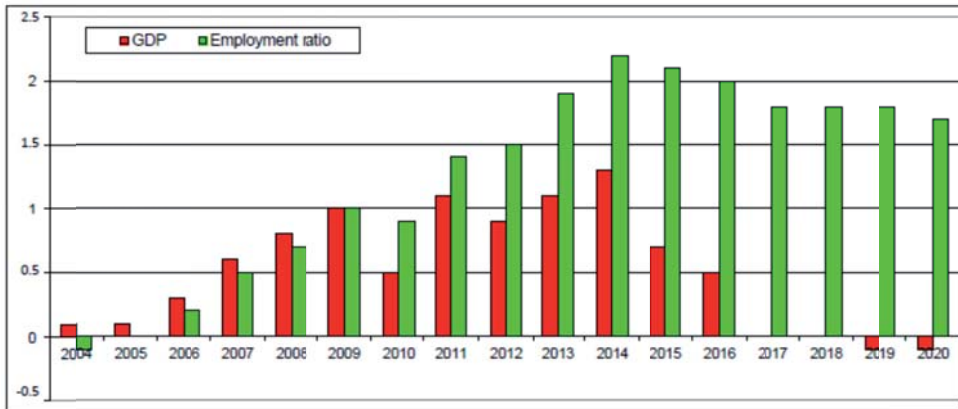
Source: Author's own elaboration based on [Kaczor, Socha 2008].

6.4. Consequences for the Polish agriculture of adopting the proposals of the CAP financing in 2014-2020 presented by the Commission.

The results of research carried out by W. Józwiak and Z. Mirkowska concerning the processes taking place in the Polish agriculture point to the fact that "the farmers' income at the beginning of the next EU planning and settlement period (2014-2020) will largely depend on the changes in the CAP and mainly the subsidies" [Józwiak, Mirkowska 2011].

The amount of the Polish national envelope proposed by the Commission for subsequent years would total to over EUR 3 billion. This amount divided by the surface area of the agricultural land entitled to direct payments in 2010 points to the fact that the average rate per 1 ha of agricultural land would amount to EUR 211 in 2014 and it would increase to EUR 217 in 2019. Taking into account the data on the overall surface of agricultural land towards which the payment was made in the 2010 campaign, the average payment rate in the subsequent programming period would be slightly higher and it would amount to almost EUR 215 and 224, respectively.

The calculated rates would still be lower than the average rates across the entire EU (Figure 15). This follows from the system of gradual equalisation of direct payment rates in individual Member States, which was proposed by the Commission and which is to consider the still existing differences in the level of salaries and costs related to the outlays on the conducted agricultural activity.

Figure 15. The average rate of direct payments per 1 ha of agricultural land in 2014 and 2019 (EUR)
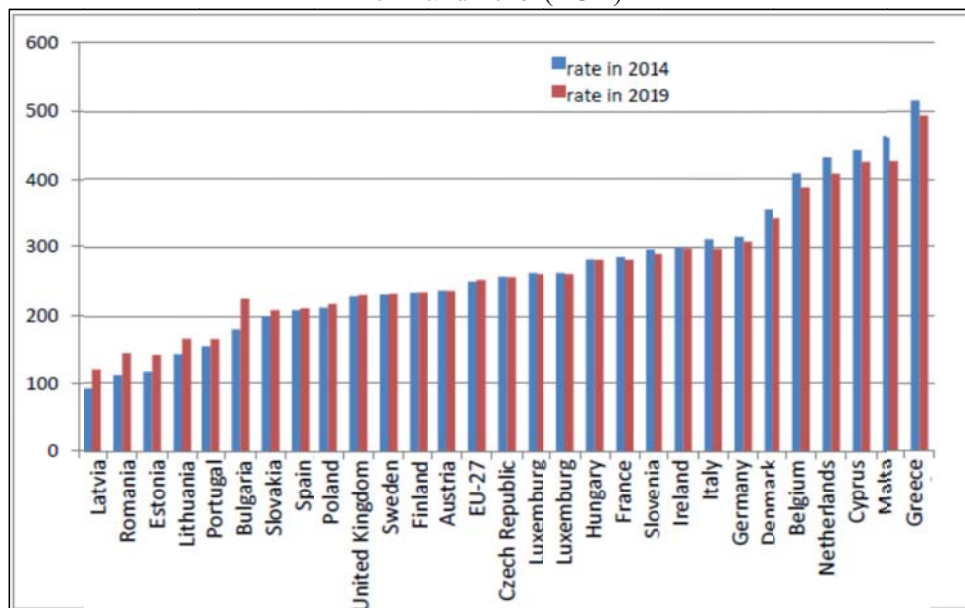
In the 2014-2020 period in the states, whose direct payments amount to less than 90% of the EU average, 1/3 of the difference between their current level and this value will be eliminated. The resources for this gradual equalisation will come from the funds for direct payments in countries in which they exceed the EU average. In 2013 the average level of direct payments in the EU is to amount to EUR 269.1 per ha (COM(2011)500).

However, it also needs to be emphasised that the above calculated averaged rate of payments will not be the actual rate received by individual farmers in Poland. The system of direct payments suggested by the Commission provides for the introduction of the new categories of financial payments from the national envelope, which will decrease the overall envelope of resources available to all beneficiaries. The Member States are to be obliged to introduce the following:

- Payments for agricultural practices beneficial to the climate and the environment – 30% of the national envelope has to be allocated to it;
- Payments for young farmers – up to 2%.

Moreover, the proposal of the Commission provides for the possibility to introduce additional categories of payments, which will limit the available amount for basic payments. These cover:

- Payment for areas with natural constraints, for which up to 5% of the envelope can be allocated;
- Transfers for payments coupled with production (concerns selected types of plants and animals) up to 5% of the envelope while in countries currently applying such payments even up to 10%.

What is more, a possibility to transfer resources between the CAP Pillars by Member State is introduced, which enables:

- Transfer to the CAP Pillar II up to 10% of the national envelope in 2014-2019;
- Transfer from Pillar II of up to 5% of the resources received for direct payments in 2015-2020 (concerns only some Member States, including Poland).

It can be expected that Poland will decide to transfer resources from Pillar II in order to increase the rate of payments, thereby decreasing the total amount allocated to the implementation of the rural development programme in the subsequent programming period. One can also assume that the individual EU Member States will make different decisions as regards the possible solutions concerning the use of the national envelopes allocated to the direct payments, which will result in greater differences not only pertaining to the level of payment rates, but also to the scope and character of support to different groups of farmers. This differentiation of solution will result in a lack of uniform conditions of competition following not only from the national natural conditions and historical events, but also the different policy of the Community states.

The European Commission failed to present a method to divide the resources earmarked for the CAP Pillar II. It was only stated that the division will be based on objective criteria. Poland, being in the current programming period the largest beneficiary of support under the rural development policy, has to expect that the amount of resources that it will be awarded for the next period – under the most optimistic scenario – is going to be equal to the present support. However, it seems more probable that the envelope for our country will decrease. At the same time, it needs to be noted that some part of the resources will still have to be used for the implementation of the currently made commitments under the structural pensions and agri-environmental programmes. Moreover, the proposal of the Commission assumes that Member States should be obliged to allocate 25% of the awarded resources to agri-environmental and climate programmes and 5% to projects implemented under the Leader actions. This implies a significant reduction of the budget available to be distributed to other actions that can be implemented under the support for rural areas.

From the perspective of public finance functioning in Poland another significant change suggested by the Commission in the proposal for the regulation on the financing of the CAP (COM(2011)628), is the issue of prefinancing of expenditure for the implementation of rural development programmes. The first tranche of resources paid to Member Stated by the Commission was decreased

as compared to their rural development programmes. According to Article 25 of the Regulation (EC) No 1290/2005 the Commission transferred 7% of the resources constituting the EU contribution. This amount could have been split into two years depending on the availability of budget resources. Article 34 of the Commission proposal COM(2011)628 provides for prefinancing at the level of 4% with the possibility of splitting it into three instalments depending on the availability of resources, but the first tranche has to represent 2% thereof. It was not established when the remaining tranches are to be paid. Such a change implies a need to secure a greater envelope of resources in the national budget. In case of Poland, as for the support awarded to the implementation of the RDP 2007-2013 this would mean a transfer of only EUR 0.54 billion instead of EUR 0.94 billion (assuming that the entire amount of prefinancing is paid in one tranche).

At this point we should look at the issue of changes as regards the scale of support for the Polish agriculture in the theoretical aspect, starting from the simple model of aggregated demand in open economy with a changing currency exchange rate, which gives us the following:

$$Y = C(Y - T) + I(r^* + \theta) + G + NX(e)$$
where:
Y – aggregated demand;
C – consumption;
T – amount of paid taxes;
I – investments;
R^* – global interest rate;
Θ – risk premium related to a given country;
G – public expenditure;
NX – net export;
E – nominal currency exchange rate.

In case of Poland and other EU Member States the public expenditure may be captured in the following manner:
$$G = G_{UE} + G_K$$
where:
G_{UE} – public expenditure funded from the EU resources;
G_K – public expenditure funded from the national resources.

This very simple formula makes it possible to define the results of a drop in expenditure funded from the EU resources. The drop in the expenditure, which are not financed by national taxes or commitments of the state that form

the public debt is not directly translated into the level of the obtained taxes[31]. At the same time, given the external and internal restrictions that refer to the current macroeconomic situation of Poland and the EU, it is impossible to increase the public expenditure funded from the national resources. Increase in that expenditure would imply a need to increase the taxes and/or higher deficit and public debt, which in turn would be related to the increase in the risk premium and higher costs of public debt servicing. What is more, the conditionality of the EU resources' transfers planned by the Commission would make them dependent on the macroeconomic condition of a Member State thereby preventing an excessive increase in the national expenditure. Poland – that still implements the deficit reduction plan, related to the excessive deficit procedure initiated by the Commission in 2009 – will certainly not be able to increase its level of debt in the next years, and increase in taxes would entail a risk of additional weakening of the pace of economic growth; although if the second safety limit set out in the act on public finance is exceeded the VAT would automatically grow.

A drop in public expenditure will have a negative impact on the level of aggregated demand, which will mean that the IS curve moves from 1 to 2 (Figure 16). Regaining balance would require a nominal drop in the currency exchange rate, which would imply a depreciation of the Polish zloty thereby possibly preventing an increase in exports. However, we need to remember about the limitations of demand of major Polish trade partners related to the situation on their markets. What is more, the import intensity of Polish export also has to be kept in mind.

When estimating the scale of impact that the decreased transfers from the EU exercise, we need to consider the value of the multiplier of public expenditure, which establishes what is the impact of a change in the level of public expenditure on the size of aggregated demand. However, it needs to be stressed that the method of determining the value of the multiplier is a controversial issue, which will additionally complicate future estimations[32].

Moreover, we should also note that the resources transferred by the EU under the CAP are spent on a number of different types of instruments, which are characterised by various efficiency and scale of impact on the situation in the agricultural sector and the rural areas. When deciding on which instruments to select for the Polish programme concerning rural areas and the solutions regarding the use of the Polish envelope for direct payments we need to optimise the use of the available resources.

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[31] At this point we do not take into account the drop in tax revenue related to the purchase of goods and services funded by G_{UE}.

[32] It needs to be noted that not all schools of the mainstream economics, e.g. real business cycle, accept the existence of multiplier mechanisms. The issue of the multiplier's value of public expenditure in the context of the level of import intensity of export is presented in the work of [Łaski, Osiatyński, Zięba 2010].

Figure 16. The results of decreasing the public expenditure showed on a IS-LM model in a small open economy of floating exchange rate
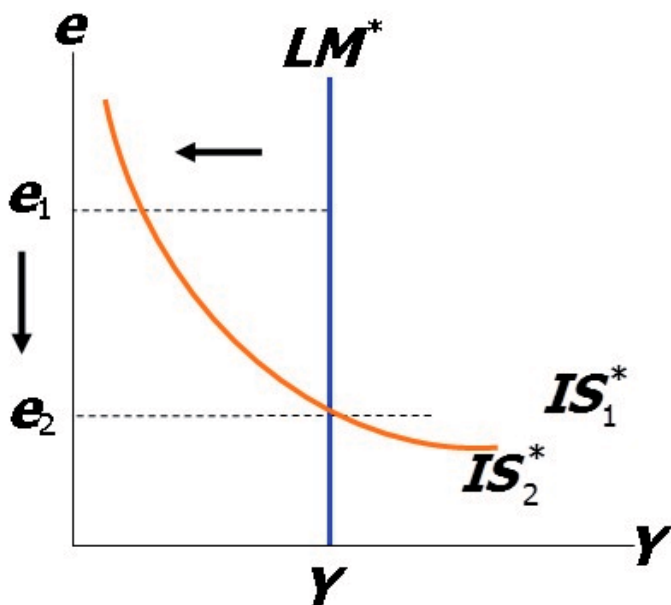
6.5. Summary

- The EU integration was a strong stimulus for changes in the Polish agriculture, especially in the area of income, but also in the area of structural changes which is evidenced by the results of numerous research.
- The proposals of the Commission pertaining to the CAP and the EU budget for 2014-2020 point to the fact that the level of resources, which are going to be allocated for the Polish rural areas and agriculture will, at the most, be equal to their current scale. This means stopping the increase in public expenditure on rural areas and agriculture.
- The proposals of the Commission, especially as regards the Multiannual Financial Framework are only an introduction to further negotiations. The income side of the EU budget has to be kept in mind (the EU budget has to be balanced). It is possible that the new budget will be adopted only at the end of 2013. A key issue is the „recovery" of the euro zone.
- It needs to be remembered that the Commission plans to introduce conditionality of payments of subsequent tranches of support to Member States

and making the payments dependent, for instance, on the implementation of a relevant macroeconomic policy, and especially financial discipline.

- The final shape and structure of support will be an important factor determining the CAP impact on the Polish agriculture. The issue of the new designation of areas eligible for payments – LFA, may turn out to be important at this point.
- At the times of severe deterioration of the fiscal situation the necessary adjustments might be also affecting agriculture.
- So far, 70% of resources spent in the EU on the support to agriculture came from the resources of the Common Agricultural Policy (SEC(2011)867). In the face of an actual reduction of the EU budget for this purpose the possibilities of introducing additional national support instruments might be considered. The current difficulties and problems with the excessive debt of many EU states suggest that the Member States will not be trying to create their own support instruments on a significant scale. However, it needs to be considered what legal possibilities within this scope are provided for by the EU regulations concerning competitiveness on the single market and what branches or agricultural regions will need additional support and what forms this support should have in order to maximize the efficiency and effectiveness of such aid.

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José M. Gil
CREDA-UPC-IRTA (Castelldefels, Barcelona, Spain)
Monia Ben Kaabia
University of Zaragoza, Spain

7. Methodological tools for price transmission studies: an application to the Spanish lamb sector

7.1. Introduction

The issue of price transmission in a vertical sector has been the subject of much research. Particularly, the asymmetric price adjustments have been one of the main research interests among agricultural economists. While asymmetric price responses do not necessarily emanate from market inefficiencies, evidence of symmetric, rapid price responses is clear evidence of an efficient market. It is a common feeling that retail prices do not react very quickly to changes in market conditions. A good example could be the situations where retail prices remain sticky in spite of decreases of input prices due to primary production increases [Borenstein et al., 1997; Peltzman, 2000]. In this situation the retail price will not be equal to the marketing clearing price, generating excess supply and consumers will not benefit for declining farm prices suggesting a redistribution of consumer welfare.

As the standard theory of markets has the general implication of symmetric price adjustment, the knowledge regarding price asymmetry has come mainly from the accumulation of empirical results. Different potential explanations have been given for the existence of asymmetries in price adjustments: the market power at the retail level[33], adjustment costs at the retail level, input substitution at the processing level, stocks at both the production and retail level, production lags at the processing level and public intervention. However, only in a few cases [Peltzman, 2000)] there has been an attempt to link asymmetries with any of the mentioned potential explanations. In any case, before explanations can be given for specific markets, the first step is to analyse the existence of such asymmetric price adjustments.

The standard approach to test for asymmetries in price transmission relies on variations of a model first developed by Wolffram [1971] and later modified

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[33] Although asymmetries have been linked to non-competitive behaviour, this is not necessarily true. McCorriston et al. [2001], with formal grounding in rational firm conduct, showed that in presence of market power price changes could be greater or less than the competitive benchmark case depending on the interaction between such market power and returns to scale. If the industry cost function is characterised by decreasing returns to scale the damping effect of market power is reinforced. On the other hand, if the cost function is characterised by increasing returns to scale the market power effect is offset.

by Houck [1977] and Ward [1982]). Recent developments in time series analyses have modified the methodological framework to tackle with this issue. Von Cramon-Taubadel [1998] showed that the traditional approach was inconsistent with cointegration among prices, specifying a linear Error Correction Model. However, the existence of transaction costs may generate non linear price adjustments, making threshold models more suitable to analyse asymmetries in price transmission [Azzam, 1999].

In this paper we investigate, using time series data, the existing asymmetries in the price transmission mechanism between farm and retail marketing channels in the Spanish lamb markets. Particularly, we will focus our study to answering the question of whether Spanish lamb farmers benefit or not from unanticipated positive and negative supply or demand shocks. By using time series observations we will be able to study the inevitable dynamic aspects of price transmission along the Spanish lamb sector. A Threshold Vector Error-Correction Model (TVECM) will be specified and non-linear impulse response functions will be calculated to tackle with this issue. Finally, results will be discussed taking into account the specific characteristics of the Spanish lamb sector.

Spain is the second largest lamb producer within the European Union (EU) just behind the United Kingdom. It represents around 5% of the Spanish Final Agricultural production and 11% of Final Livestock Production. Although the Common Market Organisation has a set of operating rules which may influence the movement of sheep on to or off a holding they do not place any physical constraints on producers adapting production to meet consumer needs, etc. However, the way in which the calculation of the premium is made has the potential to dissuade those flocks which produce less lamb per ewe then the average from responding to market signals as they have the real potential to achieve a lower income, even at higher prices per lamb, because of the potential for the premium payment to decline as market prices improve. Although producers are unlikely to deliberately sell product at low prices they will not make a significant effort to change their system to capitalise on higher market prices for different qualities of product or at different times of year. Conversely however, because the premium is equal for all ewes, individual producers who achieve better than average market prices through improved quality or other market initiatives and who produce more lamb per ewe than the standard will potentially achieve higher margins. Consequently farmer prices are not primarily determined by the ewe premium and producers have incentives to adapt to changing market conditions.

To achieve the above-mentioned objective, the rest of the paper is organised as follows. Section 2 provides a description of the methodological approach used in the paper. Section 3 reports our empirical results. Finally, section 4 closes the paper with some concluding remarks.

7.2. Modeling nonlinear adjustments

Several studies attempting to measure asymmetric price transmission focused of the estimation of the following model (which constitutes a variation of the econometric specification introduced by Wolffram [1971]] and redefined by Houck [1977] and Ward [1982]:

$$\Delta p_{1t} = \alpha_0 + \sum_{i=1}^{k} \gamma_{1i} I_t \Delta p_{2t-i} + \sum_{i=1}^{k} \gamma_{2i} (1-I_t) \Delta p_{2t-i} + \varepsilon_t$$

Where Δp_{1t} and Δp_{2t} represent changes in retail and wholesale prices, respectively, and I_t is an indicator function that is equal to one if $\Delta p_{2t-1} \leq 0$ and zero in other case. This model allows us to test if the response of retail prices differs depending on whether wholesale prices increase or decrease (see, for example, Hahn [1990], Kinnucan and Forker [1987] and Bailey and Brorsen [1989].

However, results from the empirical models used by the above authors to investigate asymmetries in price transmission have been criticised for the following reasons: i) this specification assumes that the causality goes from wholesale to retail prices only; ii) this model has been used without adequately analysing the time series properties of data. Price levels often exhibit a non-stationary covariance property which, as a consequence, may bias causality tests and lead to autocorrelation problems in the asymmetric price response function [Boyd and Brorsen, 1988, and Kinnucan an Forker, 1987]. On the other hand, if the price series are cointegrated, the specification of a model in first differences is biased as a result of the misspecification of the long-run relationships between prices. Von Cramon-Taubadel [1998] showed that the traditional econometric specification used to test for asymmetric price transmission is inconsistent with cointegration. He proposed an alternative specification of the Wolffram-Houck model based on the error correction representation, and taking into account the procedure approach suggested by Granger and Lee [1989]. Balke et al. [1998] and Frost and Bowden [1999] also use an error correction model to test for asymmetric adjustment. However, these applications are based on linear error correction models. The presence of fixed costs of adjustment along the food chain may generate non-linear reactions; that is to say, price adjustments may be different depending both on the magnitude and the sign of the initial shock. In other words, it is not unrealistic to suppose that only when the initial shock surpasses the critical threshold do economic agents react to it. Balke and Fomby [1997] present a model that allows for non-linear adjustment to the long run equilibrium by introducing the concept of *threshold cointegration*.

In this context, two different methodological approaches have been developed. The first one is based on an univariate version of the bivariate threshold cointegration models described by Balke and Fomby [1997], Enders and

Granger [1998] and Enders and Siklos [2001]. In a similar way to the two-step Engle and Granger cointegration approach, this univariate procedure analyses the threshold behaviour of the univariate cointegrating residual implied by the prices spread, equal to log price difference. It assumes that one of the two prices is exogenous and that only the adjustments to the equilibrium change with regimes, while the autoregressive parameters of the model remain constant.

The second approach to test for threshold cointegration has been suggested by Hansen and Seo [2002] and Lo and Zivot [2001]. As in Balky-Fomby [1997], the analysis of threshold behaviour is based on a bivariate Vector Error Correction Model (VECM) with one cointegrating vector. Hansen and Seo [2002] and Lo and Zivot [2001] indicate that the analysis of threshold behaviour in the bivariate model allows us to uncover potential nonlinearities and asymmetries in the adjustment of individual prices and provide more information regarding the dynamic of the data. In addition, as such a procedure utilises the full structure of the model, it should have higher power, provided the model is true, than univariate procedures, which ignore the restrictions imposed by the multivariate structure. This is the approach followed in this paper, which is described in the following section.

7.2. a) Threshold cointegration

Studies on price transmission using threshold error correction models (either univariate or bivariate) have either considered one threshold (λ^1) to separate the adjustment process into two regimes [Balke and Fomby, 1997; Enders and Granger, 1998, Abdulai, 2000 and 2002, Hansen and Seo, 2002] or two thresholds (λ^1 and λ^2) to separate the adjustment process into three regimes [Obstfeld and Taylor, 1997; Goodwin and Piggott, 2001; Serra and Goodwin, 2002, Meyer, 2003, etc.]. Several authors suggest that a price adjustment model with three regimes separated by two thresholds has more economic sense than a two regime model with only one threshold [Meyer, 2003].

In this paper we start our analysis by considering a general three-regime Threshold Vector Error Correction Model (TVECM$_3$) to analyse price dynamics along the Spanish lamb chain. Let $P_t=(p_{1t},p_{2t})'$ be the log price of a good at two different levels of the marketing channel, assuming that P_t is a vector of I(1) time series which is cointegrated with a common cointegrating vector $\beta' = (1,-\beta_2)$.

The linear VECM representation of order k of P_t can be written as:

$$\Delta P_t = \alpha[\omega_{t-1}(\beta)] + \sum_{i=1}^{k-1}\Gamma_i \Delta P_{t-i} + \varepsilon_t \qquad (1)$$

Where $\omega_t(\beta) = \beta' P_{t-1}$ is the cointegrating vector evaluated at the generic value $\beta=(1,-\beta_2)'$; Γ_i, i= 1, 2… are (2×2) matrices of short-run parameters; α is

a (2×2) matrix; and ε_t is a vector of error terms that are assumed to be independently and identically Gaussian distributed, with a covariance matrix Σ which is assumed to be positive definite. β is the cointegrating vector which is commonly interpreted as the long-run equilibrium relation between the two prices in P_t, while α gives the weights of the cointegration relationship in the VECM equations.

Following Lo and Zivot [2001], a three-regime threshold Vector Error Correction Model (TVECM$_3$), can be written as:

$$\Delta P_t = \begin{cases} \alpha^1 \omega_{t-1}(\beta) + \sum_{i=1}^{k-1} \Gamma_i^1 \Delta P_{t-i} + \varepsilon_t^1, & \text{if} \quad \omega_{t-1}(\beta) < \lambda^1 \\ \alpha^2 \omega_{t-1}(\beta) + \sum_{i=1}^{k-1} \Gamma_i^2 \Delta P_{t-i} + \varepsilon_t^2, & \text{if} \quad \lambda^1 \leq \omega_{t-1}(\beta) \leq \lambda^2 \quad (2) \\ \alpha^3 \omega_{t-1}(\beta) + \sum_{i=1}^{k-1} \Gamma_i^3 \Delta P_{t-i} + \varepsilon_t^3, & \text{if} \quad \omega_{t-1}(\beta) > \lambda^2 \end{cases}$$

Where $\omega_t(\beta)$ is the threshold variable which represents the residual of the equilibrium relationship (i.e. A deviation from equilibrium), and $\lambda = \begin{pmatrix} \lambda^1 & \lambda^2 \end{pmatrix}$ are the threshold parameters that delineate the different regimes.

As can be observed, the TVECM$_3$ in (2) specifies that the adjustment towards the long-run equilibrium relationship is regime specific. This model says that the dynamic adjustment of P_{it} depends on the magnitude of $\omega_t(\beta)$. A special case of the TVECM given in (2) occurs if price changes are smaller than transaction costs. In this case, prices will not adjust in the second regime (in the middle one) implying that prices are not cointegreted, that is, $\alpha^2 = 0$. The resulting model is the so-called Band-TVECM. In this case, if $\omega_t(\beta)$ is within the band then prices are not cointegrated and P_t follows a VAR(k) without a drift. However, in the outer bands economic forces push prices moving together implying cointegration with different adjustment coefficients. If $\omega_t(\beta) > \lambda^2$ ($\omega_t(\beta) < \lambda^1$), then the cointegrating vector reverts to the regime- specific mean with adjustment coefficient[34] ρ^3 (ρ^1) while ΔP_t adjusts to the long run equilibrium with a speed of adjustment vector α^3 (α^1). It is important to emphasise that the speed of adjustment of prices in the outer bands can be different for each element of P_t. The resulting model is given by:

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[34] The adjustment coefficient is obtained as follows:

$$\rho^j = 1 + \beta' \alpha^j = 1 + \begin{bmatrix} 1 & -\beta_2 \end{bmatrix} \begin{bmatrix} \alpha_1^j \\ \alpha_2^j \end{bmatrix} = 1 + \alpha_1^j - \beta_2 \alpha_2^j$$

$$\Delta P_t = \begin{pmatrix} \Delta P_{1t} \\ \Delta P_{2t} \end{pmatrix} = \begin{cases} \begin{pmatrix} \alpha_1^1 \\ \alpha_2^1 \end{pmatrix} \omega_{t-1}(\beta) + \sum_{i=1}^{k-1} \Gamma_i^1 \Delta P_{t-i} + \varepsilon_t^1, & \text{if } \omega_{t-1}(\beta) < \lambda^1 \\ \sum_{i=1}^{k-1} \Gamma_i^2 \Delta P_{t-i} + \varepsilon_t^2, & \text{if } \lambda^1 \le \omega_{t-1}(\beta) \le \lambda^2 \\ \begin{pmatrix} \alpha_1^3 \\ \alpha_2^3 \end{pmatrix} \omega_{t-1}(\beta) + \sum_{i=1}^{k-1} \Gamma_i^3 \Delta P_{t-i} + \varepsilon_t^3, & \text{if } \omega_{t-1}(\beta) > \lambda^2 \end{cases}$$

However, the above model does not say anything about the direction of causality and the asymmetric adjustment process. Information about such features is provided by the α_i^j coefficients. In general, we expect $\alpha_1^j \le 0$ and $\alpha_2^j \ge 0$, that is, prices adjust to the long-run equilibrium when price changes are large. In any case, and assuming a two-price system (i.e. Prices at retailing (p_1) and producer levels (p_2)), other interesting cases in this context are the following:

- $\alpha_1^j = 0$ Retail prices do not respond to changes in the marketing margin. Retail prices are sticky relative to producer prices.

- $\alpha_i^1 = 0$ and $\alpha_i^3 \ne 0$ i=1,2   Prices respond to positive shocks, but negative shocks in the marketing margin are allowed to persist.

- $\left| \alpha_i^1 \right| > \left| \alpha_i^3 \right|$ i = 1,2   The adjustment towards the long-run equilibrium relationship between producer and retail prices is faster when changes in deviations are negative (i.e. Producer prices rise and the marketing margin decreases) than when they are positive (i.e. Producer prices decline and the marketing margin increases).

The three-regime TVECM given in (2) can be compactly expressed as the following multivariate regression model:

$$\Delta P_t' = X_{t-1}' A^{(1)} I_t^1(\lambda) + X_{t-1}' A^{(2)} I_t^2(\lambda) + X_{t-1}' A^{(3)} I_t^3(\lambda) + \varepsilon_t \qquad (3)$$

where:

$$\lambda = (\lambda^1 \quad \lambda^2)$$

$I_t^j(\lambda) = I(\lambda^{(j-1)} < \omega(\beta) < \lambda^{(j)})$ is a heavyside indicator function such that I(A)=1 if A is true and 0, otherwise:

$$X_{t-1}' = \begin{pmatrix} \omega_{t-1}(\beta) & \Delta P_{t-1}' & \cdots & \Delta P_{t-k+1}' \end{pmatrix} \qquad A^{(i)} = \begin{pmatrix} \alpha^i \\ \Gamma_1^i \\ \vdots \\ \Gamma_{k-1}^i \end{pmatrix} \text{is a } (k+1) \times 2 \text{ matrix}$$

Note that when threshold parameters (λ^1 and λ^2) are both fixed (known a priori), the model is linear in the remaining parameters. In such circumstances, and under the assumption that errors ε_t are iid gaussian, parameters in model (3) can be estimated by multivariate least squares.

However, in general, the threshold parameters (λ^i) are unknown and need to be estimated along with the remaining parameters of the model. Lo and Zivot (2001) propose a strategy which combine the Hansen's (1999) approach to estimate two- and three-regime univariate TAR models and the Tsay's [1998] procedure to estimate multivariate TVECM. This strategy consists of the following steps. In the first step, a two-dimensional grid searches are carried out to estimate the threshold parameters (λ^1, λ^2) under the following assumptions: i) threshold parameters are such that $\lambda^i \in \Gamma_2, i = 1,2$ where $\Gamma_2 = \left\{ (\lambda^1, \lambda^2) : -\infty < \lambda^L < \lambda^1 < \lambda^2 < \lambda^U < \infty \right\}$ (this assumption restricts all threshold parameters to lie in the bounded subset $[\lambda^L, \lambda^U]$), and ii) the search is restricted to ensure an adequate number of observations for estimating the parameters in each regime.

In practice, the analysis is conducted by imposing an ad-hoc bound for the number of observations in each regime. Letting T_i the number of observations in regime i, Hansen (1999) suggests constraining the threshold parameters such that $T_i / T \geq \pi_0$, with typically (π_0) set to 0.1. Conditional on $\lambda = (\lambda^1 \quad \lambda^2)$ the TVECM (3) is linear in the A(i)'s and may be estimated by sequential multivariate least squares minimising:

$$S_3(\lambda^1, \lambda^2) = \ln\left|\hat{\Sigma}(\lambda^1, \lambda^2)\right| = \ln\left|\frac{1}{T}\sum_{t=1}^{T}\hat{\varepsilon}_t(\lambda)\hat{\varepsilon}_t(\lambda)'\right| \qquad (4)$$

Where $\hat{\Sigma}_3(\lambda^1, \lambda^2)$ is the estimated covariance matrix of model (3) conditional on (λ^1 and λ^2).

In the second step, the threshold parameters can be estimated through the following optimisation program[35]:

$$(\hat{\lambda}^1, \hat{\lambda}^2) = \arg\min_{\lambda \in [\lambda^L, \lambda^U]} \left(S_3(\lambda^1, \lambda^2) \right) \qquad (5)$$

The final parameter estimates of the TVECM (2) can be computed as $\hat{A}^{(i)} = \hat{A}^{(i)}(\hat{\lambda}^1, \hat{\lambda}^2)$ and the residual covariance matrix is given by $\hat{\Sigma}_3(\hat{\lambda}) = \hat{\Sigma}_3(\hat{\lambda}^1, \hat{\lambda}^2)$. Tsay (1998) shows that the conditional least squares estimators of the TVECM are strongly consistent as the sample size increases ($\hat{A}^i \to A^i, \hat{\lambda}^i \to \lambda^i$, and $\hat{\Sigma}_3(\hat{\lambda}) \to \Sigma$) and that the parameters of $A^{(i)}$'s matrices are asymptotically normally distributed.

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[35] The grid research minimizes the log determinant of the residual covariance matrix of the TVECM, which is analogous to maximizing a standard LR test.

The third step consists of testing if the dynamic behaviour and the adjustment towards the long-run equilibrium relationship is linear or exhibits threshold non-linearity. Several univariate and multivariate test for linearity that have power against the threshold alternative have been proposed in the literature [Balke and Fomby 1997, Hansen 1997, 1999, Hansen and Seo 2002, Tsay 1998].

Lo and Zivot [2001] suggest the Hansen's method for testing linearity in univariate TAR models based on nested hypothesis tests and which can be easily extended to test linearity in multivariate tvecms. They propose the sup-LR statistic:

$$LR_{13} = T\left(\ln\left|\hat{\Sigma}\right| - \ln\left|\hat{\Sigma}_3(\hat{\lambda})\right| \right) \quad (6)$$

Where $\hat{\Sigma}$ and $\hat{\Sigma}_3(\hat{\lambda})$ are the residual covariance matrices of the VECM and three-regime TVECM, respectively.

The statistic to test such a hypothesis suffers from the problem of the so-called unidentified nuisance parameters under the null hypothesis. In other words, the non-linear model contains certain parameters which are not restricted under the null hypothesis and which are not present in the linear model. Consequently, the conventional statistical theory cannot be applied to obtain the asymptotic distribution of the statistics [see Davies, 1987; Hansen, 1999 and Hansen and Seo, 2002]. Given that the test statistic has a non-standard distribution, Hansen [1999] and Hansen and Seo [2002] suggest using the fixed regressor bootstrap or, alternatively, a parametric residual bootstrap algorithm, to compute the p-value for the linearity tests.

Once the presence of threshold effects is confirmed, in the empirical analysis there are several questions that they would have to be answered before allowing the researcher to interpret results. In this context, the most important, with no doubt, is to determine which kind of threshold model is more appropriated for the data (number of regimes, TVECM or Band-TVECM, and symmetric or asymmetric threshold model). Two approaches have generally been considered to determine the appropriate threshold specification. The first approach uses a model selection criterion (AIC, SBC, etc.) To determine the best specification form the data [Tsay, 1998]. Following Hansen [1999], Lo and Zivot (2001) consider nested hypothesis tests based on an unrestricted estimation of the TVECM. They consider, first, the determination of the number of regimes. Thus, in order to test the null of a $TVECM_2$ (two-regime model) against the alternative of a $TVECM_3$ (three-regime model) they propose the following Likelihood Ratio (LR) statistic:

$$LR_{2,3} = T\left(\ln\left|\hat{\Sigma}_2(\hat{\lambda})\right| - \ln\left|\hat{\Sigma}_3(\hat{\lambda})\right| \right) \quad (7)$$

Where $\hat{\Sigma}_2(\hat{\lambda})$ and $\hat{\Sigma}_3(\hat{\lambda})$ are the estimated residual covariance matrices from the unrestricted two-regime TVECM$_2$ and three-regime TVECM$_3$, respectively. The asymptotic distributions of LR$_{2,3}$ are non-standard and bootstrap methods can be used to compute approximate p-values.

Once the number of regimes has been established, they propose specification tests for the Band-TVECM. Since the estimated threshold parameters from the TVECM are superconsistent, as mentioned previously, then a Wald test can be used, by defining appropriate restrictions on the TVECM parameters, which follows an asymptotic chi-square distribution.

7.2. b) Non-linear impulse response functions

Once the TVECM has been estimated, it is useful to analyse the short-run dynamic behaviour of the variables by computing the impulse response functions. This can be particularly suitable for studying the time path response of variables to unexpected shocks at time t. However, given that the non-linear time series model does not have a Wald representation, computing the IRF for these types of models is not an easy task. In addition, as discussed in Koop et al. (1996), the complications arise because in non-linear models: i) the effect of a shock depends on the history of the time series up to the point where the shock occurs; and ii) the effect of a shock depends on the sign and the size of the shock. As a consequence, in non-linear models impulse response functions depend on the combined magnitude of the history $P_{t-1}=\omega_{t-1}$ and the magnitude of the shock δ (relative to the threshold value λ).

The Generalised Impulse Response Functions (GIRF) introduced by Koop et al. [1996] and Potter [1995] offer a useful generalisation of the concept of impulse responses to non-linear models. Their analysis focused on the asymmetric response of the variables to one standard deviation of both positive and negative shocks. The Non-linear Impulse Response Functions (NIRF) are defined in a similar manner to traditional GIRF, except for replacing the standard linear predictor by a conditional expectation. Hence, the NIRF for a specific shock $\varepsilon_t = \delta$ and history $P_{t-1}=\varphi_{t-1}$ (the history of the system) is defined as:

$$
\begin{aligned}
\text{NIRF}(n,\delta,\varphi_{t-1}) = & \, \mathrm{E}\big[P_{t+n} \mid \varepsilon_t = \delta, \varepsilon_{t+1} = \ldots = \varepsilon_{t+n} = 0, \varphi_{t-1}\big] \\
& - \mathrm{E}\big[P_{t+n} \mid \varepsilon_t = 0, \varepsilon_{t+1} = \ldots = \varepsilon_{t+n} = 0, \varphi_{t-1}\big] \text{ for } n = 0,1,\ldots N
\end{aligned}
\tag{8}
$$

Taking into account this definition, it is clear that the NIRF is a function of $\delta \in \varepsilon_t$ and $\varphi_{t-1} \in \Omega_{t-1}$ (Ω_{t-1} is the history or information set at t-1 used to forecast future values of Pt). Given that δ and φ_{t-1} are realisations of the random variables Ω_{t-1} and ε_t, Koop et al. (1996) stress that NIRF themselves are realisations of random variables given by:

$$\text{NIRF}(n, \varepsilon_t, \Omega_{t-1}) = E\left[P_{t+n} \mid \varepsilon_t, \Omega_{t-1}\right] - E\left[P_{t+n} \mid \Omega_{t-1}\right] \quad (8)$$

From (9), there are a number of alternative ways to calculate the NIRF, depending on the research objectives. For instance, in this study we have considered it relevant to assess the responses of wholesale (retail) prices to shocks in retail (wholesale) prices under different evolution price regimes, and under different sizes and signs of the initial shock. Thus, the NIRF can be used to evaluate the degree of asymmetric responses over time.

7.3. Empirical analysis

7.3. a) Data and preliminary analysis

In this section we perform the multivariate threshold cointegration approach described above to analyse the price transmission mechanism along the Spanish lamb marketing chain. Empirical specification TVECM involves the following steps: i) under the assumption of prices non-stationarity, the first step consists of testing for cointegration and estimating the cointegrating relationships; ii) if cointegration is found, the next step consists of determining whether the dynamics of the data can be described by threshold-type nonlinearities; iii) estimation and evaluation of the bivariate threshold error correction model (TVECM), and iv) non-linear Generalised Impulse Response functions are calculated in order to analyse the response of each prices to unanticipated positive and negative shocks. Each of these steps is addressed in turn in this section.

As mentioned in Section 3, our empirical analysis uses weekly data of farmer prices (FP), and retail (RP) prices along the period 1993-2002. All variables are expressed in natural logarithms. For cointegration analyses among prices, it is common to use logarithms because otherwise, with trending data, the relative error is declining through time [Banarjee et al., 1993]. On the other hand, Tiffin and Dawson [2000] suggest that the logarithmic transformation is appropriate because the variance is related to the mean and the relative error is constant for the series in levels. From an economic point of view, this transformation allows to relate prices in terms of percentage variations instead of absolute changes.

Previous to the cointegration analysis among the price series, we first examine their stochastic time series properties. Seasonality has been investigated by implementing seasonal unit root tests for weekly data following the procedure suggested by Cáceres [1996] and Cáceres et al. [2001][36]. Results from these statistics clearly suggest that seasonality is deterministic for the three price se-

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[36] The procedure is similar to that used by Franses [1991], for monthly data, and it is based on the decomposition of the polynomial $(1\text{-}L^{52})$. The description of the procedure has not been included due to space limitations. In any case, results are available from authors upon request.

ries. Accordingly, the systematic component of seasonality, to be parsimonious, has been adequately captured by using a Fourier-type series expansion.

Time series univariate properties have been examined by using unit root tests. As in small samples such tests have limited power, two alternative unit root tests developed by Elliot et al., [1996] and Ng and Perron [2001] as well as the stationary test from Kwiatkowski et al. [1992] (KPSS) have been applied. All tests are consistent with the presence of a unit root in the three price series, satisfying the first necessary condition for cointegration analyses[37].

7.3. b) Cointegration analysis

In this section we address the first step to specify a TVECM (i.e. Testing for cointegration and estimating the cointegrating relationship). Cointegration is tested using the likelihood ratio test introduced by Johansen **(1988). Escribano and Mira (1996) show that the cointegrating vector can still be estimated superconsistently in** the presence of neglected non-linearity in the adjustment process. Before determining the cointegration rank, each system has to be correctly specified. More precisely, what deterministic components must be included and what is the optimum lag that ensures that residuals are approximately white noise and have zero autocorrelations at all lags. In this paper, the optimum lag has been selected on the basis of the Akaike Information Criterion (AIC) and the Likelihood Ratio test proposed by Tiao and Box [1981]. Both tests provide consistent results and indicate that four lags would be the optimum lag in the system.

Misspecification tests for autocorrelation and normality, described in Doornik and Hendry [1997], have been carried out for each system to check for the statistical adequacy of the model. Results indicate that models specified above are quite satisfactory (Table 1). However, due to excess kurtosis, normality of residuals is rejected which may be caused by neglected nonlinearity. Table 1 also shows the results of the Johansen likelihood ratio tests for cointegration rank. At the 5% level of significance, both tests indicate that the null hypothesis of one cointegrating vector cannot be rejected. Given that the cointegrating rank is one, we have tested whether the price transmission between farm and retail prices is perfect in the long run. This hypothesis states that the cointegrating vector β should satisfy the long-run price homogeneity condition (1,-1). All restriction tests on the cointegrating vector are asymptotically $\chi^2(v)$ distributed where v is the number of imposed restrictions[38]. Results from the Likelihood Ratio (LR) statistic (second row of Table 1) show that the homogeneity restriction cannot be rejected and has empirical support. The restricted cointegrating vector is given by:

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[5] Results are not shown due to space limitations. They are available upon request.
[38] For further details, see [Johansen and Juselius 1994 and Johansen 1995].

$$\text{Lnrp} - \text{lnfp} = 0.448 \qquad (9)$$

The constant term in (10) represents the price spread at the retail levels. Taking into account that all prices are expressed in logarithms, equation (10) represents percentage spread models with a mark-up of $(e^{\alpha}-1)$ (with α being the constant) (Tiffin and Dawson, 2000). Hence, the retail marketing margin can be expressed as follows:

$$\text{Retail margin} = (e^{\alpha}-1) \times FP \times 100 = 56\% FP \quad (10)$$

Table 1. Cointegration analysis in FP-WP and WP-RP systems[a]

		H_0: r=0	H_0: r=1
Cointegration Trace Statistic		76.08	7.83
	Critical Value (5%)	20.12	9.17
H_0:β=(1,-1)		3.05	(0.08)
Multivariate misspecification tests	A_LM(1)[b] = 7.33 (0.11) A_LM(52)[c] = 8.23 (0.08) N_LM = 14.85 (0.00)		

Values in parentheses are p-values
A_LM(i) is the Godfrey multivariate test for autocorrelation of order i.
N_LM is the Doornik and Hendry (1997) multivariate test for normality.

7.3. c) Threshold cointegration

Once the presence of a long run equilibrium relationship between the two prices has been detected the next question is whether possible nonlinearities exist in the adjustment process. This question will be analysed using the procedure described in Section 3. We start by testing nonlinearity and, in case the null of linearity is rejected, the number of regimes in the TVECM is determined considering the estimated cointegrating vector, given in (11), as the threshold variable (ω_{t-1})[39]. Results from the LR linearity test against the alternative of a multivariate $TVECM_3$ $(LR_{1,3})$ are shown in Table 2 and indicate that the null of linearity is rejected at the 5% level, in favour of the threshold model.

Given that linearity is rejected in favour of threshold nonlinearity, next we test which threshold model is more appropriate to characterize the nonlinear dynamic adjustments of prices using the $LR_{2,3}$ statistic given in expression (6). As can be observed from Table 2, the LR statistic reject the null of a $TVECM_2$ against the alternative of a three-regime $TVECM_3$, suggesting that price transmission along the Spanish lamb marketing chain can be characterised by a three-regime threshold process. At the bottom of Table 2 the estimated threshold parameter from the $TVECM_3$ is showed ($\hat{\lambda} = (-0.028, 0.054)$). In other words, and

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[39] The residuals obtained from equations (12) and (13) can be interpreted as deviations from a long-term equilibrium.

taking into account (11), the TVECM splits the price adjustment processes depending on whether the retail marketing margin lies below 52%, above 71% or between 52% and 71%. Figure 1 reports the evolution of farm and retail prices under the three regimes according to the corresponding threshold parameter. As can be observed from Figure 1, the first regime (marketing margin below the threshold level) can be associated with increasing phases of lamb prices (excess demand), while the third regime (marketing margin above the threshold level) seems to be associated with periods of declining prices (excess supply). The second regime is associated with transition periods, that is, when prices start to rise or to decline. These results are quite consistent with those found for the United States by Breimyer [1957] who concluded that, in the short-run, marketing margins tended to increase when production also increases, while they decreased with production shortages, being quite stable in the long-run.

Table 2. Tests for nonlinearities in price adjustments[a,b]

	LR_{13}	LR_{23}
Test statistic	63.28	49.82
FR critical value (5%)[c]	29.17	28.91
PR critical value (5%)[d]	32.76	30.17
Threshold parameters	$\hat{\lambda} = (-0.028, 0.054)$	

The $LR_{1,3}$ tests the null of linearity against the alternative of a TVECM (Lo and Zivot, 2001).
The $LR_{2,3}$ tests the null of a two-regime TVECM against the alternative of three-regime TVECM (Lo and Zivot, 2001).
Critical values are obtained using the fixed regressor (FR) bootstrapping technique (Hansen, 1999; and Hansen and Seo, 2002).
Critical values are obtained using the parametric residual (PR) bootstrap algorithm (Hansen, 1999; and Hansen and Seo, 2002).

The estimated $TVECM_3$ coefficients are shown in Table 3 as well as results from misspecification tests. As can be observed, results of diagnostic tests suggest that the estimated models are adequate as there is no evidence for remaining residual autocorrelation, ARCH tests fail to reject the null of homocedasticity and, finally, normality cannot be rejected. Moreover, the estimated parameters in the outer regimes are significant and have the expected sign. However, in the middle regime (regime 2) adjustment coefficients are not significant, indicating that adjustment only takes place till the edge of the threshold band. Within the band, the two prices move closer to each other but without following any specific pattern.

Figure 1. Classification of prices evolution under the three regimes
(prices in logs)
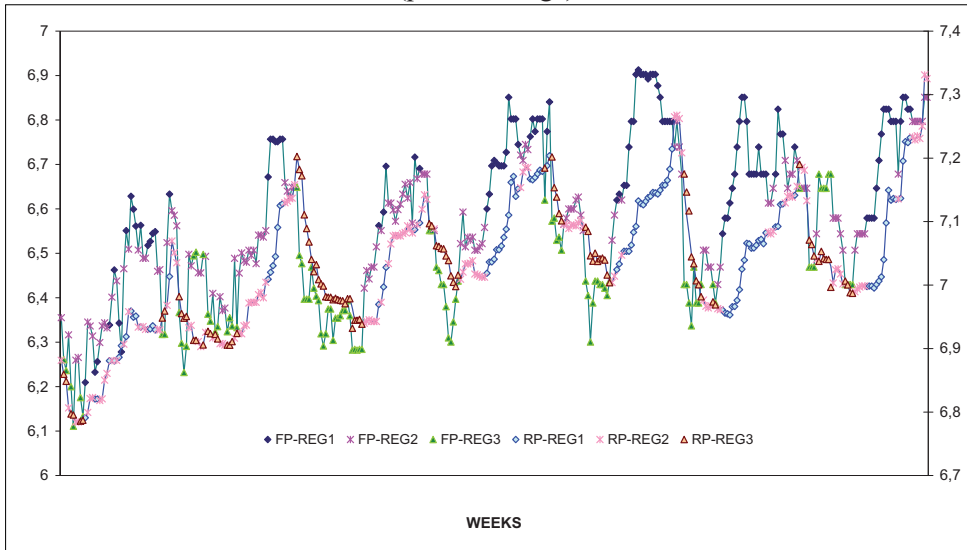
Considering this result, the TVECM$_3$ could be re-specified as a Band-TVECM as it has been defined in Section 3. A Wald test is carried out to check if adjustment coefficients in the middle regime are jointly significant. Results indicate that the null of no significance cannot be rejected at the 5% significance level (the Wald statistic is 3.31, while the critical value is 5.99 at 5% of significance level). Consequently, it can be concluded that Band-TVECM is more appropriate than the unrestricted TVECM to represent the asymmetric adjustments of lamb prices along the marketing channel.

The estimated parameters of the Band-TVECM are given in Table 4. Furthermore, we include the estimates of the adjustment parameters , which measure how the cointegrating vector reverts to the regime-specific mean (see footnote 2). As can be observed, the estimated parameters in regime 1 are always lower than those in the upper regime. A smaller means that price adjustments after disequilibria are faster. In the lower regime is 0.682 and increase to 0.867 in the upper regime.

The speed of adjustment is usually measured by the so-called half-life [ln(0.5)/ln( )] which states the number of periods required to reduce one-half of a deviation from the long-run equilibrium [Obstfeld and Taylor, 1997]. Taking into account the results mentioned in the above paragraph, the half-life increases from 1.80 weeks to 4.83 weeks. This results indicates that the adjustment induced by a negative deviation from the stationary price relationship is much faster than when it is induced by a positive deviation.

Table 3. Estimated parameters of the TVECM$_3$[a]

	Regime 1[b] $\omega_{t-1}(\beta_2) < -0.028$	Regime 2[b] $-0.028 \le \omega_{t-1}(\beta_2) \le 0.054$	Regime 3[b] $\omega_{t-1}(\beta_2) > 0.054$
$\begin{pmatrix} \alpha_1^i \\ \alpha_2^i \end{pmatrix}$	$\begin{pmatrix} -0.18 \\ \scriptstyle(0.056) \\ 0.052 \\ \scriptstyle(0.022) \end{pmatrix}$	$\begin{pmatrix} 0.002 \\ \scriptstyle(0.07) \\ -0.013 \\ \scriptstyle(0.015) \end{pmatrix}$	$\begin{pmatrix} -0.048 \\ \scriptstyle(0.020) \\ 0.102 \\ \scriptstyle(0.063) \end{pmatrix}$
Misspecification tests			
BG(1)-fp[c]	2.59	BG(1)-RP	0.44
BG(52)-fp[c]	1.46	BG(52)-RP	1.13
ARCH(1)-fp[c]	3.84	ARCH(1)-RP	3.32
ARCH(52)-fp[d]	3.76	ARCH(52)-RP	3.86
JB-fp[e]	3.04	JB-RP	4.02
% of observations	33.33	38.33	28.33

a. Values in parentheses are standard deviations.

b. $\omega_{t-1}(\hat{\beta}_2) = RP - WP - 0.448$.

c. BG(i) is the Breush-Godfrey test for autocorrelation of order i (Critical value at the 5% level of significance is 3.84).

d. ARCH (i) is the Engle test for conditional heteroscedasticity of order I (Critical value at the 5% level is 3.84).

e. JB is the Jarque-Bera test for normality. Critical value at the 5% level of significance is 5.99

In any case, as we have already mentioned in the previous section, the key feature in threshold models is the pattern of the estimated coefficients of the α matrix (α_{ij}) associated to the cointegrating vector $\omega_{t-1}(\beta)$. These coefficients can be useful to analyse which prices "equilibrium adjust", and which do not. The first interesting point to note is that the estimated coefficients corresponding to the lower regime, in absolute values, are larger than those corresponding to the upper regime, indicating that the speed of adjustment is more rapid for negative than for positive deviations from the threshold values. Given that the lower (upper) regime indicates that the marketing margin is below (above) its long-run equilibrium value, this suggests that prices react more rapidly when the margin is squeezed than when it is stretched. These results would appear to be quite consistent with those reported by von Cramon-Taubadel [1998].

During the lower-margin regime (first regime), the adjustment coefficients are significant, indicating a feedback effect between the two prices. In addition, estimated coefficients indicate that the speed of adjustment of the retail prices is more rapid than that of the farm prices (after a negative deviation from the long-

run equilibrium relationship, the retail price adjusts by eliminating 21% of such a negative impact generated in the previous period, while in the case of the farm price the adjustment is only about 10.5%). In the upper regime, adjustment coefficients are significant for the farm price, but not for the retail price. Thus, a positive shock on the price spread between the two levels of the marketing chain will initiate an adjustment process in the farm price, but not in the retail price, indicating that retail prices are sticky relative to farm prices when the marketing margin is squeezed.

Table 4. Estimated parameters of the Band-tvecm[a]

Regime 1[b]			Regime 3[b]		
$\begin{pmatrix} \alpha_1^i \\ \alpha_2^i \end{pmatrix}$	ρ^c	Half-Life[d]	$\begin{pmatrix} \alpha_1^i \\ \alpha_2^i \end{pmatrix}$	ρ^c	Half-Life[d]
$\begin{pmatrix} -0.213 \\ {\scriptstyle (0.032)} \\ 0.105 \\ {\scriptstyle (0.014)} \end{pmatrix}$	0.682	1.80	$\begin{pmatrix} -0.052 \\ {\scriptstyle (0.043)} \\ 0.087 \\ {\scriptstyle (0.023)} \end{pmatrix}$	0.867	4.83

a. Values in parentheses are standard deviations.
b. regimes 1 and 3 have been already defined in Table 3.
c. ρ is the adjustment coefficient which measures how the cointegrating vector reverts to the regime-specific mean (see footnote 2 for its mathematical expression).
d. Half Life is defined as $[\ln(0.5)/\ln(\hat{\rho}_i)]$.

7.3. d) Short-Run Dynamics

Short-run dynamics have been analysed by computing the IRF, which show the response of each price in the system to a shock in any other price. In this study, Non linear IRF (NIRF) have been calculated for each regime prices are expected to react (regimes 1 and 3). In a context of non-linear models, NIRF are a very useful tool, as they allow us to differentiate responses to both positive and negative shocks. Moreover, the time at which the shock takes place is relevant, and thus, we could expect different responses depending on which of the regimes the shock is produced.

In order to analyse the asymmetric behaviour of price adjustments, the NIRF have been computed for $\delta=\pm1$ and ± 2 and for history-specific regimes such that the long-run equilibrium relationship $[\omega_t(\beta_i) = \beta'P_{t-1}]$ (i=1,2 for the first and second system, respectively) is above or below the upper and lower threshold values. In each regime, the NIRF for each forecasting horizon is the average across all possible N_i histories (with N_i being the number of observations in the ith regime). For each response, we have computed the corresponding 95% con-

fidence intervals using bootstrapping techniques based on 5,000 replications[40].
Figure 2 shows main results.

Under the first regime, i.e. when prices are increasing (Figure 2, Panel a), a 1% positive shock to the retail price generates and immediate and significant response of both prices. However, the magnitude of such responses is quite different. The farm price exhibits a certain delay in adjusting to the new situation, reaching the maximum response after three weeks. Thus, although in the long-run both prices are perfectly integrated, in the very short-run retailers benefit from a demand shock as the price spread increases by 50%. The situation is quite similar when the magnitude of the shock is 2%, generating responses, which, approximately, doubled those generated by a 1% positive shock.

Responses of retail and farms prices to a negative demand shock at the retail level have a similar pattern than in the case of positive shocks although two main differences exist. First, responses are significant for a shorter period and, second, the magnitude of the response is lower during the first 10 weeks after the shock, mainly in the case of the retail price, suggesting that positive shocks are more persistent and generate positive asymmetries. Moreover, although in the first week the negative response of the retail price is higher than that of the farm price, the situation reverses from then generating increasing price spreads since the third week after the shock.

A positive shock in the farm market notably stretches the marketing margin the first week after the shock, as the farm price response is about 40% of the magnitude of the initial shock while in the case of the retail price, the response is only about 20%. However, during the following weeks, the retail price overreacts to the initial shocks, increasing the price spreads for about 6 weeks after the shock. The existence of only one week of delay to react has to do with the specific characteristics of lamb. It is a perishable product mainly sold in big pieces the butcher has to cut. No labels, apart from specific quality labels, are present. Thus, menu costs are irrelevant, as retailers have to change only the price. In the case of specific cuts already packed, the stock disappears in less than one week. If the magnitude of the initial shock doubles, then the magnitude of the responses is more than proportional. Responses of farm and retail prices to excess supply shocks (independently of the magnitude) have a similar path. However, the magnitude of such responses are different, being persistently higher in the case of the farm price, thus generating increasing price spreads, which benefit retailers.

As can easily be observed, comparing the responses to positive and negative farm market shocks, the price adjustment process is positive-asymmetric (price increases are transmitted faster than price decreases). Finally, the magnitude of the asymmetric effect is greater in the case of the retail price, suggesting

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[40] All analyses have been carried out in GAUSS. We are grateful to dr. van Dijk for providing valuable information on how to tackle this cumbersome task.

that inflation in food products is not generated by cost increases, but rather by increases in marketing margins.

Figure 2. Impulse response functions to a 1% and 2% positive and negative shock for system WP-RP under the two regimes

Panel a) Regime 1 ($\omega_{t-1}(\beta_2) < -0.028$)

Panel b) Regime 3 ($\omega_{t-1}(\beta_2) > 0.054$)
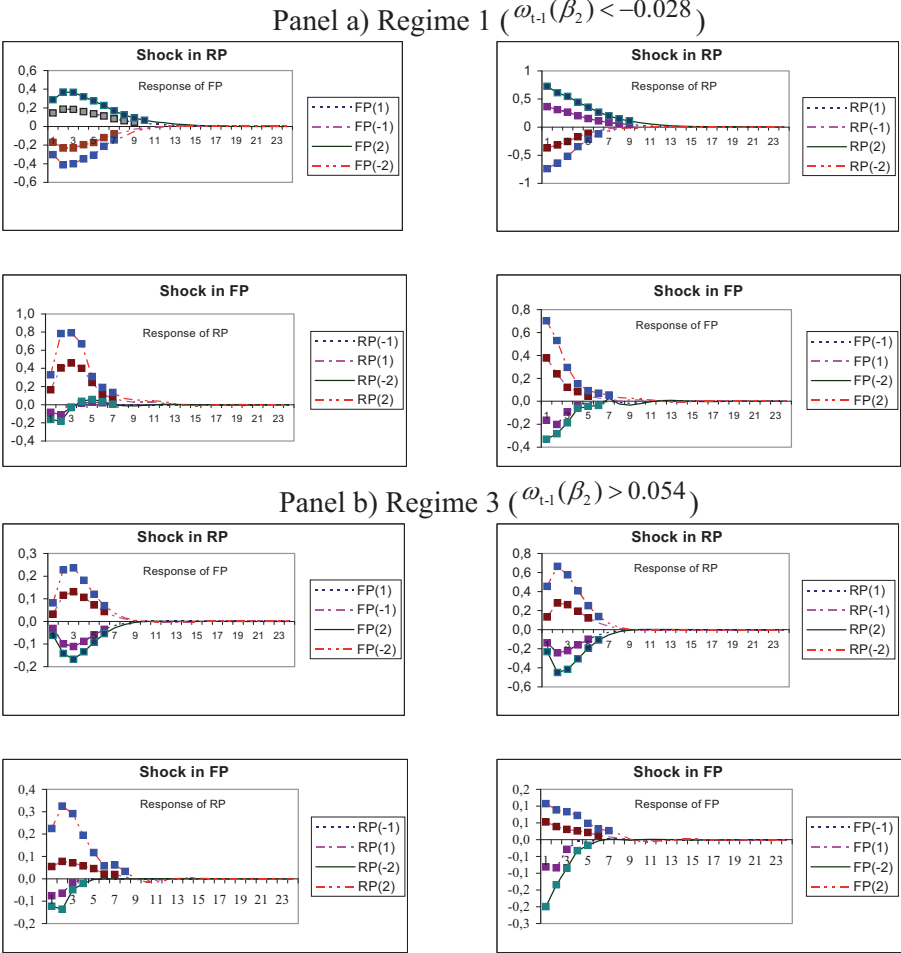
Note that squares indicate that the response is significant at the 5% level.

These results seem to indicate that retailers have certain market power in the lamb market in Spain, as is the case with most perishable products. As Bettendorf and Verboven [2000] show, price behaviour is related to market concentration and oligopsonistic behaviour. In fact, retailers are much more concentrated than farmers, at least in the case of supermarkets and hypermarkets chains operating at national level.

Under the third regime, i.e. when prices are falling (Figure 2, Panel b) the general pattern are more or less the same although three main differences may

be appreciated. First, the magnitude of the responses is lower, especially in the case of negative shocks. Second, the convergence towards the long-run equilibrium takes place more quickly, independently of the magnitude of the initial shock. Third, when declining prices variations in the magnitude of the initial shock generate responses more than proportional when the shock is positive but much less than proportional when the shock is negative.

In general terms, all considered cases lead to increasing price spreads in the short run, benefiting retailers, with the only exception of a negative shock in the retail price, in which retail prices decrease slightly faster than farm prices. In an environment of declining prices, retailers are not able to push farm prices significantly down in order to guarantee long run supply. In any case, the reduction of the price spread in this specific case is substantially lower in absolute values than the increase that takes place after a positive shock. Finally, short-run responses to positive shocks are higher than those for negative shocks, indicating, as in the first regime, the existence of positive asymmetries.

7.4. Conclusions

This paper has explored the non-linearity in the price transmission mechanism along the lamb marketing chain in Spain. The methodology used has been based on the specification and estimation of a three-regime TVECM in which regimes are associated with price cycles. Moreover, price reactions in the intermediate regime are not significant allowing us to specify a Band-TVECM. Obtained results suggest a number of points.

In the long-run, prices at both extremes of the marketing chain are perfectly integrated; that is to say, any change in any of the prices is fully transmitted to the other. However, in the short-run, price behaviour has to be with the structure of the retail sector. Retailers have clearly market power. Two thirds of total lamb sales at retail level are located in supermarkets and hypermarkets in which the market share of the top-five is around 60%. The main conclusion is that, in an environment of increasing prices, retailers benefit from any shock, whether positive or negative, that affects supply or demand conditions. In the first case, a shock to the farm price notably stretches the marketing margin in the very short run (one week after the shock) but then the retail price overreacts to the initial shock, increasing price spreads for about one month. In the second case, the price spread immediately increases by 50% and persists during one month and a half. Price adjustments are positive-asymmetric suggesting that retail prices show more nominal flexibility when they are increasing.

Under a price-declining situation, the general pattern is rather similar. However, responses converge more rapidly to the long-run equilibrium and they are much higher when shocks are positive than when they are negative as further price decreases can generate short-run losses.

The analysis has focused on vertical price adjustments in the Spanish lamb marketing chain. It can be extended in several directions. First, a natural extension will be to investigate other meat sectors in Spain with different market structures (different degrees of market integration) or other food sectors with different characteristics (branded products, more processed products, non-perishable products, etc) to better understand the price transmission mechanism and to what extent farm prices are responsible of inflation. Also, further applications to the same sector in other countries with different market structures would allow us to link our results with market power or holding stocks policy. Finally, further refinements from the methodological point of view could be used in the future as new theoretical econometric issues arise in the context of non-linear models in a multivariate framework.

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Dr Mariusz Hamulczuk
Institute of Agricultural and Food Economics – National Research Institute, Warsaw, Poland

8. Performance of the time series models in forecasting agricultural commodity prices. Example of wheat prices in Poland

8.1. Introduction

The uncertainty of price shaping and the related risk are inseparable from the management process. Therefore, the risk cannot be explained in isolation from the issue of competition in market economy, where dynamic character of reactions of a large number of food producers have to result in frequent disproportions. The issue, whether or not, in order to protect farmers from market risks, market mechanisms should be replaced by widely scoped interventionism, or whether solutions should be sought which do not interfere with market economy principles, remains open. It should be borne in mind, though, that any interference in market mechanisms by means of state interventions, too much regulation of limitations and exclusions result in incorrect allocation of production factors. This, in turn, leads to sub-optimal pricing of production factors and incorrect product prices on the basis of non-objective market signals [Hamulczuk, Rembisz 2008].

However, there are also other market methods of counteracting negative impact of price risk. One of those is price forecasting. Forecasts are a source of information concerning probable development of a phenomenon or economic process. Thus they play an important role in the decision-making process, both at the short-term, operational and the long-term, strategic level. Knowing the probable image of the future, the market participants may choose the right moment for sales, plan adequate cash reserves or enter into an profitable supply contract in advance [Hamulczuk, Stańko 2011].

It should be borne in mind, though, that the quality of such forecasts is not always satisfactory. It is a common belief that forecasting is a kind of speculation. Some economists even claim that forecasting of complex economic phenomena is indeed impossible. However, there are always those among the speculators, who, having adequate market knowledge, can forecast better than others, which helps them win.

If one has better knowledge about market mechanisms and the methodology of their construction, the knowledge might be used to gain competitive advantage over other market participants. This implies two attitudes toward forecasting. On the one hand, forecasting is a means of gaining competitive advantage over other market participants. On the other, no one credible forecast

can be developed, for instance, by a central institution, which could be the basis for economic decision-making process of market entities. However, market participants may take into consideration such forecasts, but they should be aware that they will bear consequences of actions taken on such a basis.

This study aims at presenting the performance of the time series models in forecasting agricultural commodity prices. By time series models we mean the models where no additional information is used apart from historical perspective on the analysed phenomenon. In a market approach the research covered one of the most important markets of agricultural commodities – the wheat market. A thesis could be proposed that accuracy of such forecasts is no worse than of forecasts made on the basis of other models. From the perspective of economic decisions and price risk, we are interested in short-term forecasts. A short-term is a perspective in which an agricultural producer cannot make pro-efficiency modifications in their potential or change production volume. We assumed that such a period is one year.

8.2. Time series patterns

The basis for forecasting of prices of agricultural commodities is the knowledge about market mechanisms in agriculture and its environment. Selecting all factors which influence a given phenomenon is not always possible or necessary. Often it is better and cheaper to determine consequences of these causes in a temporal perspective. Market participants know the saying that prices (which are the main market parameter) reflect all information which is known and relevant. The main question in this context is whether the data concerning historical price shaping would be enough for accurate price forecasting, since prices reflect consequences of many factors.

The fact that time series models are often used for forecasting follows from several assumptions these models are based on. First of all, as a rule the one and only source of information concerning the future progress of a phenomenon is a time series of the forecasted variable and its transformations. This has its deep justification in a general saying that "the price reflects all the information necessary". Therefore, there is no need to gather and analyse vast amounts of information from different sources. Second of all, in time series models, no assumptions as to the value of explanatory variables have to be made. These are either given (e.g. time) or we base the process on past observations. Third of all, as results from the literature of the subject, such forecasts are no worse than the forecasts based upon more complex models.

It is generally assumed, that mechanisms which constitute a basis for forecasting are hidden in a certain structure of a time series [Dittman 2008]. A time series may consist of the following mutually independent components: Trend (T), Cyclical (C), Seasonality (S) and Irregular (I). This approach is one of the propositions which facilitate understanding of the time series model. The

model approach to a time series assumes more or less readable distribution of regularities in historical periods. An example of such a decomposition of a time series for wheat has been presented on Figure 1. This decomposition has been made with the use of the X-12-ARIMA model and LOESS local regression (trend estimation).

All variations take place around tendency (trend). A tendency is defined as a long-term propensity to one-direction variations of the value of a variable in time. It might be said that a tendency does not represent variability which is decisive for the price risk level. Each market participant has time for adapting to long-term variations through technology change, concentration of production or cost decrease. Failure to adapt to market conditions on the part of some market participants conditions structural variations (for instance, concentration).

Different deviations take place around the trend, including cyclical irregularities in the form of more or less regular fluctuations around the trend. The differentiation of cyclical variability and trend is problematic in itself when it comes to methodology, as both types of variability reflect long-term variations. Factors underlying cyclical variability in agriculture include bio-technological conditions, economic conditions and external conditions, for instance, droughts which may initiate occurrence of cycles. Those fluctuations may be related both to general economic situation, and to (special) commodity cycles. In the conditions of open trade, shaping prices of agricultural commodities in a given country results not only from national demand-supply relations, but also from the impact of the situation on the so-called European or global markets.

Average length of cyclical variability of wheat prices in 1996-2011 (Figure 1) amounted to ca. 43-44 months. These fluctuations highly determine price level as their amplitudes are significantly higher than the amplitudes of seasonal and irregular variations. Therefore, guessing cyclical behaviour determines in practice forecasting accuracy. This is not easy, as their progress is very much volatile.

Seasonality is revealed in one-year length periodical fluctuations around long term tendency. For example, at the grain market seasonality effect is manifested in price decrease after the harvest and, afterwards, slow growth due to the cost of storage of raw product. The more limited options for commodity storage are, the higher visibility of seasonality effect. As regards seasonality of price trends it is nothing else than an example of the general impact of demand and supply principles. Demand on relatively stable level meets variable supply in time, which leads to price fluctuations. Seasonality is also subject to a slow change, as illustrated by Figure 1. In recent years amplitudes of seasonality variations of wheat prices amount to ca. 12-14 pp.

Figure 1. Decomposition of time series for wheat prices (PLN/100 kg): trend (T), Cyclical (C), Seasonal (S) and Irregular (I)
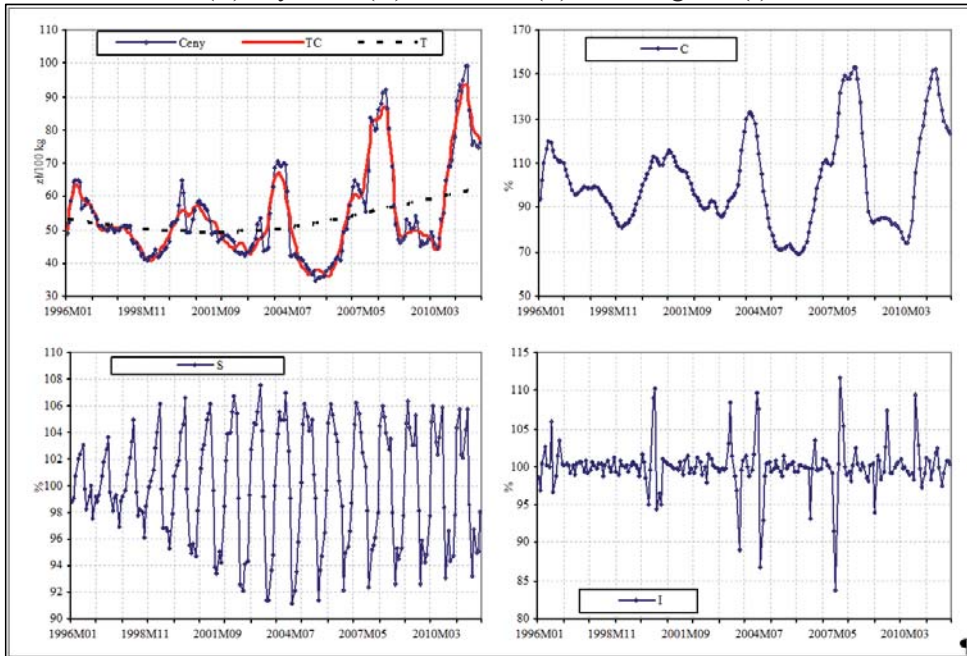
Source: Author's own research.

The last type of variability, as a part of classical decomposition observed in time series is irregular variability. It demonstrates the influence of all incidental factors and factors which are impossible to predict. Among the irregular variability one may distinguish effects of random factors, such as catastrophes, sudden policy variations, strikes.

In addition, structural variations other than the four variation types specified above might occur. Inter alia: a single observation distant from the data (outlier), permanent level shifts, temporary level change, or effects of movable feasts (e.g. Easter effect). Their occurrence is indicated in isolated big irregular variations in Figure 1. If we do not capture them by special regressors [compare: X-12-ARIMA methodology, Guide…2007], this type of variability will become a part of irregular fluctuations as shown in Figure 1.

Knowing the type of regularities occurring in data, these may be included in a more or less formal model. The model constitutes a simplified description of the reality. On the basis of such a model projection of above regularities is made (without irregular variations) onto the future, resulting in obtaining a forecast.

8.3. Time series forecasting methods

Many time series models may be used for forecasting. As they aim at projection of historical regularities, model selection depends on regularities occurring in data. The description of methodology can be found at the majority of publications on forecasting [e.g. Dittmann 2008, Makridakis et al. 1998]. Among the most popular are ARMA – Autoregressive and Moving Average models. These are sometimes referred to in the literature as Box-Jenkins models [1983]. As they constitute a generalisation for many other models and, theoretically speaking, can be used for forecasting time series with regularities observed in Figure 1, these were used for forecasting wheat prices.

In ARMA (p, q) models, the value of a variable forecasted in t period, may depend on its past values and the difference between the real past values of the forecasted variable and the values obtained from the model (forecasting errors). To put it otherwise, it constitutes a combination of the AR(p) and the MA(q) models. The ARMA (p, q) model transcription for a stationary time series is following [Box, Jenkins 1983]:

$$Y_t = \phi_0 + \sum_{i=1}^{p} \phi_i Y_{t-i} + \varepsilon_t + \sum_{i=1}^{q} \theta_i \varepsilon_{t-i} ,$$

(1)

where:
Y – value of forecasted variable,
ϕ_i – autoregressive model parameters,
Θ_i – parameters for the moving average model,
P – autoregressive rank meaning maximum delay of the endogenous variable,
Q – rank of moving average meaning its maximum delay,
ε_t – model errors, so-called white noise.

The model may be extended to include non-stationary and seasonal series. Such a model is labelled SARIMA(p,d,q)(P,D,Q)$_S$, where: d – number of non-seasonal differencing, D – number of seasonal differencing, P – number of seasonal autoregressive terms, Q – number of seasonal moving average terms. Non-stationary can also result from both the occurrence of a trend and seasonal variations. A time series differentiated with seasonal and non-seasonal order shall be transcribed as a product of two operators $(1-B)^d(1-B^S)^d y_t$. Hence the general transcription of the SARIMA(p,d,q)(P,D,Q)$_S$ model is following:

$$\phi(B)\Phi(B^s)(1-B)^d(1-B^s)^D Y_t = \theta(B)\Theta(B^s)\varepsilon_t,$$

(2)

where:
$\phi(B)$, $\theta(B)$ are polynomials for delays of the non-seasonal part of the model,
$\Phi(B^S)$, $\Theta(B^S)$ are polynomials for delays of the seasonal part of the model.

Methodology of the proceedings consists of model identification (determining the number of differencing and delays), estimation of parameters and model assessment and forecasting. If in the model assessment phase it turns out that the model fails to comply with necessary conditions (significance of parameters, right distribution of random component), then model parameters should be determined anew and the entire process should start anew [Box, Jenkins 1983]. This can be done in a more or less automatic way.

Forecasting models that make part of deseasonalising procedures were also used in the research: X-12-ARIMA and TRAMO-SEATS. These are programmed, inter alia, in Demetra Plus, and model identification is strictly automatized and performed on the basis of information criteria [ESS Guidelines … 2009, Grudkowska, Paśnicka 2007]. The autoregressive and moving average models are further developed in regarima models. These make part of, inter alia, the X-12-ARIMA procedure. General regression model estimated at the regarima stage has the following form [Findley et al. 1998]:

$$Y_t = \sum_i \beta_i X_{i,t} + Z_t$$

(3)

where:

Y_t - original time series,

β_i - parameter with i explanatory variable,

$X_{i,t}$ ith explanatory variable aimed at determining structural change, outliers and effect of movable feasts or working days,

Z_t - the rest from the model, estimated by means of the SARIMA (p,d,q)(P,D,Q) model, in the form: $\phi(B)\Phi(B^S)(1-B)^d(1-B^S)^D Z_t = \theta(B)\Theta(B^S)\varepsilon_t$.

After the transformation the equation no. 3 takes the following form:

$$\phi(B)\Phi(B^S)(1-B)^d(1-B^S)^D\left(Y_t - \sum_i \beta_i X_{i,t}\right) = \theta(B)\Theta(B^S)\varepsilon_t$$

. (4)

Another method of decomposition of a time series is a concept based on the TRAMO-SEATS procedure. Contrarily to the X-12-ARIMA model, decomposing takes place in frequency instead of time domain. The TRAMO algorithm, which is a counterpart of the regarima, estimates the z_t time series[41] by means of the following regression equation [Maravall 2008]:

$$z_t = y_t \beta + x_t$$
.

(5)

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[41] Symbols compliant with the convention used in the literature of the subject concerning TRAMO/SEATS methodology.

where:

$\beta = (\beta_1, ... \beta_n)$ – vector of regression parameters,

$y_t = (y_{1t}, ..., y_{nt})$ – matrix of regression variables describing the impact of structural changes, outliers, effect of movable feasts or working days,

x_t – factor subject to the SARIMA process.

The difference between the SARIMA and the regarma and TRAMO models consists in specification of certain non-linearities by means of additional regression variables. Thus the properties of the model and efficiency of estimators improve due to the elimination of extreme values (such as seen in the irregular component on Figure 1).

8.4. Methodology of forecast quality assessment

Forecast quality assessment for time series models has been performed on the basis of the assessment of the accuracy of ex post forecasts by their comparison with the real prices. In order to calculate ex post forecasts, time series of prices were artificially shortened and new model parameters were estimated on this basis and forecasts were calculated. The first forecast was calculated on their basis in the period until March 2011 for the upcoming 12 months. Then sequential data were shortened by another three months, new model parameters were estimated and following ex post forecasts were calculated for each of the next 12 months. The last forecast was calculated on the basis of the data for the period until March 2008. 13 ex post forecasts were calculated for each model analyzed in the horizon of from one month to one year.

Forecast accuracy was assessed dependent on the forecasting horizon. Forecast errors for the third, sixth and twelfth month were analysed. Mean Absolute Percentage Error – MAPE[42] was used to this aim, which is given in the following formula [Cieślak ed. 2005]:

$$MAPE = \frac{1}{k} \sum_{t=1}^{k} \left| \frac{Y_t - \hat{Y}_t}{Y_t} \right| * 100\% \quad , \tag{6}$$

where:
K – number of *ex post* forecasts performed,
Y_t – realisation of Y variable at the t moment,
$\hat{Y}_t$ – forecast of Y variable for the t moment.

The scale of forecast errors does not provide us with too much information if we do not have a reference (benchmark) which could make the as-

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[42] MAPE does not comply with the symmetry condition which means, that over-estimating is assessed higher than under-estimating. However, the use of Symmetric Mean Absolute Percentage Error – SMAPE did not result in changes of conclusions formulated on the basis of MAPE.

sessment relative. The simplest benchmark are errors in naive forecasting. The inclusion of naive forecasting to the comparison of forecasting errors assessment is meant to determine, whether construction of advanced time series models brings any advantages to forecasting of future phenomena.

The analysis was limited to one kind of naive forecasting[43]. The naive $\hat{Y}_{t+h}$ forecast for following periods covered by the forecasting horizon h equals the last observed real value at the t moment:

$$\hat{Y}_{t+h} = Y_t. \tag{7}$$

Additional forecasting from time series models were compared to forecasts done by the Independent Expert Team established by the President of the Agricultural Market Agency (hereinafter: AMA forecasts). Prediction intervals of agricultural products prices are obtained on the basis of the knowledge, experience and opinions of known experts in the field of agricultural economics. Forecasting range for 3-month forecasts amounts to 5%, for 6-month ones[44] – 7.5%. Average values of prediction intervals were used for reference. Expert forecasts are always prepared in the last month of the quarter (March, June, September and December). Hence, they might be compared to time series forecasting done on the basis of the data from comparable periods. Average absolute forecasting error for 3-month ARR forecasts equals 6.89% and for 6-month ones – 8.02%.

8.5. Performance (accuracy) of ex post forecasts

Forecasts from 6 models were analysed in the research. Models of wheat prices were based on logarithm data. Analyses were made first for regarima and TRAMO models. Their specification was made automatically on the basis of information criteria. The chosen models are similar to one another, contain 9 regressors each, which are decisive for abrupt variance in price level at the harvest time. Through the consideration of additional variables, estimated forecasting models fulfil the requirements concerning parameter significance, model fitting to data or distribution of random component [more on this subject in: Hamulczuk ed. 2011]. Due to lack of place in the present elaboration, models have been summarised briefly in Table 1.

Forecasting accuracy from the ex post forecasts on the basis of these models was not satisfactory (more on that below); hence usefulness of SARIMA

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[43] Another solution is assuming that the forecast will equal the real value in analogical period of the previous year. However, due to small share of seasonal variability, forecasts were much worse than forecasts on the basis of the naive, non-seasonal method.

[44] Only forecasts for 1 and 2 quarter will be discussed in this context, as they are the only ones published. In addition forecasts are made, of which the horizon covers the period up to 5 quarters.

models was assessed next. Their specification was consciously limited to just one differencing (with first or seasonal step). Therefore, forecasts were calculated on the basis of the SARIMA(p,d,q)(P,D,Q) models, where the sum of differencing amounts to 1 (d+D=1). The researchers also resigned from an automatic procedure of selection of number of delays on the basis of information criteria. Model specification was made on the basis of ACF and PACF graphs for time series data and residuals of models. The only major difference in model quality compared to the regarima and TRAMO models is the lack of normal distribution of SARIMA models.

Table 1. Selected characteristics of wheat prices models

Model	Specification	Autocorrelation	Normality
Regarima	(1,1,0)(0,1,1) + 9 regressors	NO	YES
TRAMO	(0,1,1)(0,1,1) + 9 regressors	NO	YES
SARIMA	(2,0,0)(2,1,1)	NO	NO
SARIMA	(2,0,0)(1,1,2)	NO	NO
SARIMA	(1,1,0)(0,0,1)	NO	NO
SARIMA	(1,1,0)(1,0,1)	NO	NO

Source: Author's own research.

On the basis of the above models ex post forecasts and their errors were determined. Examples of ex post forecasts compared to real data have been presented on Figure 2. Red lines show actual price fluctuations between January 2008 and December 2011. Blue lines show ex post forecasts for subsequent quarters, starting from March 2008.

These figures show two typical progresses of ex post forecasts. For regarima, TRAMO and SARIMA models in non-seasonally differenced, pursuing short-term trends forecasts over-estimated forecast value in price maximum periods. Those models can be described as „short-memory" models. On the other hand, for models with only one seasonal differencing, e.g. (2,0,0)(2,1,1), forecast values come closer to average values (long-term trend). Therefore, model selection determines a certain direction for forecasting.

Figure 2. Ex post forecasts for wheat prices on the basis of the selected models
(PLN/dt)
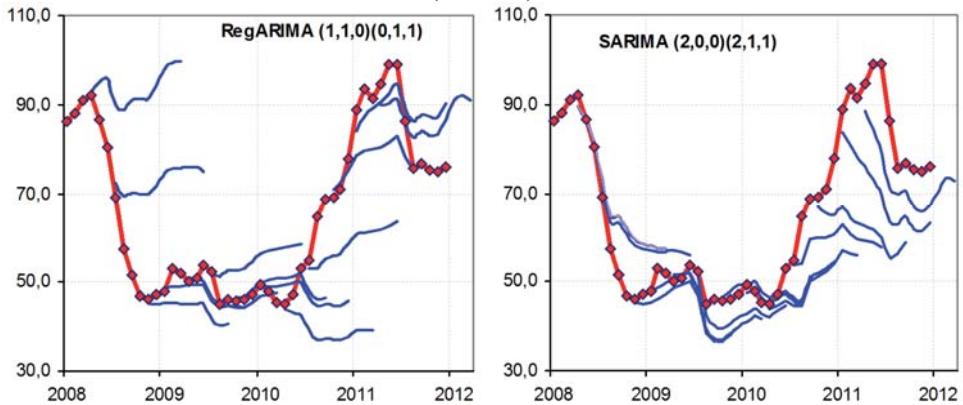
Markings: Ex post forecasts – marked blue, actual prices – marked red.
Source: Author's own research.

The main difficulty in forecasting agricultural commodities prices, which are characterized by significant share of the cyclical in total variability, is forecasting of the cyclical variance in the future. In such cases forecasting accuracy depends mostly on the ability to forecast turning points in cycles. As shown in Figure 2, the regarima model forecasts pertaining to wheat prices most often indicated that the prices remained at a level similar to their recently registered level. On the other hand, aiming at the SARIMA forecasting model average (2,0,0)(2,1,1) causes that the information about a change of cycle phase are obtained too early.

Conclusion of accuracy of ex post forecasts for time series models against accuracy of ex post forecasts in naive and expert forecasts has been presented in Figure 3. The non-seasonally differentiated SARIMA models proved the least accurate. Average forecasting errors in a time perspective longer than 3 months were even bigger than in naive forecasts.

The regarima and TRAMO models, which had the best qualities, proved a bit better. Forecasts on this basis in a 6-month perspective would err ca. 22-23%, in a one-year perspective – ca. 30%. Expectations were much higher considering that naive forecasting errors in respective periods amount to 25 and 30%.

The most accurate forecasts from time series models were obtained from the seasonally differentiated SARIMA models. In each of the time horizons forecasts were more accurate than the naive forecasts. In the case of time horizon starting from the 6th month, differences are significant.

Figure 3. MAPE errors (%) of ex post forecasts for wheat prices depending on forecasting horizon
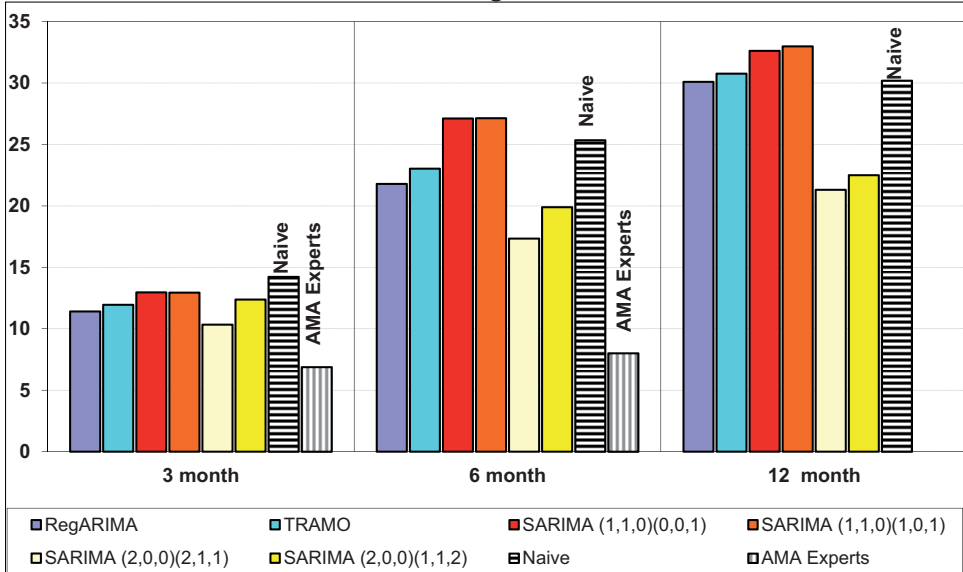
Source: Author's own research.

However, the AMA experts' forecasts remain the most accurate ones in a time perspective up to 6 months. One might say that they were highly accurate. Bearing in mind that in 2006-2011 the coefficient of variation for wheat price series was at the level of 29%, the error of ex-post forecasts at the level of 7-8% is relatively low. Therefore it shows that the knowledge about the past of a phenomenon is not enough to get a highly probable forecast for the future. The above shows that achieving more-than-average profits on the basis of generally accessible historical information about prices is not possible.

8.6. Conclusions

Time series models make it possible to obtain a range of information concerning regularities in data. Thus it is also possible to extend the knowledge of analysts and market participants on trends, cyclical fluctuations, seasonal fluctuation patterns. On the basis of selected components a less-formal forecast may be done, which combines hard data with intuition and non-statistical knowledge.

Higher forecasting usefulness of the SARIMA seasonally differentiated models is observed than the SARIMA first-order differentiation models and automatized DEMETRA+ procedures. Those forecasts were also more accurate than naive forecasts. The analysis of errors in ex post forecasts has shown that the majority of time series models do not permit accurate forecasting of prices not only in turning points, but also in the period of up to six months after the

change of cycle direction. Forecasts obtained on the basis of the above models can be compared to market expectations as a whole. Lack of higher advantage with respect to naive models also confirms weak-form of the efficient market hypothesis (EMH).

Forecasts calculated on the basis of time series models were decisively worse than the forecasts by the AMA Expert Team. Forecasting errors in a 6--month perspective were ca. 2-3 times higher than in the expert forecasts. This indicates that basing the analysis solely on historical data is not enough for obtaining accurate forecasts. Such forecasts are just one of information sources about the future progress of the phenomenon. Hence each forecast based on quantitative models should be assessed with regard to its reality.

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Dr Paweł Boczar
Faculty of Market and Marketing, Poznan University of Life Sciences
Dr Yelto Zimmer
Institute of Farm Economics, von Thünen Institute, Braunschweig, Germany

9. Production costs as a determinant of worldwide competitiveness of cereal producers

9.1. Introduction

Cereals belong to one of the most important groups of products in agriculture because of the role they play in provision of nutrition for the world's population and since production thereof is one of the main directions of production in agricultural holdings. As indicated by Klepacki [2007], nowadays we have to deal with a cereal-based civilisation since a crucial amount of energy and proteins used to keep the world's population alive originates in cereals' grain. Wheat is the main consumption cereal; the production thereof and need for it was on the increase in the recent years. The current production and consumption level of wheat amounts approximately to 650 million tons, and the world's turnover of that species equals approximately 130 million tons. Further, as the production, use of and trade in wheat rise, the competitive pressure on the wheat market increases. Recently new players have emerged among the main wheat exporters, who also plan to sell their cereals on the international markets. The main players in terms of export include: the United States, Argentina, Australia, the European Union and a group of countries from the Black Sea region, i.e. Russia and Ukraine, and Kazakhstan, which have recently joined the Big Five group. It can be presumed that when the production and the need for wheat rise, the competition on that market will intensify. According to the OECD-FAO forecasts [2011], the production and consumption of wheat in 2020 will amount to about 750 million tons. On the other hand, the FAPRI forecasts [2011] indicate a wheat production and consumption growth in 2020 to approximately 720 million tons.

Kamerschen et al.[1991] claim that competition is a process by means of which market participants attempt to pursue their own interests by presenting offers that are more beneficial than others in terms of price, quality or other properties that have impact on the decision to enter a transaction. In agricultural conditions, competitiveness may result from the size of an agricultural holding; the specific natural conditions in possession; the opportunity to use a periodical production technology; the obtained know-how or the macroeconomic conditions in a given country, e.g. the type of practised agricultural policy towards agricultural holdings. The selection of an appropriate production technology for the possessed resources and external conditions might determine the competitive

position of a given agricultural holding. Agricultural holdings may compete with each other by generating as many profits from unit of area (which is a resultant of the obtained harvest and profits from a production unit) or by producing 1 ton of wheat with the lowest costs. The lowest production cost does not have to guarantee the highest profits from unit of area, in particular in case of low harvest, but after taking into account the area of an agricultural holding such profits may be considerable, notably in case of a large area of an agricultural holding.

The goal of this study is to present the used wheat production technologies and costs in selected agricultural holdings of main market players in the context of the natural conditions at hand and the financial result obtained owing to them. Due to such a comparison, it will be possible to indicate selected factors that determine the competitiveness of crops.

9.2. Methodology

The data used in this study come from the agri benchmark Cash Crop database. Agri benchmark is a global network of agricultural economists, counsellors and producers. The goal of the agri benchmark activities is to reliably present the used production technologies, the method of agricultural holdings' organisation, the framework conditions under which such agricultural holdings operate and prospects for their development. Since authentic information was obtained from agricultural holdings, it is possible to compare the cultivation costs and the obtained financial result for the production of a specific plant that is grown in various parts of the world. By means of these data, we can, for instance, compare the wheat cultivation technology in various regions of the world. In its benchmarking data, agri benchmark uses the data coming from *Typical Farms*. A Typical Farm is an existing farm or a data set describing a farm, in a specific region which represents a major share of output for the product considered, running the prevailing production system for the product considered, reflecting the prevailing combination of enterprises as well as land and capital resources, as well as the prevailing type of labour organisation.

Agricultural holdings belonging to the above-mentioned group of world's main wheat exporters, i.e. The United States, Canada, Argentina, Australia, the European Union, Russia, Ukraine and Kazakhstan were chosen for analysis from the agri benchmark Cash Crop database. The list of agricultural holdings presented in the study is shown in Table 1. That table demonstrates the characteristics of agricultural holdings in terms of the country they belong to, the size, the used cultivation system and the amount of precipitation in such agricultural holdings. The size of agricultural holdings ranged from 150 to 20,000 ha. These agricultural holdings used three different cultivation systems, ranging from the traditional cultivation system through simplified tillage to direct seeding. The amount of precipitation oscillated between 300 and 950 mm. Agricultural hold-

ings marked with an asterisk in the table include leading farms in a given region in terms of size and organisation.

The agricultural holdings presented in Table 1 were compared in terms of obtained wheat harvest, incurred costs and revenues and profits obtained from 1 hectare of cultivated land. The wheat cultivation costs include:

- Direct costs, including the cost of seeds, fertilisation, crop protection products and other direct costs, e.g. the cost of drying, irrigation, crop insurance,
- Running cost, among which own labour costs[45], costs of hired labour, services, mechanisation costs[46] and diesel fuel were differentiated,
- Land cost[47]; it is included in the calculations to show the full cost, however, in certain regions, it is distorted to a great extent since various types of production subsidies are used, therefore, when specifying the obtained profits of an agricultural holding, total costs and costs reduced by land cost were taken into account.

The obtained revenue is presented as gross revenue that comprises the sales plus the decoupled production subsidies, if any. In addition, gross revenue enhanced by production-linked payments is presented in the case of the EU agricultural holdings. The profits obtained by agricultural holdings represented the difference between the gross revenue and the incurred costs. The cost level and obtained financial result is presented in USD ($). For the purposes of in-depth analysis of the used cultivation technology, in particular in the context of increasing energy prices, agricultural holdings were compared in terms of energy costs incurred per 1 ha of wheat crops. Energy costs included: the costs of diesel fuel used by machinery utilised for work, the cost of drying and cost of nitrogen fertiliser. Because the agricultural holdings in question differed largely in terms of production intensity and the quantity of obtained harvest, additionally an analytical profile was presented to show the level of costs per 1 ton of wheat. The data presented in the study for most agricultural holdings represent an average for three years: 2008-2010. On the other hand, for agricultural holdings AU4000, AU4500, KZ5386, RU20000, it is an average for: 2009-2010, and for agricultural holdings RU10000, UA2500, US810, it is an average for: 2008-2009.

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[45] Costs of own labour – they are estimated on the basis of alternative costs for own labour (how much a farmer could earn if they worked outside their farm).
[46] Mechanisation costs – they represent depreciation write-offs, repair costs and interest on the contributed capital.
[47] Land cost – it represents the sum of the current tenancy rent paid for the leased land and/or alternative costs for own land (alternative cost for own land is calculated on the basis of the tenancy rent rate in a given cultivation region).

Table 1. Characteristics of agricultural holdings in question

No.	Farm symbol	Country	Area in ha	Cultivation system	Precipitation
1	AR330	Argentina	330	Direct seeding	900
2	AR700	Argentina	700	Direct seeding	950
3	AR900	Argentina	900	Direct seeding	900
4	AU4000*	Australia	4000	Direct seeding	320
5	AU4500*	Australia	4500	Direct seeding	516
6	CA1700	Canada	1700	Direct seeding	400
7	CA6000	Canada	6000	Direct seeding	400
8	KZ16000	Kazakhstan	16000	Direct seeding	300
9	KZ5386	Kazakhstan	5386	Preserving tillage, seeding in mulch	N/A
10	RU10000	Russia	10000	Preserving tillage, seeding in mulch	500
11	RU20000	Russia	20000	Preserving tillage, seeding in mulch	N/A
12	RU7000*	Russia	7000	Preserving tillage, seeding in mulch	500
13	UA2500*	Ukraine	2500	Preserving tillage, seeding in mulch	450
14	UA2600	Ukraine	2600	Preserving tillage, seeding in mulch	580
15	UA6700*	Ukraine	6700	Traditional cultivation	560
16	US810*	USA	810	Preserving tillage, seeding in mulch	380
17	US900	USA	900	Preserving tillage, seeding in mulch	510
18	BG4040	Bulgaria	4040	Preserving tillage, seeding in mulch	670
19	CZ1200*	Czech Rep.	1200	Traditional cultivation	450
20	CZ4000*	Czech Rep.	4000	Traditional cultivation	575
21	DE1300*	Germany	1300	Preserving tillage, seeding in mulch	700
22	DE240	Germany	240	Traditional cultivation	800
23	DE360*	Germany	360	Traditional cultivation	850
24	DE370*	Germany	370	Traditional cultivation	N/A
25	DK1300	Denmark	1300	Traditional cultivation	710
26	DK605	Denmark	605	Traditional cultivation	710
27	FR150*	France	150	Traditional cultivation	660
28	FR230*	France	230	Traditional cultivation	800
29	HU1100	Hungary	1100	Traditional cultivation	650
30	IT240*	Italy	240	Traditional cultivation	570
31	PL2000*	Poland	2000	Preserving tillage, seeding in mulch	550
32	RO640*	Romania	640	Preserving tillage, seeding in mulch	450
33	SE440	Sweden	440	Traditional cultivation	650
34	SE570	Sweden	570	Traditional cultivation	650
35	UK255	GB	255	Direct seeding	600
36	UK800	GB	800	Direct seeding	600

Source: Author's own compilation based on agri benchmark Cash Crop 2011.

For the needs of transparency of the presented data, the analysis was made with a breakdown into two groups of agricultural holdings. First, agricultural holdings from outside the European Union were discussed and, subsequently, the agricultural holdings from the European Union.

9.3 Agricultural holdings from outside the European Union

9.3. a) Wheat harvest

Figure 1. Average wheat harvest in 2008-2010* obtained in selected agricultural holdings from outside the European Union in t/ha
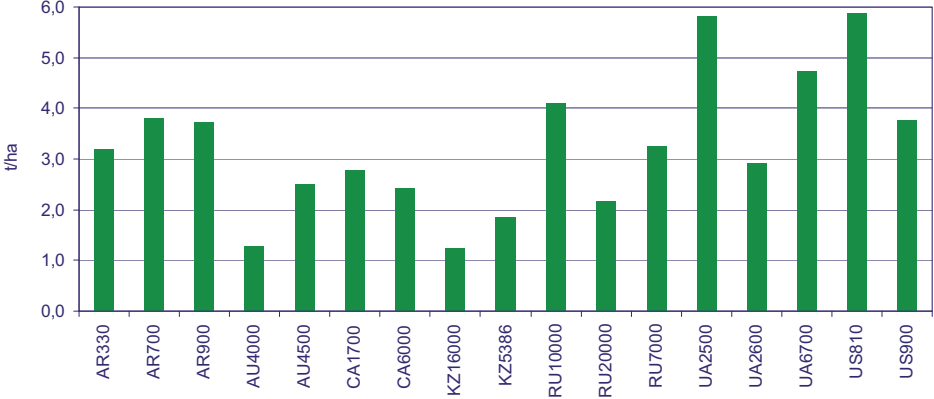
* For agricultural holdings AU4000, AU4500, KZ5386, RU20000, it is an average for 2009-2010 and for agricultural holdings RU10000, UA2500, US810, it is an average for 2008-2009.
Source: Author's own compilation based on agri benchmark Cash Crop 2011.

Wheat harvest obtained by individual agricultural holdings from outside the European Union were very diverse. It ranged from 1.2 t/ha (in Australia, Kazakhstan) to nearly 6 t/ha (Ukraine, the United States), so there were nearly five-fold differences in terms of wheat harvest level in the agricultural holdings in question (Figure 1).

9.3. b) Direct costs

Figure 2 presents the development of particular direct costs in wheat production in the discussed agricultural holdings. The cost of seeds is a resultant of two components: the amount of seeding and price of seeds. There were significant discrepancies between agricultural holdings that resulted from the amount of seeding (ranging from 60 kg /ha to 260 kg/ha) and the price of such seeds (ranging from USD 11 per dt to USD 50 per dt). The cost of seeds for the agricultural holdings presented in Figure 2 oscillated from 11 $/ha (KZ5386) to 80 $/ha (RU10000).

When analysing the fertilization level, one can conclude that all agricultural holdings used nitrogen, yet on a varying scale. The highest level of nitrogen fertilisation took place in the US810 agricultural holding and amounted to 140 kg N/ha, while the lowest was in the agricultural holdings from Kazakhstan and amounted to 17-18 kg N/ha. It should be pointed out that agricultural holdings from the Black Sea region had the cheapest nitrogen from among the agricultural holdings in question (with the cost per 1 kg of N below USD 0.8). Phosphorus fertilisation was used in most agricultural holdings apart from the ones from Kazakhstan and Russia. Phosphorus fertilisation ranged from 6-60 kg/ha. Potassium fertilisation was utilised clearly least frequently. It was used only in Ukrainian agricultural holdings and in two Russian ones (RU10000, RU20000) and in one Australian (AU4000). The span of potassium fertilisation ranged from 5 to 80 kg/ha. No agricultural holding in question used lime as a fertiliser. The total nitrogen, phosphorus and potassium fertilisation level in the agricultural holdings in question ranged from 17 to 280 kg/ha, and the total costs ranged from 10 to 280 $/ha. The highest level of mineral fertilisation was in the agricultural holding UA2500 and it equalled 280 kg/ha whereas the lowest one was noted in the agricultural holdings from Kazakhstan at the level of 17 kg/ha. The highest fertilisation cost fell for the agricultural holding US810 at 280 $/ha and the lowest for the agricultural holding KZ16000 at 10 $/ha.

Figure 2. Average direct costs in 2008-2010* incurred in wheat production in selected agricultural holdings from outside the European Union in $/ha

* For agricultural holdings AU4000, AU4500, KZ5386, RU20000, it is an average for 2009--2010, and for agricultural holdings RU10000, UA2500, US810, it is an average for 2008--2009.

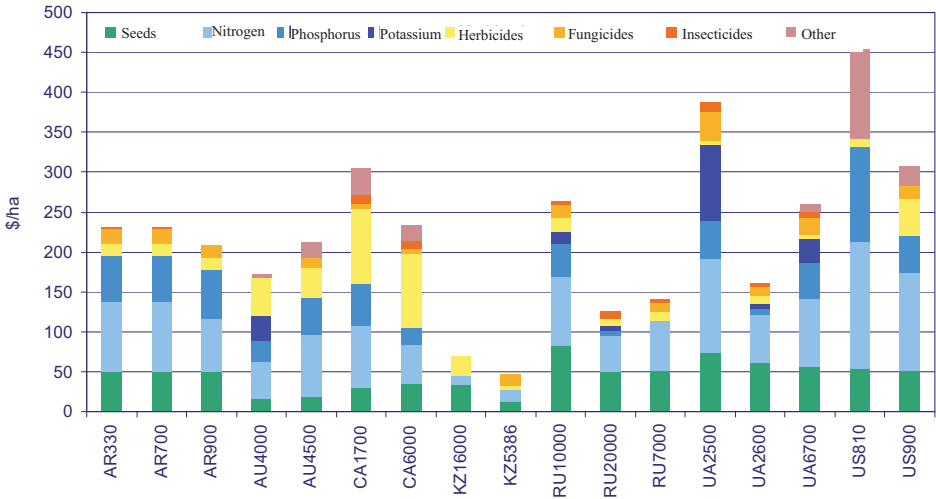*Source: Author's own compilation based on agri benchmark Cash Crop 2011.*

The crop protection costs in the agricultural holdings in question oscillated from 11 to 110 $/ha. The highest crop protection level was used in Canadian

agricultural holdings at approximately 110 $/ha, and it resulted first of all from high herbicide costs – over 90 $/ha. The lowest crop protection costs (approximately 10 $/ha) were recorded in the agricultural holding US810. The outlays for crop protection products were predominated by expenditure on herbicides in most of the presented agricultural holdings. The second rank was occupied by fungicides while the expenditure on insecticides had the lowest share.

The highest other direct costs took place in the agricultural holding US810, and they resulted from high cost of insurance at the level of approximately 70 $/ha and irrigation costs amounting approximately to 40 $/ha. The total direct costs in the agricultural holdings in question from outside the European Union ranged from 50 $/ha (KZ5386) to 470 $/ha (US810).

9.3. c) Operating costs

Individual operations in an agricultural holding can be carried out by means of own labour or machinery or by means of hired labour used to operate one's own machinery or when using services. As can be seen in Figure 3, there might be various combinations of such options.

Figure 3. Average operating costs in 2008-2010* incurred in wheat production in selected agricultural holdings from outside the European Union in $/ha
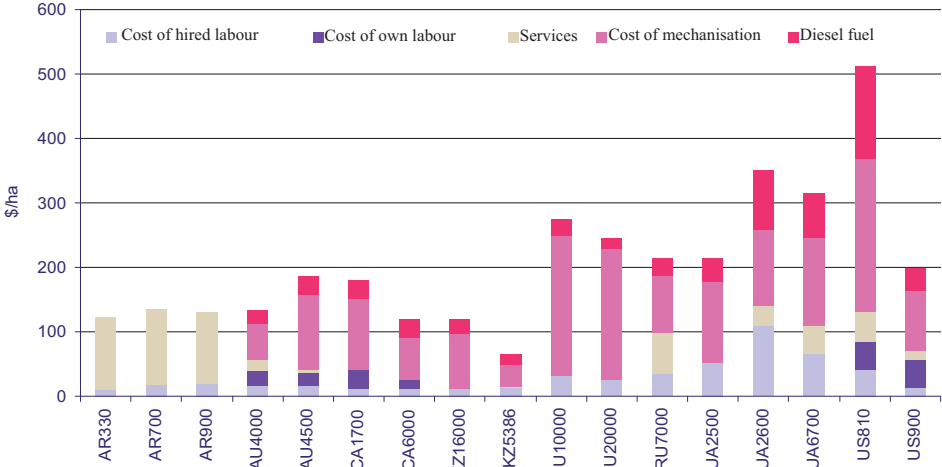
* For agricultural holdings AU4000, AU4500, KZ5386, RU20000, it is an average for 2009-2010, and for agricultural holdings RU10000, UA2500, US810, it is an average for 2008-2009.
Source: Author's own compilation based on agri benchmark Cash Crop 2011.

Works in Argentinian agricultural holdings were carried out mainly on the basis of services. Services were also used by agricultural holdings in the United States, two agricultural holdings from Ukraine (UA2600, UA6700) and one

from Russia (RU7000). The mechanisation costs represented the highest share in the operating cost structure (apart from agricultural holdings from Argentina, where services prevailed). The highest mechanisation costs fell for the agricultural holding US810 at the level of 240 $/ha and the lowest for the agricultural holding KZ5386 at the level of 34 $/ha. On the other hand, the highest labour costs were in Ukrainian agricultural holdings, notably in the agricultural holding UA2600 at the level of 110 $/ha (they resulted from high outlays per hour per ha) and the lowest in agricultural holdings from Kazakhstan at 11-13 $/ha. The cost of diesel fuel amounted to 16-134 $/ha. The highest costs fell for the agricultural holding US810 and the lowest for KZ5386. The total operating cost in the agricultural holdings presented in Figure 3 oscillated from 64 $/ha (KZ5386) to 517 $/ha (US810).

9.3. d) Energy costs

The lowest energy costs below 50 $/ha in wheat production were incurred by agricultural holdings from Kazakhstan (Fig. 4).

Figure 4. Average energy costs in 2008-2010* incurred in wheat production in selected agricultural holdings from outside the European Union in $/ha

* For agricultural holdings AU4000, AU4500, KZ5386, RU20000, it is an average for 2009-2010, and for agricultural holdings RU10000, UA2500, US810, it is an average for 2008-2009.
Source: Author's own compilation based on agri benchmark Cash Crop 2011.

Relatively low energy costs were also to be found in agricultural holdings from Argentina, Australia, Canada and Russia, with the costs in those agricultural holdings amounting to 70-120 $/ha. Another group, with costs reaching approximately 170 $/ha, was formed by agricultural holdings from Ukraine and the United States, apart from the agricultural holding US810, which had the

highest energy costs, which exceeded 300 \$/ha. As mentioned in the methodology, energy costs include the cost of diesel fuel used by machinery utilised for work, the cost of drying and the cost of nitrogen fertilisers. The lowest energy costs in agricultural holdings in Kazakhstan arise from extensive soil cultivation, low nitrogen fertilisation level and low nitrogen price. The lowest energy costs were recorded in the agricultural holding SU810, and they arise from more intensive soil cultivation, utilisation of irrigation and high doses of relatively expensive nitrogen fertilisers.

9.3. e) Gross revenue

Figure 5 presents the development of gross revenue in comparison with direct, operating and land costs. Apart from the two previously described cost items, also the land cost might have an impact on the competitiveness level. The highest land costs in the group of agricultural holdings in question were recorded in Argentinian agricultural holdings (AR330 – 308 \$/ha, AR700 – 180 \$/ha, AR900 – 205 \$/ha) and the agricultural holdings in the United States (US900 – 150 \$/ha, US810 – 320 \$/ha). On the other hand, the lowest land costs were featured by agricultural holdings from Kazakhstan (KZ5386 – 12 \$/ha, KZ16000 – 13 \$/ha).

The gross revenue obtained in agricultural holdings was a resultant of the achieved wheat harvest and its prices and other decoupled production subsidies received by agricultural holdings. The lowest gross revenue level achieved in agricultural holdings amounted to approximately 200 \$/ha and was recorded in both agricultural holdings from Kazakhstan, in one agricultural holding from Australia (AU4000) and in one agricultural holding from Russia (RU20000). The highest gross revenue at approximately 1,100 \$/ha was obtained by an agricultural holding from the United States (US8100). A relatively high gross revenue level at 820-850 \$/ha was achieved by the other agricultural holding from the United States and one agricultural holding from Ukraine (UA2500). In case of other agricultural holdings, the gross revenue level ranged from 400 to 600 \$/ha.

When taking into account all the discussed costs, then gross revenue in eight agricultural holdings from outside the European Union (AU4500, CA6000, KZ16000, KZ5386, RU7000, UA2500, A6700, US900) covered the total costs. The highest profits at approximately 200 \$/ha were achieved by an agricultural holding from Ukraine (UA2500). With land cost excluded, then only in the case of four agricultural holdings (AU4000, RU10000, RU20000, UA2600), the gross revenue would not cover the direct and operating costs. The highest profits amounting to over 320 \$/ha with land cost excluded were achieved by an agricultural holding from the United States (US900).

Figure 5. Average costs and gross revenues in 2008-2010* incurred/obtained in wheat production in selected agricultural holdings from outside the European Union in $/ha
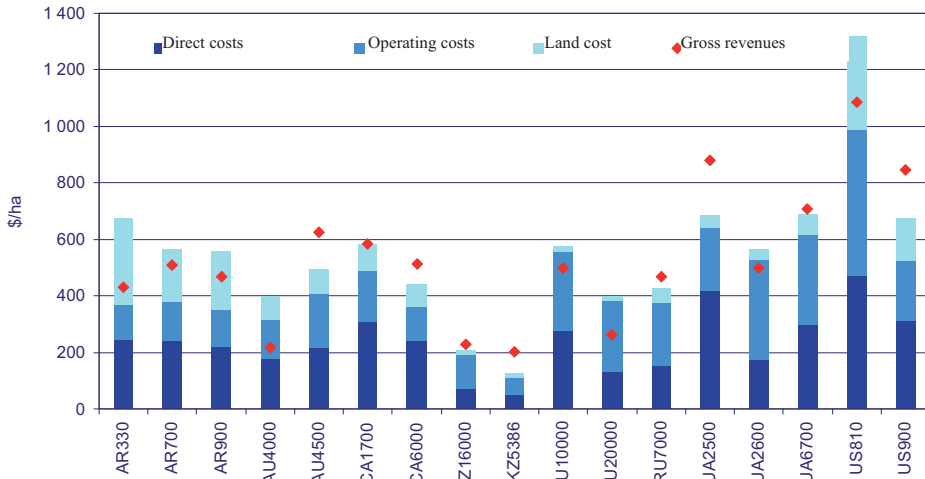
* For agricultural holdings AU4000, AU4500, KZ5386, RU20000, it is an average for 2009-2010, and for agricultural holdings RU10000, UA2500, US810, it is an average for 2008-2009.
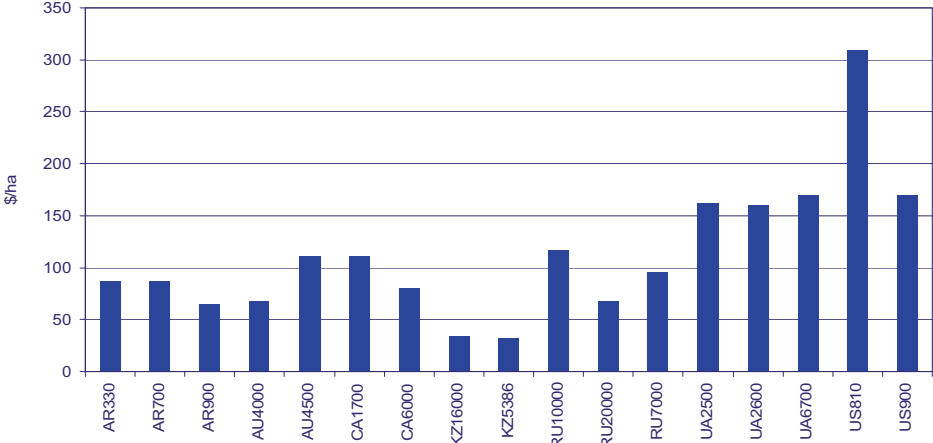*Source: Author's own compilation based on agri benchmark Cash Crop 2011.*

9.3. f) Cost of producing 1 ton of wheat

Figure 6 presents the level of costs per 1 ton of obtained harvest. Two calculations were presented, and one of them determines the level of all costs discussed in this study per 1 ton of the achieved harvest while the other variant does not include the land cost. The lowest costs of producing 1 ton of wheat for both calculation variants was recorded in one of the agricultural holdings from Kazakhstan (KZ5386) with cost below 70 $/t. Cost of producing 1 ton of wheat was very disadvantageous in one of the agricultural holdings in Australia (AU4000). The total cost of producing 1 ton of wheat in that agricultural holding exceeded 300 $/t or 250 $/t exclusive of land costs.

Figure 6. Average cost of producing 1 ton of wheat in 2008-2010* in selected
agricultural holdings from outside the European Union in $/t

* For agricultural holdings AU4000, AU4500, KZ5386, RU20000, it is an average for
2009-2010, and for agricultural holdings RU10000, UA2500, US810, it is an average for
2008-2009.
Source: Author's own compilation based on agri benchmark Cash Crop 2011.

9.4. Agricultural holdings from the European Union

9.4. a) Wheat harvest

On the basis of the obtained wheat harvest level, we can divide the agricultural holdings from the European Union Member States into three groups. The first group includes agricultural holdings with harvest level at approximately 5 t/ha (BG4040, CZ1200, CZ4000, HU1100, RO640). The second group includes agricultural holdings with harvest at approximately 7 t/ha (IT240, PL2000, SE445, SE570). The third group includes agricultural holdings with harvest at 8 t/ha and more, and it covered all German, Danish, French and English agricultural holdings.

Figure 7. Average wheat harvest in 2008-2010 obtained in selected agricultural holdings from the European Union in t/ha
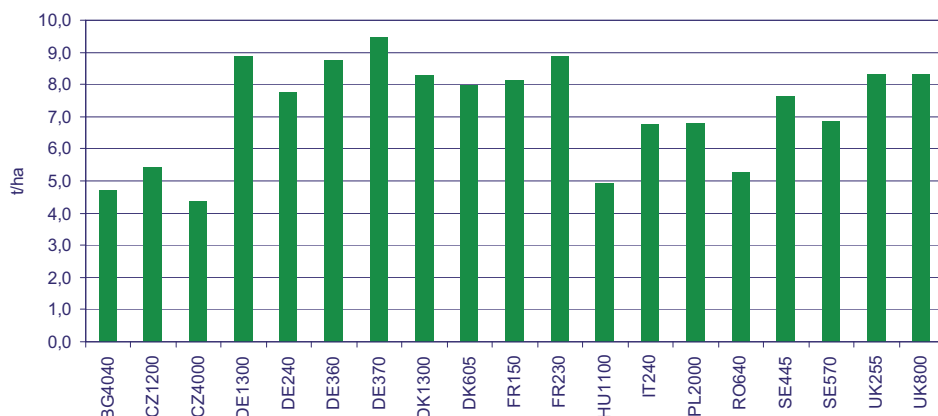
9.4. b) Direct costs

The level of direct costs incurred per one hectare of wheat crops in the discussed agricultural holdings from the European Union is presented in Figure 8. The cost of seeds in most agricultural holdings amounted to approximately 100 $/ha with the exception of the Polish and the Hungarian agricultural holding, where the seeding material cost was around 50 $/ha. The quantity of the sowed seeding material ranged from approximately 100 kg/ha (a French agricultural holding) to over 250 kg/ha (the Bulgarian and the Hungarian agricultural holding).

The fertilisation cost in the EU agricultural holdings in question were within a very broad scope from 100 $/ha (DE240) to 450 $/ha (DE360). The total quantity of utilised nutrients ranged from 120 kg/ha (CZ1200) to over 330 kg/ha (DE360). Nitrogen fertilisation cost had the largest share in the fertilisation costs. The nitrogen fertilisation cost was within the range from 95 $/ha (DE240) to 250 $/ha (SE570) whereas the level of nitrogen doses ranged from 85 kg N/ha (RO640) to 250 kg N/ha (DE370). The cost of 1 kg of nitrogen oscillated from 0.65 $ (DE240) to 1.5 $ (SE570). The P and K fertilisation level was within the same range, i.e. from 0 kg to 85 kg of a given nutrient per 1 hectare. Lime was used only by the Polish agricultural holding.

The cost of utilised crop protection products ranged from 25 $/ha (SW570) to 300 $/ha (DE370). The group of agricultural holdings with the lowest costs of crop protection products included agricultural holdings from Romania, Bulgaria, as well as one agricultural holding from Czech Republic (CZ4000) and one from Sweden (SE570), with the level of costs in those agricultural holdings below 60 $/ha.

Figure 8. Average direct costs in 2008-2010 incurred in wheat production in selected agricultural holdings from the European Union in $/ha

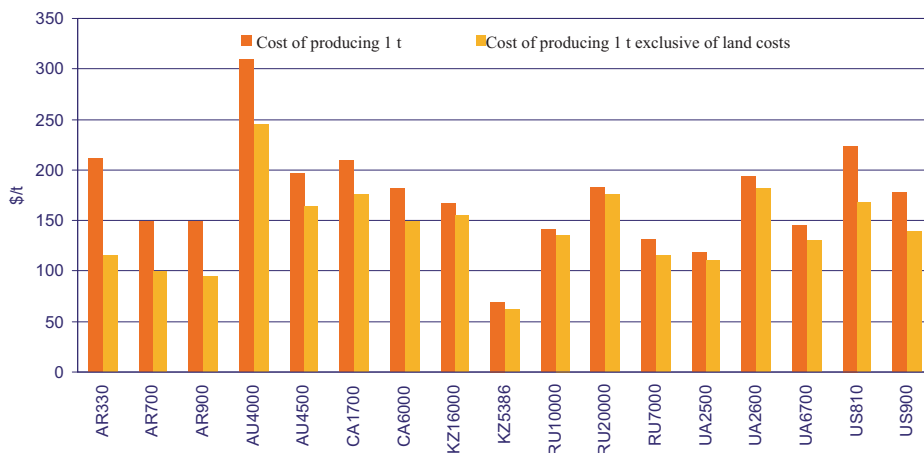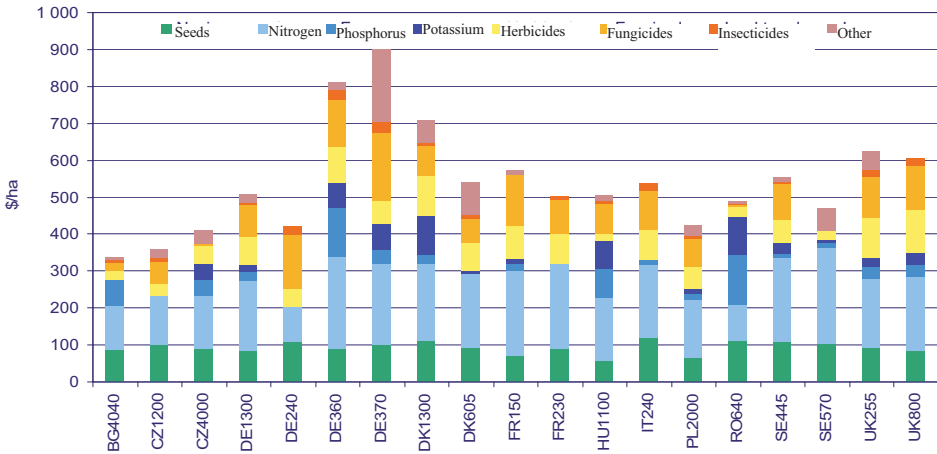*Source: Author's own compilation based on agri benchmark Cash Crop 2011.*

On the other hand, the highest costs of crop protection products at around 200 $/ha were recorded in agricultural holdings from Germany, France, Denmark, Great Britain, Italy and one agricultural holding from Sweden (SE445). In most EU agricultural holdings, the fungicide costs exceeded the costs of herbicides. Insecticides had the lowest share in the costs of crop protection products. The highest other direct costs at 200 $/ha were in the agricultural holding DE370, and they resulted from the use of irrigation. The total direct costs in the agricultural holdings in question from the European Union ranged from 320 $/ha (BG4040) to 900 $/ha (DE370).

9.4. c) Operating costs

When analysing the operating costs, one can notice that, just like in case of agricultural holdings from outside the European Union, the highest costs in most EU agricultural holdings involved the costs of mechanisations (Figure 9). They were within the range from 85 $/ha (RO640) to 510 $/ha (DE370). All agricultural holdings used hired labour to a smaller or greater degree. The highest labour costs were in French agricultural holdings with approximately 400 $/ha, and the lowest labour costs were in the Romanian agricultural holding below 40 $/ha. Relatively low labour costs at about 100 $/ha were also present in the Hungarian, Bulgarian, Polish and one of the Czech agricultural holdings (CZ4000). Some agricultural holdings, in particular two German ones (DE240 and DE360) and one from Great Britain (UK255) used services to a relatively large extent, which contributed to relatively low labour costs when compared to other agricultural holdings from those countries. The cost of diesel fuel ranged from 65 $/ha (DK605) to 120 $/ha (DE370).

Figure 9. Average operating costs in 2008-2010 incurred in wheat production in selected agricultural holdings from the European Union in $/ha
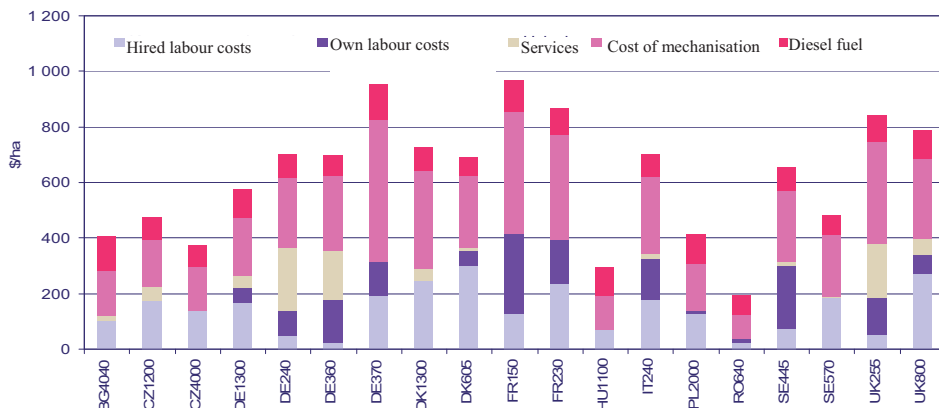
The highest operating costs in the EU agricultural holdings in question at nearly 1,000 $/ha were in one of the German agricultural holdings (DE370) and one of the French agricultural holdings (FR150) while the lowest, below 200 $/ha, in the Romanian agricultural holding (RO640).

9.4. d) Energy costs

The energy costs in the discussed agricultural holdings from the European Union ranged from 250 $/ha to 350 $/ha (Figure 10). This level was lower in agricultural holdings DE240 and RO640 and amounted to 170-180 $/ha. This cost resulted from reduced quantity of consumption of N per ha. On the other hand, in the agricultural holding SE570, the level of such costs exceeded 400 $/ha due to utilisation of high doses of expensive nitrogen.

Figure 10. Average energy costs in 2008-2010 incurred in wheat production in selected agricultural holdings from the European Union in $/ha
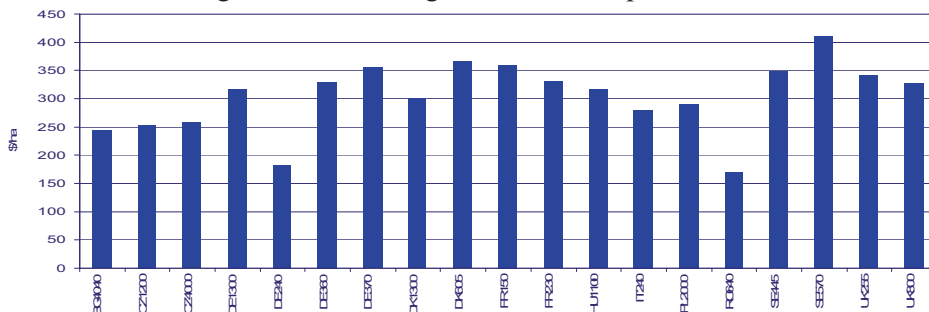
9.4. e) Gross revenue

Figure 11 presents the development of gross revenue and gross revenue with production-linked payments in comparison with direct, operating and land costs. The level of direct costs and operating costs is described in Figures 8 and 9. As it comes to the land cost in the agricultural holdings from the European Union, they were highly differentiated. The highest land costs were in Danish agricultural holdings at approximately 880 $/ha and the lowest at 65 $/ha were in one of the Czech agricultural holdings (CZ4000). A relatively high land cost at 500-800 $/ha was also recorded in German agricultural holdings as well as in the Italian agricultural holding and in one of the Swedish agricultural holdings (SE445). The land cost in other agricultural holdings ranged from 100 to 300 $/ha.

Figure 11. Average costs and gross revenues in 2008-2010 incurred/obtained in wheat production in selected agricultural holdings from the European Union in $/ha
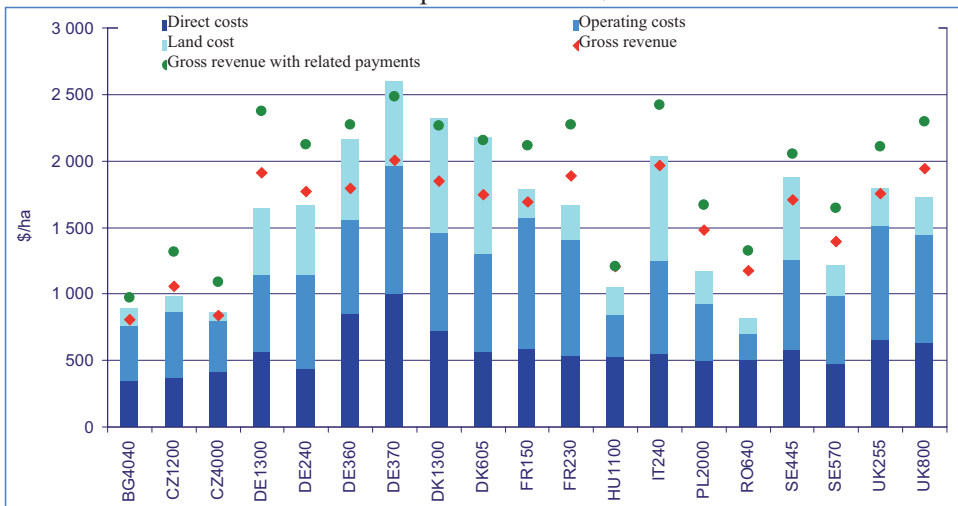
Source: Author's own compilation based on agri benchmark Cash Crop 2011.

Gross revenue obtained in EU agricultural holdings mainly reflects the level of harvest obtained in such agricultural holdings. The lowest gross revenue between 800 and 1,200 $/ha was achieved by agricultural holdings from Bulgaria, Czech Republic, Hungary and Romania. Other agricultural holdings, excluding the Polish one, whose gross revenue amounted to 1,500 $/ha, obtained gross revenue ranging from 1,700 to 2,000 $/ha. Given all the costs in question, only in nine agricultural holdings (CZ1200, DE1300, DE240, FR230, HU1100, PL2000, RO640, SE570, UK800), gross revenue covered the total costs. When taking into account the production-linked payments, gross revenue plus production-linked payments was not sufficient to cover the costs in question due to

high land cost only in case of three agricultural holdings (DE370, DK1300, DK605). If the land cost was not taken into consideration, then gross revenue in all presented agricultural holdings would cover all costs in question.

The highest revenue level at approximately 360 $/ha exclusive of decoupled cultivation subsidies was achieved by the agricultural holding from Romania. When taking into consideration production-linked payments, then the highest revenue level at approximately 700 $/ha was achieved by the agricultural holding DE1300. If we did disregard land cost, then the highest revenue level at about 770 $/ha exclusive of decoupled cultivation subsidies would be achieved by the DE1300 agricultural holding, and with production-linked payments included, the highest profits of over 1,200 $/ha would be also achieved by the DE1300 agricultural holding.

9.4. f) Cost of producing 1 ton of wheat

With land cost excluded, we can see that the cost of producing 1 ton of wheat in most agricultural holdings amounted to approximately 150-180 $/t (Figure 12). The lowest costs below 150 $/t were in one of the German agricultural holdings (DE1300) and the Polish and Romanian agricultural holding while the highest cost, over 200 $/t, in the DE370 agricultural holding. Inclusion of land cost results in the discrepancies between the countries becoming larger. In particular in German and Danish agricultural holdings, the Italian one and in one of the Swedish agricultural holdings (SE445). High land cost prevailing in those agricultural holdings causes a considerable increase in production costs per 1 ton of obtained wheat harvest.

Figure 12. Average cost of producing 1 ton of wheat in 2008-2010 in selected agricultural holdings from the European Union in $/t
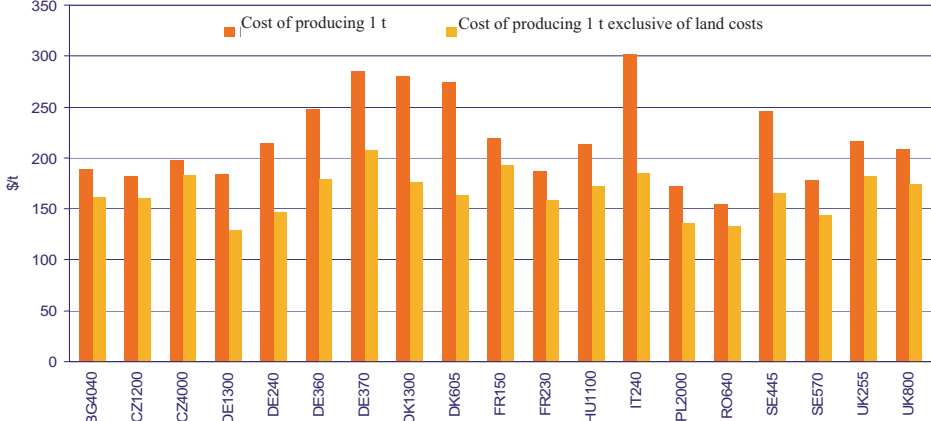
Source: Author's own compilation based on agri benchmark Cash Crop 2011.

9.5. Discussion

The analysis of agricultural holdings was characterised by high differentiation as far as the level of obtained harvest is concerned. Wheat harvest in the EU agricultural holdings ranged from 4.5 to 9 t/ha, and in the other discussed agricultural holdings from 1.2 to 6 t/ha. Such high a differentiation of harvest resulted from the used technology and from the natural conditions at hand.

Like in the case of obtained harvest, there were major differences among the analysed agricultural holdings in the level of outlays made. The least intense technology from among all analysed agricultural holdings was used by the agricultural holdings from Kazakhstan, where the total level of all costs amounted to 100-200 $/ha. The highest level of all analysed costs was registered in one of the German agricultural holdings (DE370), and it amounted to approximately 2,700 $/ha. When analysing the applied production technology in the presented agricultural holdings in more detail, it can be concluded that:

- In case of direct production costs:
  - ➢ The seeding material cost in the EU agricultural holdings was on average twice as high as such cost in other agricultural holdings in question;
  - ➢ The fertilisation costs in all agricultural holdings in question was predominantly the cost of nitrogen fertilisation;
  - ➢ There was high differentiation of nitrogen prices, both in the area of the EU agricultural holdings (0.7-1.5 $/kg of N) and in the area of other agricultural holdings in question (0.6-1.3 $/kg of N);
  - ➢ The EU agricultural holdings featured higher consumption of crop protection products.
- Among the operating costs, it should be pointed out that:
  - ➢ The cost of mechanisation in all discussed agricultural holdings was relatively high (apart from agricultural holdings from Argentina, which used services);
  - ➢ Most of the EU agricultural holdings (apart from the agricultural holding from Hungary and Romania) had higher labour costs, which generally resulted from higher work time load per unit of area (smaller agricultural holdings, more operations) and higher rates per hour.
- Energy costs were clearly higher in most of the EU agricultural holdings, and they resulted mainly from higher doses of nitrogen fertilisation.
- There were large differences between land costs both in the area of the EU agricultural holdings and the group of other agricultural holdings under analysis:
  - ➢ The highest land cost among the EU agricultural holdings was in the German, Danish and Italian agricultural holdings while the lowest land cost was in Czech, Hungarian and Romanian agricultural holdings;

➢ In the group of agricultural holdings from outside the European Union, the highest land cost was noted in Argentinian agricultural holdings and the ones from the United States whereas the lowest in the agricultural holdings from Kazakhstan.

The level of obtained gross revenue was also very diverse. The lowest obtained gross revenue level amounting to approximately 200 $/ha was achieved in agricultural holdings from Kazakhstan and in one agricultural holding from Australia (AU4000). The highest gross revenues amounting to about 2,000 $/ha were achieved in the following agricultural holdings: DE370, IT240 and UK800.

The level of profits obtained by the presented agricultural holdings was subject to major changes depending on whether land cost and cultivation-related subsidies were taken into account. When all analysed costs and gross revenue exclusive of production-linked payments were taken into consideration, then the highest profits amounting to 340 $/ha were achieved by the agricultural holding in Romania. With land costs excluded, the highest profits amounting to 770 $/ha were obtained by the DE1300 agricultural holding. With production-linked payments included and when taking into account all analysed costs, the highest profits amounting to 700 $/ha were achieved by the DE1300 agricultural holding. Also that agricultural holding obtained the highest profits amounting to 1,200 $/ha when land costs were not included.

The lowest costs of producing 1 ton of wheat both for all analysed costs and with land cost excluded were incurred by one of the agricultural holdings from Kazakhstan (KZ5386) with cost below 70 $/t. On the other hand, the highest production costs for both analysed variants were incurred in one of the Australian agricultural holdings (AU4000). The total cost of producing 1 ton of wheat in that agricultural holding exceeded 300 $/t, or 250 $/t exclusive of land costs.

The financial results achieved by individual agricultural holdings in question demonstrate that positive financial result can be obtained when using different cultivation technologies under various conditions. However, the use of extensive or intensive technology does not guarantee a positive financial result. The presentation of costs per unit of area shows that high harvest does not guarantee low costs per unit of harvest. Despite relatively higher harvest obtained in the EU agricultural holdings, the production costs per 1 ton of wheat are higher than the production costs in most other discussed countries from outside the European Union with relatively low harvest. High harvest does not have to guarantee a positive financial result at all.

Two extreme management types can be differentiated on the basis of the presented group of agricultural holdings. Some of them, through making the production more extensive, generated relatively low costs of producing 1 ton of wheat, e.g. the agricultural holdings in Kazakhstan. Other agricultural holdings intensify the production, in an attempt to generate possibly highest revenues from unit of area, for example the agricultural holding from Germany – DE360.

The former solution is used most frequently in the agricultural holdings in which there is a high natural risk of production due to disadvantageous climate and soil conditions. Of course, by means of certain production outlays (cultivation method, selection of varieties, fertilisation, protection or irrigation), the production risk can be limited to a certain degree, but only to a certain degree, especially in case of increasing weather anomalies. Extensive production features lower relation of capital outlays to Earth's resources, which may lead to incomplete exploitation of the production potential in such agricultural holdings. However, such a production method does not necessarily have to be negative if it is a conscious choice instead of compulsion arising from lack of capital and/or managing skills. This way of management keeps production costs at a low level, and hence the market risk[48] arising from high variability of prices of agricultural raw materials is reduced. In case of the latter solution, that is increased intensification of production, we can use the possessed resources in a better way and improve the efficiency of factors of production. However, increased intensification of production often leads to increased costs per unit of area, which can be covered only by a sufficient harvest level. Sometimes it happens that very high obtained harvest is not sufficient to cover the entire cost of production, as was the case in the DE360 agricultural holding.

The level of used expenditure depends on the producer, and it is them who have impact on their level. Therefore, the level of used expenditure should be adjusted to the production risk and the market risk. Production intensity should correspond to the opportunities available to achieve a given harvest level. Two agricultural holdings should be quoted as an example. UA2500 is one of them, and despite relatively intensive technology, it obtains profits amounting to 200 $/ha and 240 $/ha with land cost excluded. AU4000 is another such an agricultural holding, and despite relatively low outlays, it incurs a loss of 180 $/ha, or 100 $/ha with land costs excluded.

When analysing individual factors that decide the competitiveness of agricultural holdings' production, it can be concluded that in case of the EU agricultural holdings, competitiveness is clearly improved by the EU subsidies while it is reduced by high land costs, notably in German, Danish and Italian agricultural holdings. The EU agricultural holdings are negatively affected by high labour costs, and the threat to competitiveness is represented by high energy consumption costs in case of further increase in energy prices. Therefore, one should contemplate the intensity of soil cultivation and the necessity to carry out certain operations during wheat production. Because nitrogen fertilisation has a high share in energy costs, one should also analyse the effectiveness of utilising nitrogen and search for other sources of nitrogen at the same time, e.g.

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[48] In addition, one can protect themselves against market risk by purchasing hedging contracts on the stock exchange.

by introducing papilionaceous plants into the crop rotation. High cost of seeding material and crop protection costs also do not weigh in favour of the EU agricultural holdings. The simplest solution to reduce the cost of seeding material is to decrease the norm of seeding. Many agricultural holdings used relatively high norms of seeding. In case of crop protection costs, one should analyse the economic damage threshold more thoroughly. An attempt can be made to reduce high cost of mechanisation by detailed planning of investments in equipment. Another solution to reduce high cost of mechanisation might be to use services, provided that a market of services actually exists.

Some EU agricultural holdings that achieve a positive financial result may find it difficult anyway to compete with other analysed agricultural holdings from outside the EU due to the size of agricultural holdings. The level of profits obtained from 1 ha or 1 ton of product may be comparable in agricultural holdings. However, due to significant discrepancies in the area of agricultural holdings, the total profits per agricultural holding will be different to a great extent. Two agricultural holdings can be given as an example: one from France (FR150) and one from Kazakhstan (KZ5386). Both of these agricultural holdings obtained profits from 1 ton of wheat crops at the same level of USD 40 (exclusive of land costs), but all the profits for a 150 ha agricultural holding in France even with harvest amounting to 8 tons are something different than the profits obtained by a 5,000 ha agricultural holding in Kazakhstan with a harvest of 1.8 t/ha. Therefore, it appears that the only solution from among the main ones that are aimed at achieving a specific level of profits in an agricultural holding in the face of increasing competition and reduced opportunities to improve cost-effectiveness of production that arise from increase in prices of productive assets is to increase the area of an agricultural holding.

The ultimate evaluation of competitiveness of the utilised technology should also take into account the calculation method, i.e. what cost items are taken into consideration. A farmer is not able to impact certain cost items, and they are differentiated to a great extent by external conditions present in a given region or country, e.g. land cost, which largely reduced the achieved financial result in case of certain agricultural holdings.

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Assos. Prof. Rumen Popov, Assos. Prof. Plamena Yovchevska
Institute of Agricultural Economics, Sofia, Bulgaria

10. Priorities of Bulgarian agriculture as a factor for competitiveness of agri-food sector

10.1. Introduction

The main purpose of the CAP is to prerequisite the functioning of a single, internal for the EU agricultural goods market by common rules of production, support and common standards of quality and safety of the food products, environmental preservation and enhanced animal welfare, market stabilization, tariff support, investment support and the organic farming, the rural areas development, etc. This is of course mainly sector's policy, including as well elements of regional and cohesion policies. At the same time it is a common policy for the union, resolving issues and setting regulations at this level. Obviously, important aspects of the agricultural policy remain national responsibility and priority. Naturally, they can be solved in the frame of existing rules, as far as they do not conflict the principals of the CAP and the Union's legislation in the fields of the internal market, the state support, etc.

After the year 2000, the efforts of the sector's policy were steered toward the preparation of agriculture for the application of CAP, including legislation harmonization. After Bulgaria's accession to the EU, as a priority was determined the aids' utilization of the first and the second pillar. This is explainable on one hand in terms of the political priorities and on the other, by the urgent need of financial resource for the current economic activity and modernization. The agricultural aids have their budgetary and economic limitations. They are an important part of the overall policy of establishment of a sustainable agricultural production, capable to produce a sufficient quantity of food products, with appropriate quality characteristics, preserving the natural resources at the same time. The achievement of this aim requires underpinning of the CAP with relevant policies, especially on issues of national responsibility.

The objective of the article is to outline the medium-term priorities of the Bulgarian agricultural policy based on analysis of some main indicators of the potential and level of development of Bulgarian farming, compared to the average European indexes and a SWOT analysis for identifying the most important interior (strong and weak sides) and exterior factors (abilities and threats) of the Bulgarian agriculture development.

10.2. Place of Bulgarian agricultural sector in the European agriculture – some comparative characteristics

Bulgaria disposes with 1,77% of the utilized agricultural land in the EU, and produces 1,2% of the European agricultural output for EU-27 (see annex: Table 1, Table 2). The average UAL per head of the population in 2007 in the EU was 0,348 ha. For Bulgaria this index is 0,397 ha. The correspondent values for some other countries of the EU are as follows: Belgium – 0,130; Holland – 0,117; France – 0,432; Czech Republic – 0,342. With certain convention (because of the dependence of the farming potential on other natural factors – climate, etc.) it could be esteemed that the comparatively high land provision for Europe is a comparative advantage for the country. More favorable for Bulgaria is the index of provision per person with arable land – 0,347 ha, while for Europe it is 0,211 ha. The labour productivity for Bulgarian farming in 2009 based on GVA and AWU is 3 664 €, which represents 32,79% of the EU total value (see annex: tab. 3 and 4). The livestock breeding density, expressed by animal units (AU) per ha UAA is of the lowest in the EU – only 0,4 per ha (see annex: Figure 1). The expenses for fertilizers and chemicals for plant protection in €/ha UAA are considerably lower than the average for EU-27 – respectively for fertilizers 42,4 and 58,0 (73%) and for the chemicals 37,2 and 50,7 (73%), (see annex: Table 5).

The average yields of main agricultural products are considerably lower than those of the leading agricultural countries and the average European level. The average yield of wheat is twice lower than the one in France, Belgium, Holland and Germany and 1,5 times lower than Poland [Atanasova 2011]. The average yields per ha of corn are also low – twice lower than in Spain and France.

Compared to the European average level, the Bulgarian agriculture is characterized with good provision of land and labor and low capital investments and as a result – extensive utilization of the production factors and output of products with a low GVA, with a low labour and land productivity level. In these conditions the achievement of the aim – competitive agricultural production, conserving the natural resources and providing comparable to other sectors level of incomes and employment requires clarification – establishment of sustainable production through full utilization of the farming potential of the country. Practically, this means sustainable intensification of production in which the effect exceeds the costs of its achievement.

10.3. SWOT analysis of the Bulgarian agriculture

The SWOT analysis should identify the most important internal (strengths and weaknesses) and external (possibilities and threats) factors for the achievement of the set target. Such analysis of the Bulgarian agriculture has been performed in the course of preparation of the NSPDRR 2007-2013, and by the au-

thors of „Competitive Opportunities of the Agricultural Sector" [Slavova 2011]. The present SWOT analysis is targeted toward creating a strategic concept for achieving the defined objective – organizing a sustainable production fully using the farming potential of the country. It is based on the results of the investigation of the condition of the Bulgarian agriculture and the drawn world and European trends of farming development.

Strengths and weaknesses, opportunities and threats facing Bulgarian agriculture:

Strengths	Weaknesses
• Favorable soil-climatic conditions for agriculture crops growing, typical for the temperate climate zones; • Comparative advantages in vegetable growing, some fruits, oil-bearing crops, viticulture and sheep breeding; • Relatively good provision of agricultural land, especially arable; • Low pollution in the farming areas; • Putting back in economic turnover of abandoned agricultural lands; • Rural population and communities with experience and traditions in agriculture; • Manufacturing of products with specific local features; • Proximity of seaports to important farming regions; • Established school, science and consultancy net; • Improved access to agricultural aids of CAP; • Availability of purposeful resources for restructuring.	• Low grade of utilization of the production factors (land, labor, and capital) due to technologic, management and market weaknesses; • Land property fragmentation; • Insecurity of the long-term leasing and as a result of investment abstinence; • Weak adoptability of the existing irrigation systems to the new land utilization conditions; • Polarized farm structure and lack of a significant sector of middle-sized family farms; • Difficult access to the market due to underdeveloped production and market infrastructure – stores, refrigerators, etc. • Lack of an approved by the market product range, especially processed with specific national quality properties; • Prevailing unprocessed products of a low value added in the exportation; • Technologic omissions and under-development and weak innovation transfer; • Growing older population in the rural regions;

	Weak diversification of the economic activities in agriculture;
	• Weak diversification of the economic activities in agriculture;
	• Weak link between educational preparation and realization in agriculture;
	• Underdeveloped education and knowledge dissemination systems;
	• Isolation of the producers from the markets, due to weakly developed local markets and direct sales;
	• Inability of the producers to answer the requirements of the commercial chains about quality and quantity of the products;
	• Limited investments in land improvements – land reclamation, roads, etc. and research investigations;
	• Misbalanced absorption of the means for the PDRR and a low synergistic effect;
	• Institutional insufficiency in the sector
Opportunities	Threats
• Better price conditions, emanated by the increasing demand of food products;	• Misbalanced development of agriculture, due to the uneven support of production for the different subsectors;
• Sustainable economic conditions due to the CAP application;	• Jog of the structural changes caused by the ineffective land market;
• Increasing consumer's demand of quality goods of guaranteed quality and origin;	• Loss of qualified labor because of uncompetitive payment of labor and living conditions in the rural areas;
• Extended demand of products of the organic farming;	
• Consolidation of the agricultural farms;	• Deepening of the regional differences in the level of development of the EU;
• Easier access to existing and new	

knowledge and technologies, due to the sector's integration with the European agriculture, the national research investigation development and the computing technology; • New attitude to the multifunctional role of agriculture and its functions as a supplier of social services, including such, related to the climatic changes; • Increasing significance of social understandings of values and ethics, in favor of the preservation of traditional methods of production; • New social evaluation of the significance of rural environment as a place for living, recreation and economic activity.	• Unfavorable climate changes and incapacity of the sector to face their consequences; • Absence of purposeful support for the sector's modernizing and development, requiring huge investments and long term of redemption – storage and refrigeration base, irrigation, livestock breeding, etc; • Conserving of differences in the support of production in the separate countries of the EU and the flowing from this disparity in their competitive positions; • Inability of Bulgarian agriculture and processing sector to adopt to the globalization processes; • Increasing pressure on the natural resources and loose of agricultural land.

10.4. Priority directions of the agricultural policy

The analysis of the place of the Bulgarian agriculture in the European one and the drawn SWOT profile is the base for formulating of the aim and strategy of the Bulgarian agricultural policy.

If the vision for the country's development is the growth of the population welfare and its full personal realization, then the agricultural policy aim should be the achievement of food security for the population and the increase of the welfare of farmers in the conditions of sustainable production, i.e. a competitive one, preserving the natural resources and environment. In general plan, the achievement of this aim requires full realizing the potential of Bulgarian farming and food manufacturing sector through increase of the utilization of the production factors (land, labor and capital) and the output of quality products with a high value added.

In order to take an advantage of the new possibilities related with the increased demand for food products and the integration with the European agriculture, the Bulgarian farming should use its strengths, overcoming its weaknesses and neutralize the possible threads. In a long term plan this imposes structural measures in the fields described below.

10.5. Overcoming the structural problems through consolidation of the land property and rationalizing of the land usage

At a first place, this means formation of a rational agrarian structure, i.e. farm structure allowing efficient economic activity. The starting conditions were and still remain unfavorable – after recovering the right of ownership, the land ownership structure is extremely fragmented. It is compulsory to overcome the structural problems through consolidation of the land property and rationalizing of the land usage. The experience of many other countries shows that the centralized, mainly administrative means for resolving the problem as consolidation and state companies for land trade are expensive, slow and with doubtful results. The natural solution is the establishment of a real land market. In this respect, the strengthening of the right of ownership is the most important economic prerequisite. Still more that the Bulgarian farming abounds with nobodies' property, both due to the lack of economic interest of the owners and too complicated and expensive legal procedures. Legal prerequisites are necessary for acceleration of the consideration of the delayed lawsuits for not restored ownership and not concluded voluntary partitions which cause insecurity in the land utilization and block the investments. There are no reasons for the delay of the lasting legislation of the status of land on art.19 of the Low of Management and Use of Agricultural Lands, i.e. for lands of no sought ownership, which can be rented by the Municipality Councils only for a period of one year. At a next place, the existing Cadastre and property Register of the agricultural lands should be maintained implicitly updated and accessible, which will improve the abilities of disposal of property and consequently will stimulate the land market development and the land utilization.

Besides the strengthening of property rights, Bulgarian farming needs legal guarantees for a determined stability of the land usage. The land utilization regulation should not only create possibility of formation of rationally sized farms in order to obtain scale economies, but to guarantee durable enough tenants' rights. This is a key aspect of the problem for the investments in agriculture, especially for these of a long term character.

The farm structure formation is usually a result of a long lasting historical process. The lack of agricultural land market turnover for almost half a century and the recovering of the property rights brought to a strong fragmentation of the ownership rights upon this important economic resource. In spite of these circumstances, it did not put any obstacle to the formation of huge in size farms by renting lands, belonging to multiple owners. These farms are specialized in grains and some technical crops production, the efficient functioning of which, requires availability of huge compact areas. At the same time the long term investments have a relatively small share of the costs and in their majority are comparably fast liquidity assets – machinery and inventory. Due to these particularities in these sectors the efficient agricultural activity is mainly organized on

the base of farming land renting. Besides this, generally the utilization of land in the production co-operatives does not differ from the one in the lease holdings – they have an identical economic base. Despite all said, the significance of the security of the land using should not be depreciated for these sectors, the opposite – it will grow up in the future.

At the first place, the reason for such development will be the inevitable production intensification. The inputs and the average yields per ha in Bulgaria are considerably lower than the average for the EU. The prognostic permanent increase of the prices of the agricultural products also will stimulate the further production intensification. The sustainable intensification – with higher results than the additionally input resources, requires precise technologic decisions, including based on inputs of a long-term effect on the production – potassium (K) and phosphorus (P) fertilizing, anti-erosion activities, etc.

On the second place, still more of the farming output will be achieved through the sustainable use of the natural resources. A considerable part of the agricultural support by the CAP –- the "green" component of the direct payments will be granted on dependence of the application of special farming practices, some of which with a multi-annual character. Part of the social services, concerning the preservation of the cultural land shaft and the application of traditional production practices also require multi-annual consecutive efforts.

Besides all, the character of the modern agricultural production requires knowledge and skills in different fields – production, economics, management, etc., the acquirement of which is a long lasting activity. The instability of the land utilization leads to an instability of the production structures and as a result – inevitable losses of qualified labor. The problem of the land utilization is still more important for the intensive agricultural sectors – vegetable growing, fruit-growing and viticulture. The investments in these sectors very often have a long-term character for example for the plantation creation, irrigation systems, storage and refrigeration bases, and could be motivated only in the conditions of permanent rights for agricultural land utilization. In the specific historical conditions, the foregoing emphasizes the particular social interest of achievement of stable land-usage. Therefore, Bulgaria should strive to establish a legislation of durable enough rental terms, which premise investments with a long term effect on the soil fertility and the land management.

The problem of the formation of rational farming structure is linked with the agricultural aids. One of the effects of the direct payments is the reduction of the abandoned lands, a development with positive economic and ecologic consequences. At the same time the payments per area does not significantly impact the intensive agricultural productions. This is one of the reasons for the vegetable and the fruit growing decline. The state of these sectors requires a targeted policy for their recovery. One of the possible measures in this respect is investments in land management (technical-economic measures for the correct agricultural land utilization), especially in amelioration and management as a base

of the establishment of rational land and water utilization on the irrigated areas and other kinds of agricultural infrastructure [Official Gazette 1996]. We should clearly mark that the land market development as a most efficient and natural mean for overcoming the structural problems of agriculture does not contradict other programs' and projects' realization in intensive farming regions, especially of these in vegetable and fruit-growing. Base condition for overcoming the decline in these two sectors is the performance of such projects for ameliorative land management with full respect both of the rights of the land owners and the land users. In this respect the PDRR (2007-2013) contains opportunities concerning the financing of the measures for consolidation, construction and reconstruction of hydro land reclamation equipment and other farming infrastructure – measures not started five years after the Program beginning.

An argument in favor of the necessity of achievement of targeted policy is the assessment of the effect of the application of the two measures of the PDRR for support of the incomes of the agricultural producers from the mountainous and other regions of natural limitations for agricultural activity. The application of these measures, the support of which is based on the area of utilized land and on annual base, has a notable contribution for the farming activity conservation in these regions with positive effect, featured by economic, ecologic and social dimensions. Specifically for the mountainous regions, the positive effect is due to the circumstance that the greater part of these aid users are family farms. In order to consolidate these results, is necessary to submit to use the state and municipality land fund to the farms with highest economic, ecologic and social effect of activity. The practice of renting huge areas – over 100 ha to different types of companies in its majority has a speculative nature.

There is no doubt that in the future the pressure on the natural resources, in the case on agricultural land will grow before all for urban and industrial purposes. At the same time the society is concerned to preserve this unrecoverable natural resource – agricultural land and soil fertility. Chief role in this respect plays the Law on Protection of Agricultural Lands which governs „… the protection from damage, the recovering and improvement of the soil fertility of the agricultural lands and determines the conditions and order for their change of use" [Andonov]. In this case we will notice the too easy attainable change of use of agricultural lands. Actions were undertaken in spite of the availability of abandoned industrial zones with built infrastructure and motivated only by the low state taxes for this procedure. The consequences from such unreasonable decisions are unfavorable due to the lack of general development plans for the municipal territories. The social loses in these cases are inevitable, of agricultural land, unjustifiable expenses for engineering infrastructure water and electrical supply, roads, private property expropriation, etc. The solution of the problem is either in changing the law or even simpler, new tariffs for the state taxes for changing the use of agricultural lands.

10.6. Raising the educational and qualification preparation of the employed in agriculture

The preservation of vibrant rural communities with available educational net are pointed as one of the strengths of the Bulgarian agriculture. Meanwhile its labor productivity is 1/3 of the average EU level. The reasons for this circumstance are complex but among them undoubtedly is the knowledge and skills level of the employed in the sector.

At a certain grade is under esteemed the role of education and qualification for the development of agriculture, as well as the necessity of the creation of a system for permanent professional education, being accepted that the investments in human development have highest rate of return.

Undoubtedly, a relation exists between the age structure of the employed in agriculture and their educational level. In 2003 only 11,6% of the employed in agriculture were under 35 years of age, against 54,6% of the persons over 55 and more. The surveillance of the labor force in 2004 shows that 57% of the occupied in agriculture had educational level from 0 to 2 (basic and primary education), according IESK, while for the country their share averages 17%. The share of the employees with higher education is only 4.4%, on average for the country 25% [MAF]. Only 2,4% of the farm managers have secondary special or higher agricultural education. The preliminary results of the census of the farms in 2010 shows a slight advance in this respect – a value of 3% for this index [MAF 2010]. Obviously this extraordinarily low share is ought to the retail farms, while the huge commodity farms have managers with a higher professional education.

Against the background of the numbered facts has an actual sound the Bulgarian Industrial Association's position dated 12th of August 2011, that "The decrease of qualified workers and specialists is a key problem which will hinder the development and function of whole economic sectors and social life spheres" [BIA].

The data above is alarming and requires explanation and action. The country indeed has a system of secondary professional, specialized and higher educational schools. Appears the question of their efficiency and before all, the professional realization of the graduates. The share of the graduates who work on the acquired specialty is low. Equally serious is the effect of the conducted program training of MLSP, SAPARD and PDRR. The effectiveness of the training courses for unemployed organized by the Employment Agency of the MLSP could be judged by the number of trained persons employed on the acquired specialty. The planned results for measure „Professional Training" of SAPARD were not achieved. The advance in the accomplishment of Measure 111 – „Professional training, information activities and dissemination of scientific knowledge" of the PDRR 2007-2013 is not sufficient and the set targets seem unattainable. The reasons for the comparable low professional and qualification

level of the occupied in agriculture are of a different origin. Part of them is due to the living conditions in the rural areas, which causes a reflux of young and qualified labor force towards the towns and abroad. Others are consequence of weaknesses of the educational system, including cases of an end of self-training of specialists. These are two groups of problems the solution of which should be sought in a long term plan in the national regional and educational policy. At the same time, there are opportunities for training and acquisition of knowledge and skills the utilization of which requires professional attitude of the responsible structures – MAF and SF „Agriculture". Moreover the dynamic changes in agriculture create a necessity of organization of a training system during the whole professional life of the occupied in the sector, and not formal carrying out of training courses to report activities without permanent results.

The status of professional preparation of the employed in agriculture requires increasing of the effect of the training system. This means:

- Improvement of the training process in the secondary professional and special schools;
- Binding of the preparation of staff with higher education with the needs of agriculture;
- Orienting of the training courses of the MLSP toward the achievement of specific results (finding a job on an acquired qualification);
- Utilizing the opportunities of the PDRR for obtaining sustainable results in the improvement of the professional training of the employed in agriculture.

Specifically on the last point should be noted that, the forestated unfounded requirements for carrying out of training courses and the administration tardiness adversely affected the application of Measure 111 – „Professional training, information activities and dissemination of scientific knowledge". Furthermore, as it was stated the modern farming requires a constant training process. Such can be provided by organizations with proved capacity and clear status – professional, higher schools, universities and research centers. Moreover, the whole professional life training could be efficient in terms of stable and constant relations between the two sides in the process, and not within sporadically organized, randomly selected training staff.

10.7. Development of the system of knowledge dissemination and consultancy services

The changes in the country, after 1989, radically changed the requirements for the professional preparation of the agricultural producers. At the place of the socialist state agriculture with strict hierarchic system of responsibilities in the economic organizations emerged pluralistic structure of farms, functioning in the conditions of private property of the land and a market type of connections. In the new conditions the modern agricultural production requires, particularly from managers, complex knowledge of the production technology, the economics and management of the farm, farm machinery etc. Knowledge, which should be constantly renewed and complemented due to the advance of the agricultural science in the field of the productivity increase, climatic changes modulation etc. All the above circumstances lead to the necessity of a strong and efficiently functioning system for knowledge dissemination and consultancy services. The National Office for Agricultural Advisory (NOAA) is the institution in the structure of MAF, to which these functions are imposed, but we should immediately note that within its limited staff and budget restrictions it is not capable to respond to the extraordinary demand of services in this field. Moreover at the moment this executive agency is the only beneficiary of the measure „Providing advisory and consultancy services in agriculture for Bulgaria and Romania", providing a full set of free of charge services to farmers applying on four measures of the PDRR. Obviously at this stage the agency has no capacity to encompass the enormous work of dissemination of knowledge and satisfy the necessities of information access of the multiple agricultural producers. In this context becomes obvious the necessity of an Agency of Development not as a new administrative structure, but as a coordinating and integrating link, combining the capacity and efforts of the regional and municipality structures of MAF, professional schools, universities, research centers, NGO sector and the local social capital in the transfer of knowledge in the farming practice. Due to its specifics, the system for knowledge dissemination and advisory services should be developed at a municipal level. The development of information and communication technologies creates new possibilities of spreading of knowledge and good practice. In this sense the MAF is a debtor to the Bulgarian farmers. First, due to lack of financed projects on measure 312 "Support and establishment and development of micro enterprises", providing access to broadband Internet, five years after the start of the PDRR. It seems that the problem is not at the center of attention of the responsible institutions – currently is ongoing a study of the status of these services in the rural regions. It will be useless for the inhabitants of these regions if such projects are not realized in a short period of time. And second, Bulgaria still has not introduced the National Rural Net (NRN), the system designated to accomplish the exchange of information and experience in the field of development of the rural region to disseminate the

good practice among all concerned. The NRN should be an integrated part of the ERN, which on its side provides opportunities of utilizing the experience of the 27 countries-members of the EU. The funds for the establishment and function of this net are guaranteed by the budget of the PDRR 2007-2013. The delay of the realization of the NRN is a disadvantage from the point of view of the integration of the country to the EU, the access to knowledge and experience, the social dialogue development and the formation of community of agricultural producers, NG sector and administration concerned in this activity.

In summary, the development of the system of knowledge dissemination and advisory services requires:

- Strengthening of the NOAA;
- Integrating the capacity of knowledge dissemination and consultancy services of the executive agencies, the Agricultural Academy, and the regional and municipality offices of MAF, as well as the NG sector and the local social capital;
- Building up capacity at municipal level;
- Starting of NRN;
- Considerable extension of the access in the rural regions to a broadband Internet.

Each policy, including CAP has specific goals, which can be achieved through concomitant measures. The measures are set at the entrance of the system when they are financially secured, if we use the system approach. The reaching of the goals is function of the application of the measures. The result appears at the exit of the system. It is important that no policy, even that with the best chosen measures, would achieve sustainable results without active behavior and motivation of the human factor. Furthermore, the realization of each policy is positioned within specific period of time. Within that period the subjects and the objects are being cared for on purpose, in order to complete the goal, stemming from the chosen policy. Often the result is function from the human factor which is a conductor of the ideas and main actor on the field. The link between the activity of the main actors and the effect from application of CAP is straightforward. Even the best cared for measure, especially in the agriculture production would not give the expected result if the behavior of the subject is not aimed at the proper direction. This concerns not only the period of operation of the measure. The effect of the European financing should not be short termed, with transitional result. A sustainability is necessary in the behavior of the actors which means to apply the good practices after the expiry of the period of financial stimulus. This problem becomes more important bearing in mind the budgetary restrictions imposed by the community and world financial problems. In this regard, one of the mid-term priorities in Bulgaria should be a more active approach towards the provision of information and training for the people engaged in the agricultural sector.

The results of the Empirical Sociological Survey (ESS)[49] show the awareness of agricultural producers of CAP. The answers to the question *where did you primarily acquire this information from* are quite indicative. Most respondents, about 23% gather information from the media, 16% – from colleagues and relatives. The same percentage of respondents is informed about CAP by the Services of Agriculture and Forestry (SAF) and the National Agricultural Advisory Service. The Figure sets out in detail the results depending on the age of the respondents. The services to the ministry are most important for the respondents aged 40-49 years of age. The least impact for the provision of information these services have for the youngest and the oldest. Overall, the results show insufficient administrative capacity.

This would be subject to further analysis, in order to overcome the information deficit and to increase the effectiveness of utilization the funds of the financial resources of CAP in the upcoming period (2014-2020).

In this respect, one of the middle term priorities in Bulgaria should be more active information and cognitive provision for the people occupied in the system of agriculture.

10.8. Development of the scientific research

The establishment of competitive production, preserving the natural resources is impossible without applying the scientific achievements. This is of a greater validity in conditions of climatic changes, requiring technologic, economic and political decisions, allowing greenhouse gasses emission decrease and adapting agricultural production to the new conditions. Bulgaria has its achievements and traditions in this field, but serious problems to be solved meanwhile. Hardly anybody will renounce the significance of the scientific researches, although they have not been a priority of the sector's policy during the last years. This is explainable – the scale of the changes was extraordinary, as well as of the efforts, associated with the country's membership in the EU. But today the scientific researches acquire new relevance.

The scientific researches in agriculture are mainly achieved in the institutes of the AA, as well as in the universities. Generally can be noted that is not sufficiently intensive the integration between the institutes and universities in the fields of research and education activities. Certain efforts have been made to coordinate the research activity between the AA and BAS and the universities,

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[49] The report used data from: Empirical sociological survey "Environmental culture of producers of agricultural products" – in 56 villages situated in Blagoevgrag region, one stage claster sample. The survey was carried out in March 2010 (Project "The transformation of the national value system and its synchronization with European patterns: the development of environmental culture as an indicator of translation of European values in the Bulgarian society", project leader Assoc. prof. A. Mantarova), funded by National Science Fund. www.value-nature.com

as well as to determine the research priorities by the MAF. The periodically raised discussion about the place of the science – in the universities or in the separate academies as BAS or AA is more a reaction to the crisis situation and the financial problems of these organizations than responsible, thought out position for the reformation of the research activity. The statesmanlike approach requires not the mechanical application of the foreign experience, though a relevant one, but through reformation activities to create conditions for the efficient functioning of the already built structures. The last requires knowing of the problems, clear policy objective and strategy for its achievement. The brief SWOT analysis of the AA could provide some orientation marks in this relation.

SWOT analysis of AA

Strengths	Weaknesses
• Many years tradition in research activity with serious achievements; • Realized priority of the application designs; • Available research fund, methodology and approaches in different fields; • Assembled research teams; • Balanced territorial location of the research institutes in the main agricultural regions; • Highly evaluated participation of institutes, research teams and individual researches in international projects and other initiatives; • Important role in the knowledge dissemination and the advisory services in agriculture; • Expert's participation in different state management levels.	• Inadequate legislation, not corresponding to the character of the research activity (appointed management and absence of general Assembly of the researchers, i.e. absence of the typical for the science internal democracy and electivity of the managing bodies); • Centralization and bureaucratization of the management functions leading to depersonalization of the research institutes as centers of the research achievement; • Systematic insufficient financing of the research activity, not allowing full capacity development of the investigation, causing loss of researchers; • Insufficient and obsolete equipment and facilities; • Financial status – a secondary budget funds administrator and regulation, blocking the opportunities for research products' and services' income realization; • Unsettled author's rights and wages for research products;

	• Uncompetitive payment to the research staff with a result – staff deficit and ageing; • Blocked opportunities for optimizing of the staff and activity organization in the institutes; • Slow pace of renewal of the research staff due to low remuneration of the research junior personnel.
Opportunities	Threats
• New legislation, creating prerequisites for the efficient management and stabilizing the status of the research institutes; • Changes of the financial regulations of the research activities with clear rules of targets and range of budget expenditure and the adoption of the incomes from scientific products and consultancy services; • Integrating of the research institutes and their activity into the European research space – a key significance factor for the investigation quality increase; • Increase of the significance of the research achievements for the development of agriculture, dropdown of the greenhause emissions and production adaptation to the climatic changes; • Financing of research projects and modernizing the activity by the structure funds of the EU and the private sector; • Integrating the institutes to the net of dissemination of knowledge and consultancy services.	• Lack of social understanding and assessment of the role and functions of the research studies; • Insufficiency of public interest and reformatory capacity for constructive changes; • Preserving of the acting financial regulation not allowing the institutes to achieve their potential; • Postponing the necessary changes of the legislation acts; • Lack of a consistent state policy in the field of the research activity.

The natural aim of the state policy, concerning the AA, is to create the premises and conditions for an effective scientific research activity, with a considerable contribution for the Bulgarian agricultural development. This primarily means newly formulated priorities of the research activity, institutional development, legislation regulation, etc. It should be noticed that concerning the research strategy and the legislation regulation for the development of the academic staff, a considerable advance has been achieved. But the activity regulation, mostly referring the financial aspects, is still pending to be solved. From such a point of view the direct policy priorities are:

- Adoption of a new Law of the Agricultural Academy;
- New financial framework of the research activity, providing the necessary stability of the system and creating conditions for realizing incomes from research products and services;
- Changing the legislation framework toward higher flexibility of the research activity;
- Access of the research institutes to the financing of the EU structure funds.

Decisions in these directions will open new space for initiatives and an active conduct of the institutes, which on its side will improve their financial and staff stabilizing.

10.9. Improvement of the access to the market

The conditions of market realization of the commodities are of a key significance for the vitality of the agricultural sector. The market position of the agricultural producer is instable in many respects. At a first place, because of the stiff type of the demand of food products and the inability of the producers to recover in short terms the market equilibrium. For the majority of the cases the products are perishable and their longer storage requires higher costs. Very often the market strength of the producers and merchants is unequal – on one side stay a large number of disunited, weakly informed farmers, and on the other – a small number economically strong commercial chains. There are other obstacles to the market access – remoteness of the markets, weak access to market information, lack of infrastructure, not constant product's quality, small batches of standardized goods, etc. All mentioned is not new but the drawn trend of the decreased share of agriculture in the price of the final product becomes sharper. This is a result of some objective circumstances – the dietary pattern change, but with no doubts this development shatters additionally the producer's position, particularly in the smaller farms. More arguments can be mentioned but it is obvious that the interests of farmers and society predicate on purposeful measures at political level for improving the market access of the agricultural producers. Underlying the different dimensions of the market problems for the huge and

small producers, as well as for the different subsectors, I consider that they could be merged in the following groups:

- Market integration.

   The development of transport infrastructure and decrease of transportation costs are of a big importance for the farmers. Of a special significance is the increase of the sea ports' capacity. In the same direction will go the impact of the advance of communications and the access to information, particularly the availability of a broadband Internet.

- Development of market infrastructure.

   The functioning of a developed stock exchange system, marts and markets equipped with refrigerators and appliances for primary product's processing is of a key importance, particularly for the retailers. The so far experience in this relation is not so encouraging which makes the state support of such projects still more relevant.

- Cooperation of producers.

   This is the natural solution of the issue, which allows the resources combining for the necessary investment, as well as achieving scale economies. Meanwhile, the cooperation increases the market strength of the producers and provides for them better conditions for realization. Unfortunately, the advance in the accomplishment of Measure 142 „Creation of organizations of producers" of the PDRR 2007-2013 is insignificant.

- Effective competitiveness environment.

   The high production concentration in the food processing sector and commerce and the public known experience in some spheres arise the issue of the full and effective application of the Law of Protection of Competition. The admission of cartel agreements would be destructive for agriculture. The question arises whether this law is in condition to prevent the appearance of dominating economic structures, imposing suspicious agreement relations.

   The other group of measures impacts the creation and support of a pluralistic structure for the redemption and trade with agricultural goods. The unimpeded participation of companies in this sector is particularly important, as well as the functioning of different in size, organization and functions economic agents.

   A bigger transparency in price formation will be of benefit both for producers and consumers. Special attention deserves the limitation of cases of asymmetric pricing at which with the growing of the producer's prices, grow the consumer's too, while at dropping down the farmers prices, the consumer's detain at the reached level.

   Not at a last place should be stopped the practice of the misleading labeling of the products.

10.10. Development of local markets and regional products

The huge food supply chains, which trade share grows, impose the production of big batches standardized uniform raw products. In these conditions the products diversity and the specific quality characteristics are set to the background. Meanwhile, the consumer's preference for qualitative products, which besides are a part of the regional identity and the conditions variety in the country, gives a chance to the smaller sized, but requiring higher labor costs farms. Precisely these farms should be granted support for a realization channel development and a straighter access to consumers. In addition the labeling of the geographic region of origin and the used methods of production should assign a "regional status" to the products. The measure requires the conducting of a wide information campaign and an introduction of a label system, for supplying sufficient information to customers.

The local market development should receive a more considerable place in the agricultural policy. The arguments favoring such concept are of different character: correspond to the consumer's interest, preserve the created through the years culture of production and consumption, contribute to the preservation of the local identity, etc. From the point of view of the structural and regional policy this is an efficient, market oriented measure for supporting the small sized farms and the ones of agriculture naturally limited regions. In the conditions of globalization, the success of the local markets and products could counteract to the unification process of production and consumption. Ultimately this is a contribution, both for the preservation of the pluralistic farm structure and diversity of the agricultural products and vitality and cultural heritage of the rural regions.

The improved access to markets in the globalization process, allows the huge sized farms to increase their profitability through the achievement of scale economies. The chance of the small farms is to produce qualitative products of a higher value added. So far the CAP and the agricultural policy in Bulgaria were directed mainly to the interest protection of the big companies. The social interest requires the achievement of a more balanced policy for to provide successful activity of the smaller companies as well. The strengthening and support of local markets and regional products of specific features is a policy with especially strong potential in this direction.

10.11. Products' development and increase of the share of the products of high value added in the food processing industry

The progress achievement in the competitiveness and the share increase of the products of high value added is of a key importance of the vitality of Bulgarian agriculture and the food processing sector. The integration of agriculture and the food processing sector is the realistic answer of the trend of decrease of the

share of primary production in the total created value in the framework of the food chain. The issue is particularly topical for Bulgaria, which for a continuous historical period has a positive balance of the import and export of agricultural commodities. At the same time, the balance of import and export of processed foods, beverages and tobacco is negative for the last years. During these last years, Bulgaria has lost traditional markets for these commodity groups, not being compensated by the penetration of new ones. Meanwhile has been increased the import of foods, beverages and cigarettes, mainly from the countries of the EU. Such development has its explanation, but in all cases is indicative for a deepening process of a loss of competitiveness.

The problem cannot be neglected because the food processing industry is traditionally important and developed sector of the Bulgarian industry. Its importance for the Bulgarian economy is determined by the fact that 3% of the GVA created in the country and simultaneously 13% of the GVA in the industry is generated in the sector. The employed persons in the sector represent 3,7% of the total number of workforce. In the framework of the EU the number of people employed in the Bulgarian food processing industry is 2,3% of the employed in the sector and the generated value added is 0,3% of the value for the EU [Kovacheva 2011]. Within some convention could be made the conclusion that the labor productivity of the Bulgarian food processing industry is in times lower than the average for the EU. The analysis of the status and the development opportunities should be based on a clear assessment of the depth of changes during the last twenty years. Firstly, the food processing sector lost huge and at a high grade guaranteed market – of the recent CMEA and USSR. Secondly, a considerable part of the existing facilities proved unnecessary and depreciated. Third, a new link with the raw products producers had to be established. Some of the subsectors adapted comparably fast to the new conditions as the milling industry, bread and bakery production, vegetable oils production, etc. The modernization of others required huge volumes financial resources, such as meat, milk and vegetable and food processing industries. Others lost their market positions – wine and tobacco products. In these conditions, a significant part of the food processing sector limited itself to the internal market and in the export of foods prevail products of the milling, confectionary, and vegetable oil products.

In the conditions of dominating position of the TNK in the field of food supply, when 15 commercial chains control 77% of the market of food products, the small unconsolidated Bulgarian food processing companies face strong difficulties in stabilizing and expanding not only on the internal but on the external market as well [CAP reform during 2013].

The competitiveness of the food processing sector, together with other factors will depend on the product development and the share increase of the products with a higher value added, which can be achieved through:
- Fuller integration between the processors and the suppliers of raw materials as a condition for the production of qualitative and specifically featured

food products, including through the realization of integrated investment projects, containing the processes from the raw material production to the final realization;

- Integration of Bulgarian producers in the big companies for production, commerce and supply of food products;

- Maintenance of the production of products, corresponding to the taste preferences and the dietary habits of the consumers at the interior market, as well as at ethnical markets abroad;

- Validation of qualitative food products of specific national and regional characteristics, including such of geographically protected label of origin with traditional specific features, etc.;

- Working out and achievement of exterior commerce strategy of the food commodities.

The advance in the drown directions depends before all on the financing of qualitative, duly justified investment projects. From this point of view becomes still more important the achievement of Measure 123 „Value adding to agricultural and forestry products" of the PDRR2077-2013, as well as the support of company projects of the food processing sector by the Operational Program "Competitiveness".

The product development is an important, but not the only aspect of competitiveness. The integration processes at the world market and the diet changes, before all due to the advancing urbanization, convert this group of problems' solution to a key significance for the future development of the food processing sector.

10.12. Annex

Table 1. Utilized Agricultural Area (UAA) in the countries of the EU, 2007

	UAA (1 000 ha)				Farms	
	Total	Arable land	Pastures and meadows	Perennials	Number (1 000)	UAA/farm (ha)
EU-27	172 485	104 341	56 791	10 963	13 449	12,8
Belgium	1 374	842	511	21	47	29,2
Bulgaria	3 051	2 664	280	90	482	6,3
Czech Republic	3 518	2 571	909	37	38	91,4
Denmark	2 663	2 452	201	9	44	60,2
Germany	16 932	11 890	4 839	198	369	45,9
Estonia	907	627	273	3	23	39,0
Ireland	4 139	1 008	3 130	1	128	32,3
Greece	4 076	2 119	820	1 126	854	4,8
Spain	24 893	11 883	8 650	4 355	1 030	24,2
France	27 477	18 302	8 105	1 059	522	52,6
Italy	12 744	6 939	3 452	2 323	1 678	7,6
Cyprus	146	108	2	36	40	3,7
Latvia	1 774	1 111	640	18	107	16,5
Lithuania	2 649	1 809	819	20	230	11,5
Luxemburg	131	61	68	2	2	57,2
Hungary	4 229	3 553	504	155	566	7,5
Malta	10	8	0	1	11	1,0
Netherlands	1 914	1 059	821	34	75	25,5
Austria	3 189	1 389	1 730	66	165	19,4
Poland	15 477	11 756	3 271	375	2 380	6,5
Portugal	3 473	1 078	1 781	596	274	12,7
Romania	13 753	8 691	4 540	344	3 852	3,6
Slovenia	489	173	288	26	75	6,5
Slovakia	1 937	1 358	551	24	67	29,1
Finland	2 292	2 248	38	5	68	33,8
Sweden	3 118	2 627	487	4	72	43,2
UK	16 130	6 018	10 080	33	249	64,8
Norway	1 032	617	412	3	48	21,3

Source: Eurostat (epp.eurostat.ec.europa.eu).

Table 2. Output value at producer prices in agriculture, mill. Euro

	2000	2005	2009	2000	2009
	Mill. €			% of EU-27	
EU-27	295 330,9	308 681,0	329 390,4	100,0	100,0
EU-15	258 936,0	263 451,9	279 278,9	87,7	84,8
Belgium	6 844,6	6 540,3	6 864,0	2,3	2,1
Bulgaria	3 389,3	3 356,0	3 795,7	1,1	1,2
Czech Republic	2 819,1	3 424,2	3 702,8	1,0	1,1
Denmark	7 725,3	7 865,5	8 180,4	2,6	2,5
Germany	39 203,4	38 946,0	42 923,3	13,3	13,0
Estonia	363,4	521,3	547,5	0,1	0,2
Ireland	5 141,7	5 301,2	5 002,4	1,7	1,5
Greece	9 849,2	10 539,7	10 332,9	3,3	3,1
Spain	32 693,5	35 406,9	37 087,4	11,1	11,3
France	56 607,1	56 149,0	61 235,7	19,2	18,6
Italy	40 995,9	42 169,6	42 465,8	13,9	12,9
Cyprus	579,6	654,1	656,9	0,2	0,2
Latvia	459,8	693,1	773,8	0,2	0,2
Lithuania	1 140,4	1 433,2	1 706,9	0,4	0,5
Luxemburg	237,9	256,0	290,7	0,1	0,1
Hungary	4 851,4	5 700,7	5 718,9	1,6	1,7
Malta	130,4	109,7	122,9	0,0	0,0
Holland	19 638,7	20 302,1	22 710,4	6,6	6,9
Austria	5 226,3	5 342,7	5 972,1	1,8	1,8
Poland	12 406,3	14 120,9	16 441,9	4,2	5,0
Portugal	5 996,8	6 110,6	6 537,7	2,0	2,0
Romania	7 971,5	12 667,1	13 843,7	2,7	4,2
Slovenia	952,4	982,9	945,7	0,3	0,3
Slovakia	1 331,5	1 566,0	1 854,7	0,5	0,6
Finland	3 424,4	3 605,8	3 862,4	1,2	1,2
Sweden	4 392,3	4 282,3	4 399,1	1,5	1,3
UK	20 958,9	20 634,1	21 414,6	7,1	6,5
Norway	2 946,8	3 106,3	3 374,7	1,0	1,0
Switzerland	7 067,1	6 627,9	7 039,4	2,4	2,1

Source: Eurostat – Economic Accounts in Agriculture (epp.eurostat.ec.europa.eu).

Table 3. Agricultural gross value added at producer prices and subsidies, mill. Euro

	GVA at producer's prices			Subsidies		
	2000	2005	2009	2000	2005	2009
EU-27	131 213,5	129 433,6	125 408,8	38 633,1	49 336,5	52 997,6
EU-15	116 401,5	111 991,1	108 296,4	37 462,8	43 814,5	44 762,4
Belgium	2 484,0	2 138,2	1 914,0	351,2	486,2	598,6
Bulgaria	1 634,1	1 544,3	1 465,5	5,4	86,7	446,9
Czech Republic	831,4	969,5	629,2	170,1	669,5	1 226,9
Denmark	2 495,5	2 248,7	1 570,8	788,8	974,3	1 002,3
Germany	13 570,7	12 919,7	12 923,9	5 600,7	6 093,0	6 546,0
Estonia	137,5	196,5	157,0	22,2	89,6	134,8
Ireland	1 616,7	1 627,2	936,6	1 284,0	2 225,0	1 924,4
Greece	6 239,8	6 405,9	5 800,6	2 134,3	2 221,0	3 099,6
Spain	19 225,1	20 344,7	21 276,8	4 895,3	6 550,5	7 021,4
France	23 889,7	21 303,2	20 585,5	8 152,3	9 742,9	9 787,3
Italy	24 526,8	24 410,2	22 074,9	4 794,1	4 315,1	4 096,9
Cyprus	324,6	332,3	302,1	3,0	45,5	40,1
Latvia	182,4	221,9	141,0	15,1	175,1	271,3
Lithuania	394,1	409,5	426,7	17,8	228,4	326,7
Luxemburg	102,9	107,2	87,3	48,4	62,0	65,6
Hungary	1 814,5	1 794,8	1 551,3	172,2	1 087,7	1 162,7
Malta	64,5	44,7	52,1	1,0	19,4	17,0
Holland	9 052,8	7 751,1	7 396,3	408,4	801,3	842,4
Austria	2 126,8	2 201,6	2 338,4	1 409,5	1 725,1	1 672,2
Poland	4 597,5	5 160,7	5 651,3	214,4	2 111,4	3 120,0
Portugal	2 159,9	1 926,7	1 846,1	663,7	1 071,8	891,2
Romania	4 121,3	6 003,1	5 998,8	228,3	548,8	712,5
Slovenia	399,4	397,4	344,2	93,9	232,2	265,8
Slovakia	310,7	367,8	393,3	226,8	227,6	510,6
Finland	669,7	785,2	699,1	1 967,3	2 095,3	2 155,0
Sweden	1 093,5	1 118,9	1 200,3	881,9	1 018,0	970,0
UK	7 147,4	6 702,6	7 645,9	4 083,0	4 433,1	4 089,6
Norway	980,0	919,5	878,1	1 291,1	1 207,0	1 234,2
Switzerland	3 052,8	2 582,6	2 657,3	1 497,0	1 717,9	1 982,9

Source: Eurostat – Economic Accounts in Agriculture (epp.eurostat.ec.europa.eu).

Table 4. Agricultural labour input

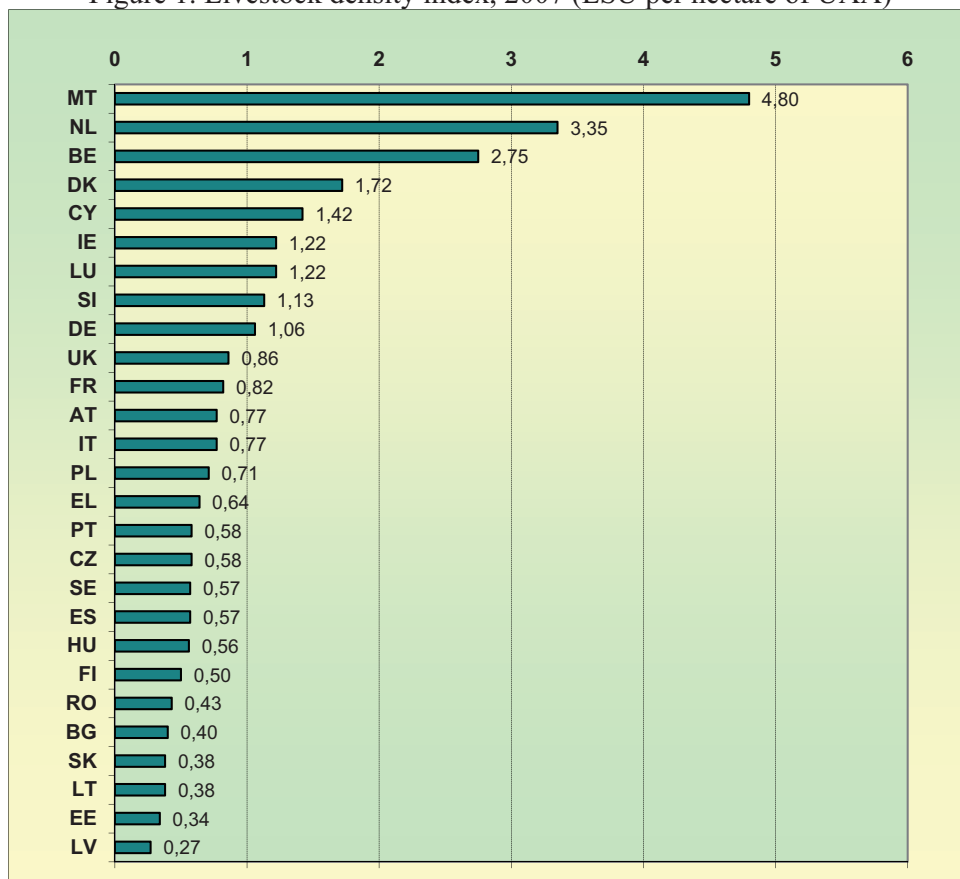|	2000	2005	2009	2009/2008
	1 000 AWU			%
EC-27	14 945	12 688	11 223	97,7
EC-15	6 511	5 928	5 424	98,0
Belgium	75	70	64	98,2
Bulgaria	771	626	400	90,6
Czech Republic	166	152	134	99,0
Denmark	76	63	56	98,1
Germany	685	583	536	98,3
Estonia	65	38	29	93,3
Ireland	153	149	147	99,1
Greece	586	607	571	99,6
Spain	1 102	1 017	909	96,1
France	1 028	936	858	97,9
Italy	1 383	1 242	1 164	98,1
Cyprus	31	29	26	100,0
Latvia	149	138	92	94,9
Lithuania	187	174	147	97,6
Luxemburg	4	4	4	97,3
Hungary	676	522	441	100,8
Malta	5	4	4	100,0
Holland	220	194	182	98,8
Austria	177	165	153	98,6
Poland	2 495	2 292	2 214	96,3
Portugal	503	429	344	95,7
Romania	3 645	2 596	2 148	99,8
Slovenia	104	90	82	98,4
Slovakia	143	99	82	91,0
Finland	111	96	87	98,0
Sweden	77	76	63	96,0
UK	334	298	290	101,8
Norway	72	66	58	97,3
Switzerland	101	89	85	98,7

Source: Eurostat – Agricultural labor input (epp.eurostat.ec.europa.eu).

Table 5. Expenses for fertilizers and plant protection chemicals, EUR/ha UAA

	Fertilizers and soil improvers			Plant protection products		
	2000	2005	2010	2000	2005	2010
EC-27	:	71,6	58,0	:	50,6	50,7
Belgium	164,3	155,4	245,9	126,1	123,8	126,0
Bulgaria	:	48,6	42,4	:	26,5	37,2
Czech Republic	:	39,5	42,0	:	44,5	50,8
Denmark	94,4	76,9	62,3	58,1	65,6	72,8
Germany	136,9	97,8	50,4	54,3	78,5	73,1
Estonia	:	16,9	14,4	:	7,4	10,4
Ireland	96,3	86,1	86,7	15,6	13,2	11,2
Greece	87,0	61,5	40,8	67,1	55,1	38,5
Spain	52,8	45,6	39,5	37,2	28,8	23,8
France	:	112,6	86,8	:	94,9	87,5
Italy	78,6	85,8	73,0	55,6	52,4	48,4
Cyprus	:	112,8	79,1	:	94,1	128,6
Latvia	16,8	28,9	26,3	6,4	12,8	17,4
Lithuania	:	59,8	51,4	:	23,4	34,3
Luxemburg	24,0	86,0	410,0	61,6	54,4	53,3
Hungary	47,2	66,1	62,9	48,4	63,0	74,4
Malta	:	121,0	120,0	:	64,4	63,9
Holland	155,8	154,2	167,0	168,8	181,1	198,7
Austria	38,6	37,4	30,6	28,2	26,1	31,9
Poland	:	53,8	42,4	:	22,9	41,0
Portugal	35,5	35,0	30,9	23,2	25,9	24,3
Romania	:	30,3	22,9	:	14,2	7,5
Slovenia	82,0	67,3	54,6	44,0	41,1	40,4
Slovakia	28,7	38,9	43,5	40,3	51,4	40,9
Finland	111,4	108,1	88,2	19,6	30,7	32,9
Sweden	84,0	70,7	79,5	30,5	21,4	20,3
UK	99,3	70,9	59,2	54,6	50,1	62,9

Source: Eurostat (epp.eurostat.ec.europa.eu).

Figure 1. Livestock density index, 2007 (LSU per hectare of UAA)

	LSU per hectare
MT	4,80
NL	3,35
BE	2,75
DK	1,72
CY	1,42
IE	1,22
LU	1,22
SI	1,13
DE	1,06
UK	0,86
FR	0,82
AT	0,77
IT	0,77
PL	0,71
EL	0,64
PT	0,58
CZ	0,58
SE	0,57
ES	0,57
HU	0,56
FI	0,50
RO	0,43
BG	0,40
SK	0,38
LT	0,38
EE	0,34
LV	0,27

Source: Eurostat, Food: From farm to fork statistics, (epp.eurostat.ec.europa.eu).

Figure 2. Awareness of CAP as per age group
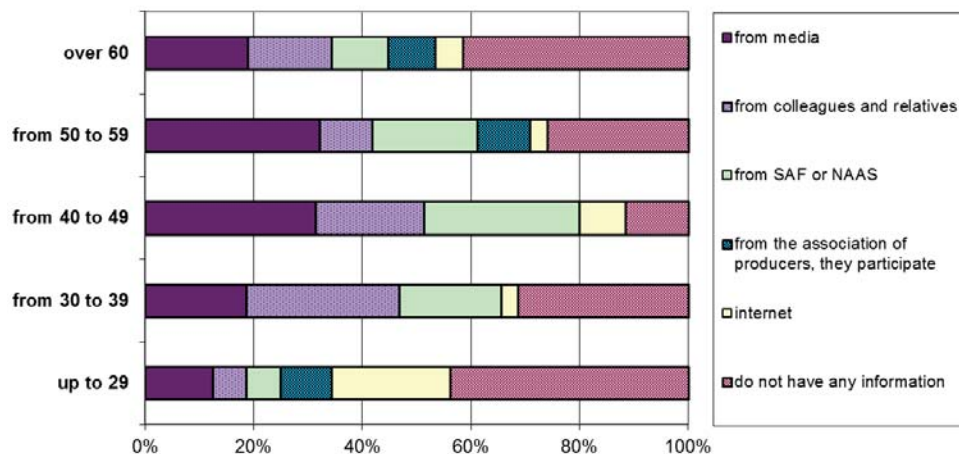
Source: ESS, Blagoevgrad region, march 2010.

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Yury Lupenko
Professor, Dr in Economics, Director of National Scientific Centre
"Institute of Agrarian Economics" (Kiev, Ukraine)

11. Ukrainian agriculture and its prospects in European and World markets

Ukraine is a young independent country with a population over 45 million citizens and has the biggest territory in Europe. Traditionally, agriculture is one of the key industries in the economy. Also, Ukraine is the biggest European country in terms of total agricultural land area, more than 75% of that is arable and has the highest quality. Quality of Ukrainian black soils is well known and they represent 1/3 of the World's humus area.

According to that, it is important to note the role of land as the main asset for agricultural production. Our views are similar to international forecasts – growth of global food demand together with Ukraine's entry into WTO have created stable and strong conditions for usage Ukrainian agricultural land into production. The increase of one's agricultural land to 31 million hectares (27%) in 2020 is expected. Share of cereals is increasing in total volume crops production. In our opinion, this trend will be stable. Sunflower production also will grow. Ukraine has taken obligation to decrease existing 10% export duty by 1% every year, according to the negotiations with EU. Last harvest in Ukraine was one of the best in 2011 – over 56 million tons of cereals. Main factor to this was price that increased during the year, especially for sunflower seeds.

Ukraine: Production of main agricultural commodities, th. t
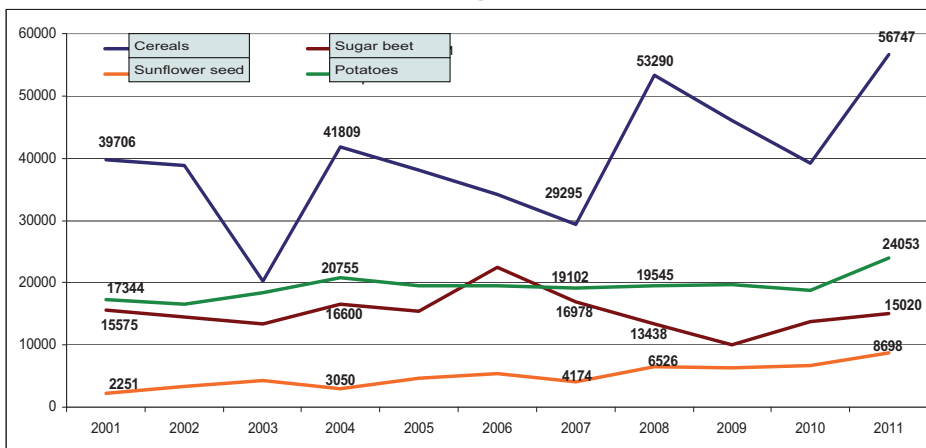
Also, we have positive expectations for the livestock sector growth. This growth is based on reasonably priced concentrated feed that has a significant effect. Main growth is expected for poultry and pork production.

Ukraine: Poultry and Animal Inventories
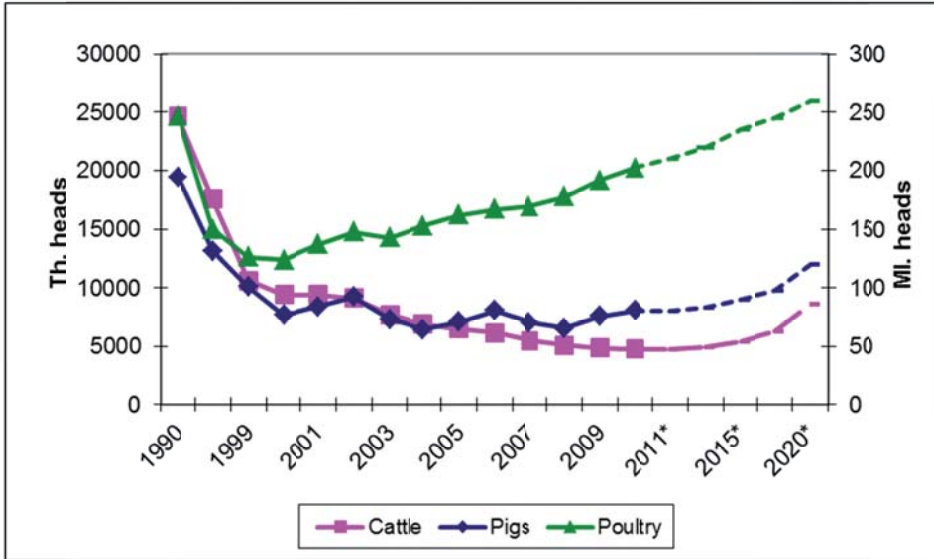
Ukraine is located in continental climate zone, that is colder than in some other world regions. For example, farmers in Brazil have possibility to keep livestock on grass all year long accordingly increasing beef production and export. Besides, as regards livestock production, we should note serious progress in poultry sector development during previous years. First of all, it was a result of forming modern highly integrated and highly production intensive agro-industrial holdings. Listing on international stock market became possible for many of them. It is worth mentioning that the Warsaw stock exchange market is one of main IPO destinations for Ukrainian agroholdings.

More complicated and many-faceted is the situation concerning milk production. More than half of the dairy cattle is located in private sector, particularly on small-sized farms. Quality control is accordingly more complicated, the cost of raw milk logistics is much higher. Production indexes of middle and big scale farms are more stable, there are some positive impulses to increase the number of heads over the last few years. Dramatic changes not happening, although the long term prospective of this sector is not pessimistic.

Ukraine: Livestock production
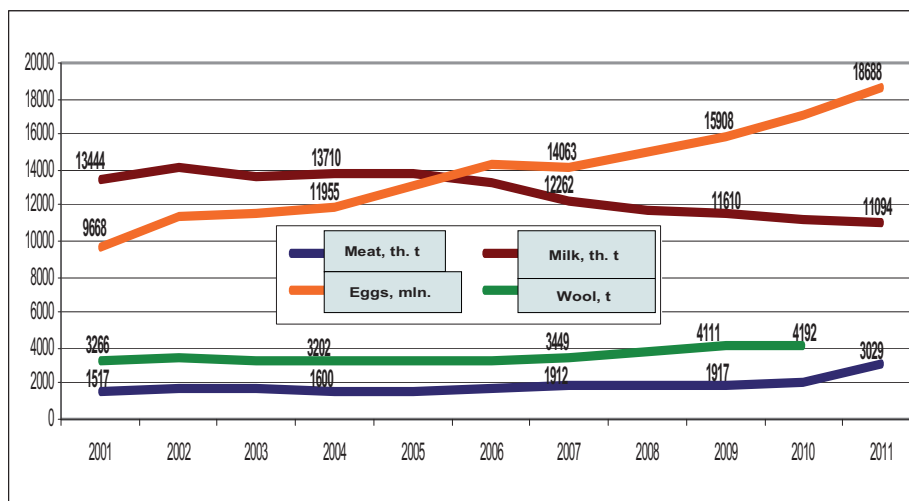
A significant part of Ukrainian yield is exported. Some decrease after 2008 was related to the global financial crisis. But we forecast the restoring of international trade, and level of the last year yield is confirming serious progress in export volumes.

Cereals have the biggest share in export structure. Growth of their export, as well, as growth of oilseed export and food products is higher than growth of livestock products export.

Ukraine: Export of agricultural and food products, mln. $
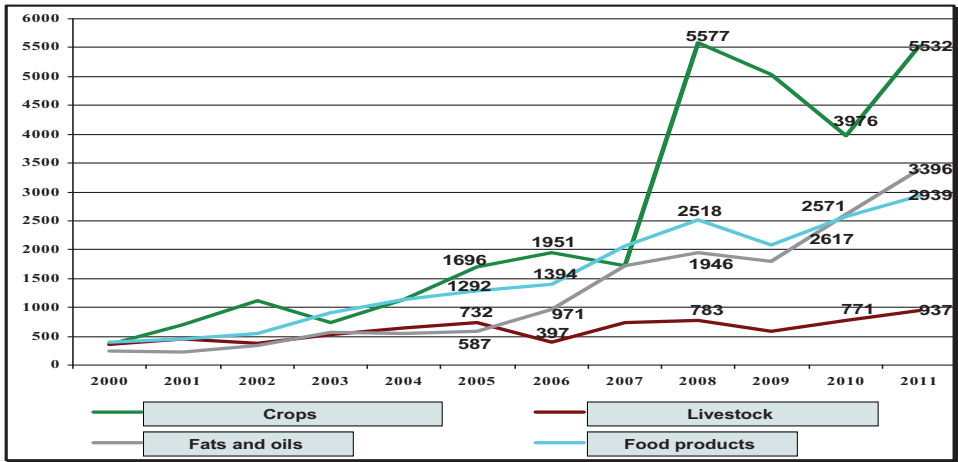
Rather interesting are figures of agricultural products export-import relations with European Union. Some increase in our export to EU may be explained, firstly, by competitive pressure growth from Russian domestic producers on our products (Russia is also demonstrating good progress in recovering of agricultural sector), secondly, by the strategic interest in the European market as one of the most profitable for Ukraine.
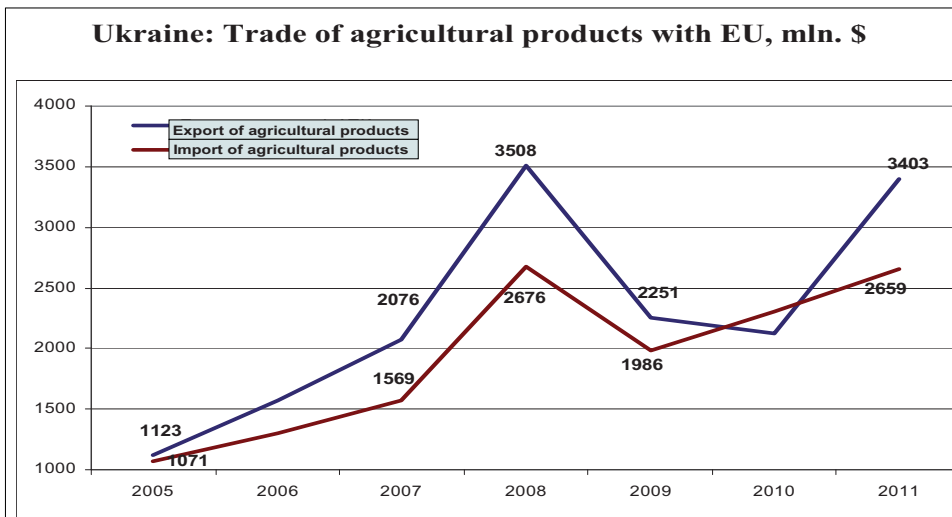
As regards general context of our relation there is successful progress to sign a free trade zone agreement. Important results of negotiations are achieved in increasing of non-duty quotas exes for Ukrainian products to the EU markets,

of low-duty quotas (applying of standard level). Number of obligation not to use export duties and in non-barrier exes to domestic markets were taken by Ukraine too. The signing of agreement is expected in next months. The proposed agreement may permit Ukraine, for example, to increase tariff free export to 1.6 million tons of cereals in the first year and up to 2 million tons in five years. Quotas are: for wheat – from 950 thousand tones to 1 million tons, corn – from 250-350 thousand tons, barley – from 400-650 thousand tons. Quotas for poultry, pork and beef are on levels accordingly 20, 12 and 40 thousand tons.

High attention of Ukrainian government to national agriculture is based on industry main budget forming role and cross influence to all economy. The share of agricultural and food products in national export volume is constantly increasing, improving national trade balance. In 2008-2009 and 2009-2010 marketing years Ukraine had a stable position on a list of top exporters of cereals, especially in exporting barley. Our expert expectations are also optimistic in this season. Taking into account gross volume of agricultural production this year, Ukraine may even improve export positions supplying 9-10 million tons of each wheat and corn and 3-3.5 million tons of barley. Total export of cereals can reach 23 million tons.

Summarizing all the above, we may state that Ukraine has great agrarian potential and possibilities for agricultural and food export increase. But the most efficient ways for realizing that potential are close integration and free trade zone forming with the European Union.

Prof. Gabriel Popescu, Phd.
Research Centre for Regional Analyses and Policies,
The Bucharest Academy of Economic Studies, Romania

12. Romanian agriculture performance under three restrictions: property, family and market

12.1. Introduction

Romania is a country with industrial-agricultural economy, where performances are among the lowest in the EU. Industrial-agrarian profile is personalized since the 1975, when, for the first time, the urban population was equal to the rural one, and industry exceeded agriculture in the GDP share.

The changes suffered by the Romanian economy, occurred after the 1990s as a result of transformation of the command economy into the free market capitalist economy, were not able to determine a qualitative leap in the performance of the economy, as the public expected.

12.2. Romanian agriculture performance

In fact, in the last 20 years, the economy keeps its industrial-agricultural profile, although overall, there is a major rebound in the growth trend, which diminished the changes of a performance increase in almost all the other branches of national economy. Compressing the domestic industry, as demonstrated by the continued reduction in the share of GDP of this sector from 40.5% in 1990 to 26.1% in 2000, and 22.9% in 2008 (Table 1) had devastating effects, emphasized by: the increase of unemployment rate, the return of an important part of the urban population to the countryside, the disappearance or restructuring of industrial units which provided advanced inputs for agriculture, loss of major sources of foreign currency and others.

Table 1. Gross Domestic Product, by category of resurces Romania and EU

	Items	1990	1995	2000	2005	2008
Romania	Share of agriculture in GDP	21,8	19,8	10,8	24,5	6,7
	Share of industry in GDP	40,5	32,9	26,1	24,5	22,9
EU15/25/27	Share of agriculture in GDP	-	-	1,8	1,2	1,1

Source: Romanian Statistical Yearbook 2009, Time series 1990-2008; Agriculture in the European Union-Statistical and Economic Information 2001, 2003, European Commission Directorate-General VI, Agriculture in the European Union. Statistical and Economic Information 2005, 2007, 2009, 2010, European Commission Directorate-General for Agriculture and Rural Development.

Given this volatile background, in terms of national economic growth, the agriculture is also declining, a phenomenon caused mainly by the implementation of two agrarian reforms (in 1990 and 2000), which resulted in the restitution of land property – confiscated by the communist regime – to their former owners and the disband of the cooperatist or state entities from agriculture.

Consequently, the agriculture share in GDP is reduced by half, every 10 years. For example, in 2000, compared to 1990, it decreased from 21.8% to 10.80%, and at the end of the next decade, in 2010, reached 5.4%.

After Romania's accession to the EU, the main objectives of the national economy aimed the strengthening of the capitalist market relations and the increase of performance in production and efficiency. These two goals were and still are of major importance, especially for agriculture, because, in this field, Romania has the lowest performance among EU countries (Table 2 and 3).

Table 2. Yields per hectare, 1985-2009 (kg / ha)

Items	1985	1990	1995	2000	2002	2004	2006	2008	2009
ROMÂNIA									
Cereals, of which:	3102	3010	3085	1856	2439	3995	3102	3247	2824
- wheat	2338	3235	3090	2299	2058	3477	2773	3422	2430
- maize	3852	2760	3191	1606	2902	4549	3575	3227	3416
Sugar beet	22303	20.148	19928	13778	22947	32393	29431	34889	38607
Sun flower	1494	1409	19928	822	1106	1682	1554	1446	38607
Potatoes	20657	10999	12360	12273	14398	16654	14185	14048	15381
Vegetables	14448	9446	12008	10866	11895	15915	14886	14241	14662
U.E.									
Cereals, of which:	4096	4320	4270	4540	4731	5339	4691	5213	5066
- wheat	4265	4811	4668	4985	4969	5616	5084	5673	5405
- maize	5418	4811	5530	5520	6500	7156	6541	7142	6922
Sugar beet	42487	48039	46790	55171	57848	59542	59154	66478	71036
Sun flower	1556	1614	1362	1408	1545	1837	1737	1889	1791
Potatoes	22236	22123	21301	25596	26854	28617	25071	28992	30038
Vegetables	20489	20664	21539	24315	24470	26541	25180	26186	27163

Source: FAOSTAT, database available at: http://faostat.fao.org, last accessed 9.04.2011.

Undoubtedly, these large differences in terms of performance per hectare or per animal, are based on inputs, both in their quantitative and qualitative component, promoters of technical progress in this sector. However, facts prove that, within the causes that keep the agricultural performance at a very low level, and among the prohibit character of inputs that determine a technological progress, a major role is played by the population working in the field, the land property as well as the marketplace. Such an approach is

motivated by the internal structure of family farms, which in Romanian agriculture are nearly 4 million.

Table 3. Yields per animal, 1985-2009

Items	UM	1985	1990	1995	2000	2002	2004	2006	2008	2009
ROMÂNIA										
Cattle meat	Carcass weight kg/year	154	146	135	116	126	159	137	139	163
Pig meat	Carcass weight kg/year	79	84	85	87	89	81	82	83	82
Cow milk	Kg/year	2007	1744	2910	2542	2753	3115	3625	3426	3458
EU										
Cattle meat	Carcass weight kg/year	235	253	252	256	259	272	276	280	280
Pig meat	Carcass weight kg/year	82	84	85	86	87	88	87	87	88
Cow milk	Kg/year	3986	4345	4858	5420	5577	5763	6013	6104	6117

Source: FAOSTAT, database available on line: http://faostat.fao.org, last accessed 9.04.2011.

In Romania there are more than a third of EU farmers; however, agricultural production is only a tenth of the production recorded in EU countries. In the last 20 years the rural population has experienced some negative aspects that have led to a decrease in its production potential. In a synthetic approach, here are some of them:

- Decrease of rural population from 9.6 million people in 1990 to 10.8 million people in 2008;
- Increase of average age and thus, increase the third age people involved in productive activities;
- Natural growth of population has registered negative values, which have fluctuated between 94-96%;
- The appearance of a new phenomena, especially after Romania's accession to the EU, with dramatic consequences in the equilibrium, already fragile, of socio-economic relations in rural areas, namely the external drain, estimated at nearly one million active people;
- Maintaining and even reducing the level of training and professionalization of the rural population – it is estimated that more than 90% of rural population are educated at the elementary level only.

All these negative aspects are common to employed population in agriculture, but more profound. For example, in agriculture, in 1992, the population amounted to 3.5 million people, and in 2008, 2.5 million people. The decrease was, as the one in the countryside, of one million persons.

The problem, in terms of efficiency, is whether this decrease in the number of people active in agriculture was compensated by increased technical

equipment. It is known that in agriculture, the human power may be replaced by animal power or mechanical force, where the tractor is one of the main vectors of promoting scientific and technical progress in the branch.

The data of Table 4 reveals that, in 2008 compared to 1992, a tractor had to replace the work of 7.14 people that left the branch, which means that the cultivated agricultural area per tractor had to be of 26.02 ha (7.14 persons / ha x 3.68 ha / person) and not 52.3 ha, how many are in present. Such a situation shows that the growth rate of technical equipment of the Romanian agriculture has been exceeded by the pace of agricultural population decrease, which took us far away from the EU average (11,8 ha/tractor), but even worse, it caused the abandonment of large areas of agricultural land, unique phenomenon in the Romanian agriculture.

Table 4. Cultivated agricultural area per person and per tractor

Items	1992	2008
Cultivated agricultural area per person (ha/person)	2,63	3,68
Cultivated agricultural area per tractor (ha/tractor)	56,1	52,3
Number of farmers per tractor (persons/tractor)	21,34	14,20

Source: own calculation, Romanian Statistical Yearbook 2009, Time series 1990-2008, available on line: http://www.insse.ro/cms/files/Anuar%20statistic/11/11.1.xls, last accessed 25.11.2011.

Currently, it is estimated that the abandoned agricultural area represents about 2.5 million ha, decreasing from two years ago, when the statistical surveys estimated this area to over 4 million hectares.

The other two socio-demographic phenomena with dramatic effects on the Romanian agriculture potential are given by the age and natural growth of people working in the branch. Nowadays, young farmers (under 40) represent only 10% of the total population of farmers and they own less than 10% of agricultural land. By contrast, farmers that have exceeded retirement age (over 65 years) represent 43% of the total number of farmers, and own 31% of agricultural land. Among these two segments there is the one between 40 and 55 years old, which owns, indeed, a significant share. However, without taking replacement measures, the share of farm leaders aged over 65, will increase significantly in coming years.

The main cause of Romania's aging population, and by extension, the rural population, is due to a decreasing birth rate. If the birth rate decreased, the natural growth of population would also record negative values, which in the last two decades never reached the rate of 100% as it was observed in the economically developed countries in EU. The negative values of the natural growth are due not only to the higher degree of aging of agricultural population,

but also the significantly lower income, poorer quality of public services and much lower promoting opportunities.

12.3. Land ownership

Nowadays land ownership, paradoxically, no longer creates wealth for peasants. The great challenge, on scientific and economic level, is to realize to what extent the land ownership can generate capitalist relations, producing welfare for the farmers and food sufficiency for the consumers. Most researchers of agricultural economics consider that, regarding the land ownership, the main shortcomings result from the farm size, which in Romania is about 3.5 ha, the lowest in the EU. Their approach is not wrong, yet it is only the tip of the iceberg. In the agricultural property field we may mention some major shortcomings, other than those related to farm size, with direct restrictive effects over the performance, namely:

- The high degree of farm parcelling, on average are 4.5 plots, with an average size of about 6000 square meters/plot;
- The legislative framework governing the land market shares referring to the sale of land, lease, rental, cooperative and association, is ambiguous and inconsistent in terms of stimulating the fusion of parcels and the growth of land property size;
- The delay in completion of the cadaster actions and land registration, which causes a high level of volatility in the property rights regime;
- The proliferation of speculative actions on the land market, with negative effects on agricultural land prices, land market stability, and what is most harmful in terms of performance of the branch, maintenance and proliferation of removal from the agricultural circuit of land, either permanently through construction of any kind, or temporarily by abandoning their cultivation.
- Lack of a law that equals, through specialized mathematical calculations, the economic value of agricultural land, which would be a starting point in negotiating land market economic categories, referring to the price of land, lease, rent or dividends.

12.4. Agricultural production and market

Regarding the agricultural production, specialized studies treat distinctly family farms compared to large farms, of commercial type. The commercial farms are over 31 thousand, own an agricultural area of about 45% of the total Romanian agricultural area and have an average size of over 190 ha. Also regarding the large,

commercial farms, performance issues related to production and market connections are in very similar positions to those of developed European countries.

In family farms (over 3,8 million, with an average size of 3,5 ha, which own almost 54% of the agricultural land), performances registered in production and efficiency, as well as in market linkages, are among lowest of all EU countries.

In fact, the Romanian agriculture in its essential coordinates, in terms of its connection to the CAP, was and is still judged in the light of the shortcomings faced by small family farms. For scientific research, and by extension, for agricultural policy decision makers, is important to know to what extent CAP has or has not contributed to performance increase in family farms after Romania's EU integration. Taking into consideration the main indicators characterizing agriculture after 2007, mentioned above, we can see that the CAP actions have not led to a significant increase of agricultural performance. All these shortcomings generate the natural question: did CAP correctly configure the Romanian agricultural support?

In order to answer correctly to this question, we need to analyze the CAP philosophy, on two doctrinal directions: Pillar I and Pillar II. According to the operation philosophy of Pillar I, the agriculture of the first 15 member states was oriented and supported to produce as much for the market as possible. The intervention scheme throughout the period when CAP was implemented only by Pillar I, between 1962 and 2003, was, in essence, quite simple, because:

The farmer received financial support only for the production that was valued on the market, based on recognized contractual relationships;

- The financial support was the result of a scheme where the intervention price was the key factor (Figure 1);
- Intervention price fluctuated within predetermined limits – minimum or maximum – depending of the demand intensity, so that if the market interest was higher for a specific product, the intervention price would increase to a maximum, and vice versa;
- The granted subsidies aimed, naturally, at the development of farm productive capacity, rather than the unproductive consumption.

Production support, through price, during the first 40 years of CAP, proved that a farmer, regardless of his nature, big or small, traditional or industrial, answered quickly and efficiently to the social command, as well as to capitalist market. The production imbalances in 1980s, referring to agricultural stocks, or the higher and higher allocation from the UE budget, were removed through MacSharry reform of 1992.

Then, removing the price support, in 2003, which was proved to be beneficial in terms of performance and efficiency, both on the supply, but mostly on agricultural market demand, does not seem credible. Here is why we link the cessation from 2003 less to the above mentioned imbalances and

more to the political decisions which were supposed to lead to an EU extension, in 2004 and 2007.

Figure 1. Intervention scheme, under Pillar I, through price over the producers, between 1962 and 2003
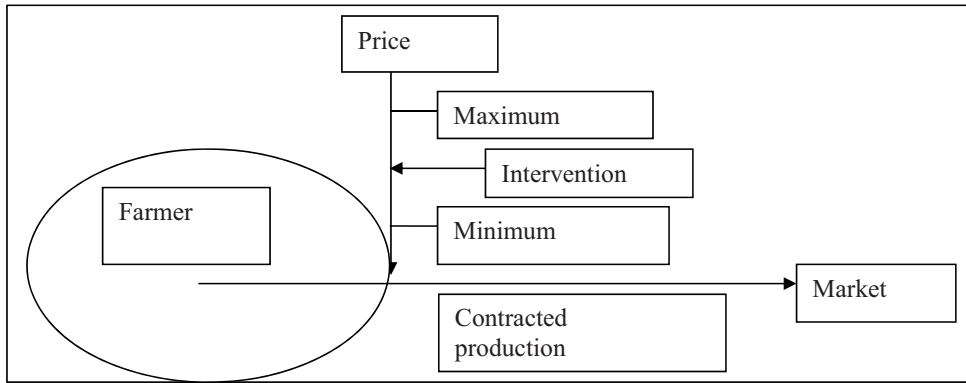
In fact, this decision, in terms of agricultural policy, has established two categories of states:

- The first one comprises the 15 countries that entered EU by the end of 1995, and have managed to improve their agricultures due to the price support advantages;
- The second one of the 12 countries that adhered to EU after 2003; these countries' economic and agricultural performances were less than modest, compared to the ones from the first group.

The EU interest over the states from the second category consists in their geo-strategic position, their size and resources, but, most of all, in their absorption potential regarding the performance excess of the countries belonging to the first category. Therefore, the integration of the last countries, in 2004 and 2007, was a saving solution for capitalization of the surpluses in agriculture, but also in other sectors of the economy of countries belonging to the first group.

In this context, the 2003 CAP reform, with only a year before the biggest integration wave, acquires new dimensions which cannot be motivated by reasoning that aim advantages for all the states involved, or for all producers or consumers categories.

Since 2003, in the Pillar I view, support occurs outside the rules of agricultural markets, and has a main objective: stimulating the farmer families' income (Figure 2). In this case, CAP addresses to all farmer categories, and the subsidies are determined depending on certain conditions relating to area, conditions, in terms of size, proportional to the size of land holdings. In economic terms, the subsidies are conditioned by the size of a production factor and not the size of

production or efficiency efforts. It should be noticed that these subsidies run out of the market outcomes and target consumption rather than development.

In a mechanistic approach, it can be appreciated that to a smaller area subsidies are also smaller, and vice versa; this should have determined farmer families to increase their farm size, because the CAP subsidies would have increased as well. Experience has shown that such behavior on behalf of farmers is valid, but in a completely different direction. This phenomenon is due to the fact that most of Romanian peasants, landowners, live in poverty and lack the financial resources to acquire new surfaces, in order to increase their land size. Under these conditions, they are content with the subsidies on land they already own, and refuse any form of land alienation.

Figure 2. Support scheme per surface, after 2003
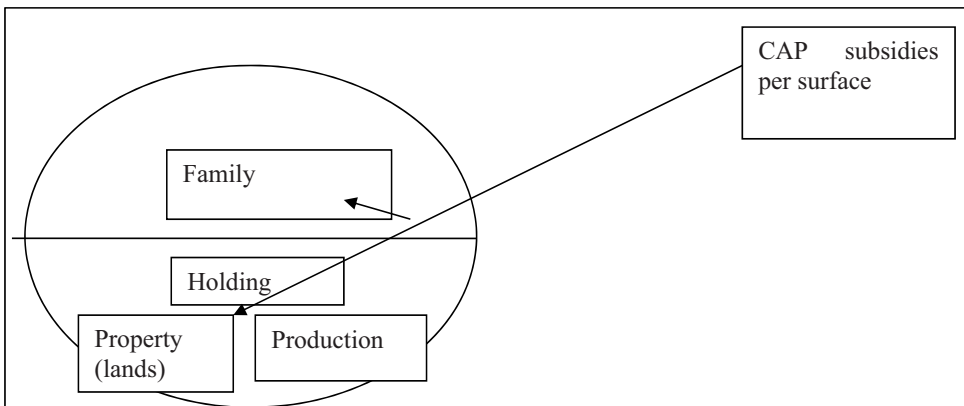
The practice of the last three years of CAP in Romania proved that, even if the subsidies per surface received a certain interest from farmer families, the macroeconomic effects of their implementation have been devastating, because: land market, regardless of its forms of manifestation (selling – buying, cooperative, association or lease) registered the lowest functioning levels in the last decade; more than 2,5 million hectares of agricultural land were abandoned; capitalization degree and the production performance registered decreasing rates; domestic demand for agricultural products is covered in a large and increasing proportion by imported products. However, most painful is the fact that the standard of living, to which the farm subsidies were and still are directed, has not improved.

In Pillar II, the main objective is the stimulation of agricultural holdings performances (Figure 3). In this case, through CAP, funds are allocated on three defining components of agricultural holdings structure: family, property and production, in order to increase both the production performance and economic efficiency.

Judging this stimulation form in relation to the agricultural market, we can draw two types of manifestation:

- If the supply of agricultural market is below demand, we can be certain that the model can be viable. This is the typical case of agriculture with a lower efficiency level, and therefore, the case of Romania.
- If the supply is above or at least equal to demand, the model is most certainly unpractical, because it can naturally generate the same types of disturbances occurred in the agriculture of EU countries, in the 1990s.

Figure 3. Stimulation of agricultural holdings performances scheme
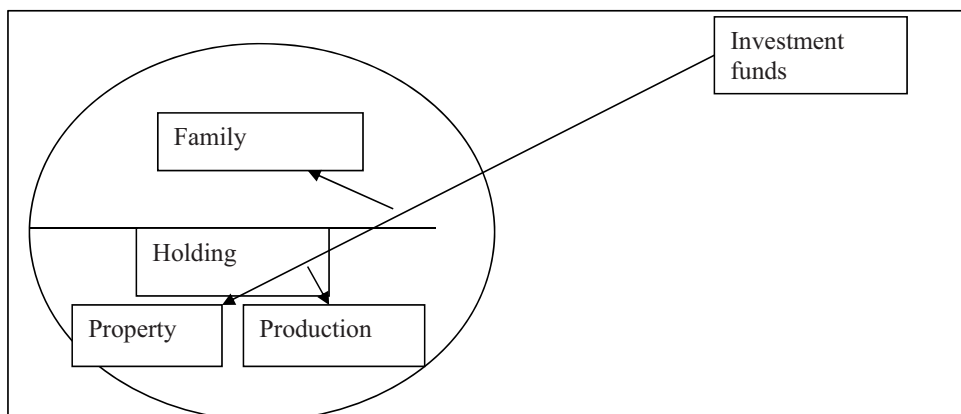
The version of agricultural holdings performances support fall under economic liberalism, which ensures the necessary application energy in a wider time period, even if it runs outside the game between the supply and demand of agricultural products. Less positive side is given, not by the work philosophy, but by the field of application. In Romanian agriculture, not more than 25 thousand agricultural farms, against over 4.2 million nowadays, can effectively access investment funds.

12.5. Conclusions

Subsistence farm approach, as a key element in evaluating the Common Agricultural Policy actions for the period 2014-2021, will definitely not solve the problem of Romanian agriculture underdevelopment. The viable solution for the Romanian agriculture is, as supported since the 1990s, to connect it to the market. In other words, set it in line with market requirements. In fact, we do not suggest anything else than what Europeans have requested for their own agricultures from 1962 to 2003: sustaining through price the production for market. This is the only guarantee in favor of progress in the field.

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Dr Andrew F. Fieldsend,
Research Institute of Agricultural Economics, Budapest, Hungary

13. Sector-specific factors affecting employment in rural areas in the European Union

13.1. Introduction and methodology

In December 2006 the European Commission (EC) published its first call for project proposals under the Food, Agriculture and Fisheries, and Biotechnology theme of the new Seventh Framework Programme for Research and Technological Development ('Framework 7'). It included the topic *New sources of employment in rural areas*, for which proposals were invited for 'small collaborative projects' with the expected impact of 'allow(ing) a better targeting of rural development measures and future evolution of rural development policies in line with the Lisbon Strategy'. Five proposals were submitted from which the project entitled *New Sources of Employment to Promote the Wealth-Generating Capacity of Rural Communities* (acronym ruraljobs, www.ruraljobs.org, see Fieldsend [2008a] for a short description) was selected for funding.

The ruraljobs research was expected to 'identify employment growth areas where rural development programmes can be targeted to increase their contribution to employment creation'. Fieldsend [2011] showed that that the potential for new jobs in rural areas exists in most economic sectors. However, other studies have revealed that the translation of rural development from the policy level to practice depends upon the particular conditions that exist in given rural areas [Murdoch 2000]. Thus, it was necessary to develop a methodological approach that would provide a clearer understanding of the ways in which these conditions impact on the potential for job creation. This paper describes the approach that was taken and the results that were obtained.

Research was conducted in eight case study areas in five countries (Table 1) selected according to a 'typology' of rural areas with GDP per capita, accessibility to an urban centre of 50,000 or more inhabitants, and population density as criteria. A brief description of each region is given by Fieldsend [2010a]. The evidence base for the research consisted of (a) information gathered from interviews with local actors/key experts, (b) quantitative data sets and (c) previously published (mainly local) studies.

Ruraljobs used the driving force, pressure, state, impact and response (DPSIR) framework to show the link between 'driving forces' which affect employment and economic prosperity, and policy responses [Fieldsend, 2010b]. In brief, rural employment (jobs per person of working age), represents the *state* in the model. Employment has an *impact* on economic prosperity and other issues

such as social cohesion, and these in turn influence policy (and other, such as socio-economic) *responses*. These responses may be targeted either at the *driving forces* which in turn influence the *pressures* on employment, i.e. supply of labour (working age population) and supply of jobs (economic activity), or directly at the creation of more and better jobs (Figure 1).

'Rural employment' was defined as 'any income-generating activity undertaken by an individual that takes place in a rural area'. This definition covers both the self-employed and employees, and all sectors of the economy. In line with the Sustainable Livelihoods Approach of dfid [2009], the *driving forces* were defined as human, social, physical, financial and natural capital.

In each case study area, a SWOT analysis of rural employment potential was conducted. The *internal audit* i.e. the Strengths and Weaknesses, was based on the 'assets' of the case study area, i.e. the 'driving forces' which are internal to the DPSIR loop (Figure 2). The asset does not necessarily need to be *within* the territory. 'Proximity to an international airport' may be a Strength even if the airport is not within the territory. Also, the status of an asset relative to a neighbouring territory may also be relevant. For example, 'unattractive landscape' may be a Weakness especially if that in the neighbouring territory is particularly attractive. The *external audit* i.e. the Opportunities and Threats was based on factors influencing change in the rural economy (and therefore rural employment) in the case study area. Opportunities could be the basis of the 'new sources of employment', while Threats are factors which are leading to a decline in employment in rural areas.

With the help of local experts, in each case study area the Opportunities and Threats (and also the Strengths and Weaknesses) were then ranked in order of importance.

The most significant Opportunities for rural job creation (and some Threats to jobs) are reviewed in the context of the Strengths and Weaknesses of the case study areas. Their incidence is summarised in Table 2. Occasional reference is made in the text to 'minor' Opportunities or Threats, i.e. those likely to have somewhat less impact on job creation.

13.2. The agri-food and forestry supply chains

Potential for new jobs in these supply chains, within the overall trend of job losses in farming was noted in all case study areas. Demand for products of the agri-food supply chain was identified as an Opportunity in three EU-15 case study areas, as follows:

'*Diverse demand for agri-food products*' in the Chelmsford and Braintree TTWA. It is estimated that a net balance (accounting for further job losses in farming) of 940 new jobs could be created by 2020 in a labour market area of ca. 40,000 rural jobs. Job creation will be in the sectors where GVA is relatively high and that are skills and knowledge led, such as processing, logistics and

wholesaling. Demand will mainly be driven by the long-term trends towards eating out, ready meals and convenience meals. Local foods/short supply chains (farmers' markets etc.) are already quite well established. '*Mechanisation of agricultural/horticultural primary production*' was suggested as a possible Threat to rural jobs in the Chelmsford and Braintree TTWA, but while no doubt occurring, the low numbers of people employed in farming in the case study area mean that the overall impact of mechanisation on rural jobs in this particular case study area will be very small. On some arable farms the GVA per employee is already comparable to some of the best industrial sectors.

'*Changing demands for short supply chains for local agricultural production*' in Pays de Tulle, where a return to the consumption of local products via short supply chains seems to be increasing. Along with '*Increase in farm size*' (with the probable future need to employ farm workers), this may lead to more farming jobs in lieu of family labour on small farms. These new workers will need to be competent, qualified and adaptable. Two possible relevant Threats are, firstly '*No clear picture of the future of aid mechanisms, particularly the Common Agricultural Policy (CAP)*', reflecting the fact that uncertainty about changes after 2013 may affect investment decisions and, secondly, '*Poor image of agricultural jobs*'. '*Agricultural sector with little diversification*' is a Weakness which can limit the ability of farming to respond to new opportunities, as can '*Difficult access for new set-ups*', which can discourage innovative entrants. This latter problem also exists in the Chelmsford and Braintree TTWA.

In Pays de Guéret 'Existence of a small market (individuals, institutional catering) for local products via short supply chains, direct selling & local market gardening' is an Opportunity. Here, short supply chains are still in their infancy but early initiatives, such as one targeting 'passing trade' along the main RN 145 road, are showing promise. Weaknesses are a 'Lack of organisation in the marketing and processing of local resources (beef products, timber)' and a 'Lack of organisation of the downstream production phases to contend with mass retailing'. Also, 'Difficulty in obtaining land' reflects the fact that it is difficult for new farmers to start a business because of the low income on small farms and prohibitive cost of larger ones.

In Thames Gateway South Essex '*Environmental Stewardship (agri-environment schemes)*' is an Opportunity, perhaps reflecting the increasing importance of management of land as a 'public good' in this predominantly urban area.

Rural areas in the post-socialist NMS have had to cope with the transition after 1991 from central planning systems towards a democratic society, market economy and European Union (EU) accession. The continuing impacts on rural employment were clearly shown in the case study area reports. In Pazardjik AA most of the agricultural cooperatives were broken up; the collective farms in Hajdúszoboszló LLS were also split up, and many former employees with no other skills have been unable to reintegrate into the labour market, a process also reported in Bistriţa-Năsăud county. The percentage of economically active per-

sons (including semi-subsistence farmers) in farming remains much higher than in the ruraljobs case study areas in the EU-15.

Despite the continuing loss of farming jobs the strong agricultural tradition is reflected in the fact that the agri-food chain is seen as an important Opportunity for rural job creation in the SWOT analyses of all four NMS, for example: '*Utilisation of the potential in the intensive agricultural production*' in Pazardjik AA, where high-value horticultural production could be developed. This Opportunity would build on the following Strengths: '*Availability of productive arable land suitable for high-intensive crop growing*' and '*Mastered and accrued traditions in agriculture, especially in horticulture and fruit-growing*' in Pazardjik AA; '*Exceptional conditions of agriculture (climate, soil)*' in Hajdúszoboszló LLS and Karcag LLS, plus '*Tradition based agricultural secondary and higher education*' in the latter; and '*Agricultural potential (crop production, orchards and nurseries, hayfields and pastures, animal husbandry, horticulture, fisheries and apiculture)*' in Bistriţa-Năsăud county.

Notably, no NMS case study area SWOT analyses actually specify *demand* for local agri-food products as an Opportunity. Indeed the lack of markets for local products was identified as a Threat in Pazardjik AA ('*Lack of markets and devoid of existing channels for realisation of the production and non-loyal competitiveness of trade retail chains*') and in Bistriţa-Năsăud county ('*Low domestic interest for rural tourism and local products*'). Since both case study areas have large urban centres, lack of markets is not due to remoteness. In fact, ruraljobs research suggests that in Hajdúszoboszló LLS there is potential for development of product chains and integration of local products in the tourist industry ('*Increasing the competitiveness and the range of local products*' is an Opportunity) whilst in Karcag LLS organic farming could be linked with the developing wellness and spa tourism industry ('*Creation of local agricultural products, establishment of domestic food industry*' is an Opportunity). Cold storage and developing milling, meat and dairy processors would add value to locally produced products but in Hajdúszoboszló LLS '*Multinational companies put local entrepreneurs in a difficult position*' is a Threat.

The need to develop competitive commercial farms in Bistriţa-Năsăud county is recognised, associated with which the workforce could migrate from crop production towards stock breeding, food processing and other upstream and downstream activities linked to agriculture, and '*EU and national funds for the development of the agricultural sector (for example the programme for the installation of young farmers) and the development of agricultural services (inputs, equipment, consulting)*' is seen as an Opportunity whilst '*The system of funding of agriculture*' is a Threat. These funds would need to address Weaknesses such as '*The problem of storage and marketing of the agricultural production is not resolved*' but the process is obstructed by a further Weakness: '*Farmers do not have the necessary knowledge to attract European funds*'.

A Weaknesses in Pazardjik AA, '*Uncompetitive agriculture due to the fragmentation and lack of effective organisational production forms*', highlights the key issue of fragmentation of land ownership causing production inefficiencies, lack of organisation amongst producers and the lack of ability to attract investment, particularly in Bulgaria and Romania. It was noted in Hajdúszoboszló LLS and Karcag LLS as a cause of economic inefficiency in farming but was not listed as a Weakness in the SWOT analyses. Land fragmentation has been accompanied by the emergence of semi-subsistence farming as a significant form of rural economic activity. The Bulgarian and Romanian reports stress the economic significance of semi-subsistence farming in these case study areas. In 2002, 72.6% of 'employment' in rural areas of Bistriţa-Năsăud county was in farming, of which the big majority of persons were semi-subsistence farmers. In some peripheral parts of Pazardjik AA, 'the economic activity is reduced to farms producing for their own consumption and some trade services'. Across the EU and beyond, family (especially female) farm labour is often not formally recognised [Fieldsend 2008b] and this is a particularly significant problem on small farms.

In Bistriţa-Năsăud county 'Diversification of agriculture and pluriactivity at family farm-level (microfarms, orchards, animal husbandry, marketing, processing and logistics of agricultural products)' is an Opportunity. A lack of significant alternative sources of employment in the case study area means that a rapid reduction in the levels of semi-subsistence farming is unlikely. Some 'microfarms' may be able to benefit from the potential offered by short supply chains by adding value to their produce, for example through processing. It should not be assumed, however, that all semi-subsistence farmers are (a) economically dependent solely on farming and (b) actually part of the labour market (rather than being, for example, retirees). In Pazardjik AA about 73% of rural population is engaged in agriculture but only about 35% of them rely exclusively on agricultural production, as most are retired persons and obtain pensions, while another part of them possess secondary gainful activity. Here a family member of working age, often a woman with a comparatively good qualification, would have a main job outside of agriculture which is the main cash source for the family household.

Regarding the forestry supply chain, '*Increasing demand for forestry products*' was noted as an Opportunity in Pays de Tulle and in Pays de Guéret which, in the former, can build on the Strength of '*Partially mobilisable forestry resources*'. Exceptional production conditions are offset by uneven terrain, divided land structure and underdeveloped potential. '*Significant wooded areas for sustainable exploitation (forestry, industry of wood) especially in the Northern and North-Eastern part of the county*' is a Strength in Bistriţa-Năsăud county and, although no specific Opportunity is listed, in the relatively sparsely populated mountainous area this could be a source of jobs for the population. A recognised Weakness is '*The uncontrolled exploitation of the forests*'; without

a proper afforestation the forests (and their ability to provide jobs) will significantly diminish. The potential of forestry to support jobs in Pazardjik AA is discussed in the case study area report but does not appear in the SWOT analysis. The other ruraljobs case study areas do not contain significant areas of forest or woodland.

13.3. The energy and water supply chains

Although the demand for energy from biomass and biofuels (crops, woodland and forest) is increasing significantly, it was not specifically mentioned in any ruraljobs SWOT analyses. Primary production is often seen as part of the farming and forestry sectors, while the later stages of the supply chain are treated as part of the overall energy supply chain.

'*Demand for electricity*' was identified as an Opportunity in the Chelmsford and Braintree TTWA which, in terms of new rural jobs, could be met by nuclear power and wind energy. '*NIMBY attitude in rural communities to development*' is a Weakness which can particularly obstruct 'emotive' developments such as these [see also Marsden 1998].

In Pays de Tulle and Pays de Guéret, an important Opportunity is '*Increasing demand related to the green economy*', a topic which includes new services, eco-industries and renewable energies, as well as forestry products mentioned above. Many recent reports [e.g. Quirion and Demailly 2008; Jolly *et al*. 2010] have shown that the 'green economy' constitutes an economic opportunity in terms of potential jobs. According to IPPR, cited by SWRDA [2009] 'there is no accepted definition of what 'green jobs' actually are. The term has variously been used to refer to jobs in environmental services, new renewable energy plant and other low carbon energy sources, production of low carbon or environmentally-friendly products, installation of energy efficiency measures, environmental consulting and low carbon finance there is no single, generic 'green' skillset' (p.2). The term can thus cause confusion, and 'green jobs' are not exclusively 'rural jobs' as they include activities such as insulation of buildings in cities. However, through the renewable energy supply chain and other activities such as those that 'protect ecosystems and biodiversity; reduce energy, materials, and water consumption through high efficiency strategies; decarbonize the economy; and minimize or altogether avoid generation of all forms of waste and pollution' [UNEP, 2008], many rural jobs can indeed be 'green jobs'.

In Pazardjik AA, an Opportunity is 'Development of renewable energy sources, particularly solar energetic systems', although 'Development of renewable energy sources is characterised with murky future because of high prices and issues concerning the allocation of the investment costs' is seen as a Threat. The energy supply chain does not feature in the SWOT analyses of other NMS case study areas, but this does not mean that Opportunities do not exist. The Bis-

triţa-Năsăud county case study area report notes 'There is a lack of innovative thinking even at the level of highly specialised persons Combating climate exchange, or renewable energy production were not mentioned as employment-generating alternatives, showing that local stakeholders are not familiar with the new trends of the global economy'.

Apart from '*Climate change - drought and flooding*', a Threat in Thames Gateway South Essex, the water supply chain was not mentioned in any SWOT analysis. Regarding depletive natural resources (included in this section for convenience), '*Exhaustion of sand and gravel resources*' was listed as a minor Threat to jobs in the Chelmsford and Braintree TTWA.

13.4. Tourism and leisure

A clear local demand for rural tourism and leisure was noted in most case study areas. '*Demand for short break tourism*' and '*Demand for leisure activities*' are Opportunities in the Chelmsford and Braintree TTWA where it is estimated that 570 rural tourism jobs could be created over the next five years. '*Attractive area to visit and stay*' is a Strength which covers natural (wildlife, landscape, coast) and cultural (buildings etc.) Capital. A possible Weakness, '*Inadequate standard of facilities for tourists*', is not however a major concern. In Thames Gateway South Essex '*Farm diversification*' (into tourism) could be a specific Opportunity for farmers while '*Fly tipping*' (i.e. Illegal dumping of rubbish), which reduces the aesthetic quality of the environment, could be Threat to rural tourism and leisure development.

In Pays de Tulle and Pays de Guéret '*Tourism*', particularly a '*Growing demand for green, nature-focused tourism*', is an Opportunity but the need for a highly innovative 'offer' which sets these areas apart from other, similar, areas is recognised. The demand for leisure services by the '*Active ageing*' elderly population is part of this Opportunity. '*Pleasant surroundings*' (including the environment) is a Strength in Pays de Tulle and in Pays de Guéret while relevant Weaknesses are '*Lack of image from outside the territory*' (as with the two Essex case study areas, both regions have a rather negative image and people only seem to change their opinion when they visit the areas on holiday) and, in Pays de Tulle, an '*Unattractive and poorly co-ordinated tourism sector*'. This covers both the lack of a single office for tourism, with branches across the territory, and the inadequate quantity and quality of tourist accommodation. In view of the low skilled and seasonal nature of many tourism related jobs, '*New potential sources of low-paid, insecure jobs*' (in which employees have little interest) and '*Low prestige of manual jobs*' may be relevant Threats in Pays de Tulle and '*Low local incomes*' a Weakness in Pays de Guéret.

In Pazardjik AA 'Attraction of more people from the urban centres into rural areas, drawn by pure nature, open landscape and possibilities for recreation' is an Opportunity which recognises the proximity of a large urban market.

Investment is needed to stimulate demand so 'Enticement of public-private investments designated to the natural and cultural sites of the region' is also an Opportunity but 'Inability to work with public funds and imminent political risks from their cessation' is a Threat. Several tourism-related Strengths are noted, namely: 'Availability of several points with mineral and hot water springs', 'Archaeological heritage of ancient origin, which is still unexplored' and 'Comparatively saved and preserved rural areas in relation to human capital, potential for provision of leisure labour force'.

'Utilisation of the opportunities of tourism and its development' is an Opportunity in Karcag LLS which can build on Strengths such as the 'Rich cultural and historical heritage' and 'Thermal water and related high level spa services'. 'Developed tourism' is a Strength in Hajdúszoboszló LLS but 'Seasonal employment' (in agriculture and tourism) is a Weakness. In Bistriţa-Năsăud county 'Touristic potential' is a Strength which covers agrotourism, mountain and ecological tourism and cultural tourism, natural amenities, reservations, tourist establishments and pensions from the mountain area, historic monuments and cultural traditions.'EU and national funds for the development of the non-agricultural sector from the rural area' is another Opportunity in the county but 'Low domestic interest for rural tourism and local products' is a Threat. The Bistriţa-Năsăud county case study area report includes the quote 'Romanians do not like going to the countryside'.

13.5. Financial services, manufacturing, construction, trade, transport and communication

This section includes most of the sectors which, according to EC (2008), are 'drivers of economic growth'. It will be noted that almost all references here are to EU-15 case study areas.

'*Knowledge-based, low environmental impact, businesses*' is a major Opportunity for rural job creation in the Chelmsford and Braintree TTWA, with possibly a 20% increase in the number of jobs by 2020. The siting of such businesses is often determined by the relocation choices of their owners/directors and the case study area has many relevant Strengths. '*Attractive business location*' covers factors such as lower start up costs, rents and rates, easier vehicular access and parking, easier or no commuting, low crime and a pleasant working environment. The relocation choices frequently also take into account the '*Pleasant living environment*' and the '*High quality of lifestyle*' of rural areas. As many of these businesses sell their products/services over the Internet a major Weakness is '*Low broadband speeds*'. '*Lack of affordable housing*' and '*Poor rural transport infrastructure*' can reduce the availability of employees. The '*Large stock of redundant farm buildings*' can provide start-up business accommodation but '*Urban-centric economic planning and development strategies*' and '*NIMBY attitude in rural communities to development*' can make it

difficult for entrepreneurs to get permission to set up such businesses in rural areas. Noted as a less serious Weakness was '*Lack of new or high quality commercial accommodation*'. '*Home based businesses/consultancies*' is another major Opportunity which relies on many of the same Strengths and Weaknesses.

It is not clear why Financial and business (and related) services are not mentioned in the Thames Gateway South Essex case study area report, given that it states that 'rural businesses are not as constrained as they were [regarding] the take-up of broadband', the number of such businesses has increased significantly in recent years, and '*Covered by ADSL broadband*' is a Strength of the case study area. However, '*Gaining planning permission*' '*House price inflation/ high property costs*' and '*Relatively high crime rate*' (probably originating from nearby urban centres) are Weaknesses which can discourage such businesses from setting up in, or relocating to, rural areas. Even when ICT services are available, take-up may be constrained in the first instance by lack of skills and other issues. The Financial and business services sector was not mentioned in any other case study area SWOT analysis.

'*Home based working remote from the office*' ('teleworking') is an Opportunity in the Chelmsford and Braintree TTWA which is also encouraged by the Strengths of the '*Pleasant living environment*' and the '*High quality of lifestyle*' of rural areas, and discouraged by the Weakness of '*Low broadband speeds*'. In Pays de Tulle, with almost complete broadband coverage, '*Good information infrastructures*' (broadband) as well as the above-mentioned Strength of '*Pleasant surroundings*' should encourage rurally-based teleworking. In Pays de Guéret, although a Weakness is that '*There are still some areas with no Internet or mobile phone coverage*', '*Internet-based businesses are developing*' (e-commerce, teleworking) is already an emerging Opportunity. By contrast, in Pazardjik AA it was estimated that only 14% of rural households have any kind of Internet access.

No SWOT analyses mention Opportunities for job creation in manufacturing and in the Chelmsford and Braintree TTWA '*Competition in the low added value manufactured products sector*' is a Threat. Amongst the accessible case study areas '*Demand for (goods) transport and storage*' is a minor Opportunity in the Chelmsford and Braintree TTWA and '*Foundation of economic clusters, integrating processing, stocking, logistic and trade*' is an Opportunity in Pazardjik AA. In Thames Gateway South Essex, '*Construction*' is an Opportunity but much of the construction activity is probably in the urban centres. '*Letting of rural properties*' (e.g. farm buildings) is also an Opportunity there as the similarities in terms of business activities between rural and urban (small) businesses means that many 'urban' businesses could easily move to rural locations (and vice-versa) if suitable accommodation were available. In Karcag LLS (and probably in other NMS case study areas), willingness to build new houses is low due to the low value of houses and the large number of empty properties.

No NMS case study area reports mentioned the idea of using redundant farm buildings to accommodate rural businesses.

In the NMS case study areas, infrastructure improvements are an Opportunity for job creation, as follows: '*Significant resource which is available for amelioration and completion of the road infrastructure*' in Pazardjik AA (where a Weakness is '*The road infrastructure at 3 and 4 classes is in a despicable condition*'), '*Infrastructural development*' in Hajdúszoboszló LLS, '*Infrastructural and economic development*' in Karcag LLS and '*EU and national funds for the improvement of physical infrastructure*' (roads, utilities, etc.) in Bistriţa-Năsăud county where '*Inadequate physical infrastructure*' is a Weakness. '*Poor rural transport infrastructure*' (including roads) is a Weakness in the Chelmsford and Braintree TTWA; although the current provision is clearly much better than in the NMS, higher demands are placed upon it leading to problems such as traffic congestion.

The relative prosperity of the ruraljobs case study areas in the EU-15 is reflected in the demand for trades services. In the Chelmsford and Braintree TTWA an Opportunity is '*Demand for services by 'cash rich, time poor incomers*'. This includes demand by the wealthy retired, who may have relocated to the case study area to live based on Strengths such as '*Pleasant living environment*' and the '*High quality of lifestyle*'. '*Demand for service products*', including increased automation of household appliances (domotics), particularly amongst retired people (again attracted by '*Pleasant living environment*' (nature, safety)), is an Opportunity in Pays de Tulle and Pays de Guéret and '*Need for good quality tradesmen*' is also an Opportunity in the latter. The situation in the NMS case study areas provides a marked contrast. For example, in Pazardjik AA the fact that the '*Population from the urban centres cannot afford yet to look for new quality of life and to move broadly to the rural areas for living*' is seen as a Threat to job creation. In Karcag LLS, Weaknesses include '*Lack of capital within the population and in the economy*' and '*Indebtedness*'. The sector is not mentioned in the other NMS SWOT analyses but several reports remark that trade services are often part of the 'black' economy.

Regarding the retail sector, '*Competition from urban-based supermarkets, DIY stores, garden centres*' is a Threat in the Chelmsford and Braintree TTWA, (where '*Poor local services*' (including retail services) is a Weakness), as is '*Changing consumption patterns (periurban mass retailers, online shopping)*' in Pays de Guéret where '*Attractive supermarket sector*' is listed as a minor Strength. The retail sector is not mentioned in NMS SWOT analyses.

13.6. Health and social work and other public services

'*Demand for services for the ageing population*' (e.g. healthcare, care homes) is an Opportunity in the Chelmsford and Braintree TTWA, as is '*Demand for services in the silver economy*' in Pays de Tulle and Pays de Guéret,

reflecting the increasing numbers of relatively wealthy elderly people in these case study areas. In Pays de Guéret '*Need for neighbourhood services*' (doctors, childminders, mini-creches etc.) and '*Expertise clusters organised around home automation*' (which particularly focuses on the home automation sector for the elderly) are Opportunities and '*Good coverage by personal service organisations*' is a Strength. There is a similar or even greater 'need' for such services in the NMS but in financial terms the 'demand' is much lower as the elderly population is generally poorer owing to low or absent state pensions and fewer occupational pensions. However the Bistriţa-Năsăud county case study area report did note the potential for 'business-based elderly homes for single, wealthy old people from urban areas'. A minor Weakness in the Chelmsford and Braintree TTWA is '*Lack of availability of childcare facilities*'.

The increasing demand for 'Knowledge Intensive Public Services' conflicts with the expected cuts in public sector employment in many EU Member States, not least as a consequence of the economic recession. For example, '*Reduction in the number of civil servants and intervention resources and response capabilities of local authorities*' is a Threat in Pays de Tulle and Pays de Guéret. Most case study areas list the lack or decline of health and related services as a Weakness or Threat: '*Poor local services*' in the Chelmsford and Braintree TTWA, '*Loss of local services*' in Thames Gateway South Essex, '*Disappearance of local services (doctors etc.)*' in Pays de Tulle, '*Disappearance of neighbourhood services (doctors etc.)*' in Pays de Guéret, '*Decadence of the social services, which to facilitate and retain people in the small residential places*' and '*Closure of schools and hospitals*' in Pazardjik AA, and '*Lack of resources in the healthcare system*' in Karcag LLS. At least part of this demand will be met by the voluntary and private sectors. For example, '*Potential for development and assistance to co-operative companies, the social and charitable economy (associations, integration companies), services to individuals*' is an Opportunity in Pays de Tulle and in Pays de Guéret '*Dynamic voluntary sector*' is to some extent a Strength. This type of job often appears to be located in urban areas simply because the association's registered office is there but the scope of activity can extend into rural areas. Innovative forms of service delivery, coupled with strategies to reduce future healthcare demands, such as more effective fitness and nutrition programmes, and less residential home care, will be needed [Audit Commission 2010].

Some attempts to protect public sector services were noted in the research. In the Chelmsford and Braintree TTWA there is a 'presumption against closure' of rural schools and there are 'protected schools' in some remote settlements in Pazardjik AA. However, the remotest settlements tend to have the poorest services, such as in the northern part of Pays de Guéret, where consequently the population is still declining and in-migration is low. In Pazardjik AA, settlements more distant from the towns have limited access to both am-

bulatory and hospital aid, and the problem is extremely acute for old people and those needing emergency aid.

13.7. Conclusions

Historically, the economic contribution of rural areas to regions was clear: it was the provider of farm produce and other raw materials such as coal. Rural employment was evidently based on the exploitation of natural capital. Today, natural capital still strongly characterises the profile of rural employment in the EU but its effect now goes far beyond the traditional rural sector of agriculture. There are in fact four drivers of rural employment and rural economic prosperity, and these can be structured by two complementary analytical directions, namely 'production' based on (a) renewable and (b) non-renewable resources, and 'consumption' by (a) non-residents and (b) residents of a territory. Thus, whether jobs are created through farming, mining, rural tourism or by attracting incomers who set up new businesses, natural capital is a common theme.

Different types of rural areas will, depending on their local circumstances, follow different routes to economic prosperity (in terms both of speed of development and the main wealth-generating activities). However, the financial, human, physical and social capitals of rural areas must be improved in parallel with their natural capital via an integrated, territorial development approach. In this way, rural areas can become part of a smart, sustainable and inclusive economy in line with the priorities of the EU's Europe 2020 strategy [EC 2010].

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13.8. Annex

Table 1. Case study areas included in the ruraljobs research

Name of case study area	Region and country
1. Chelmsford and Braintree Travel to Work Area (TTWA)	Essex, East of England, UK
2. Thames Gateway South Essex	Essex, East of England, UK
3. Pays de Tulle	Correze, Limousin Region, France
4. Pays de Guéret	Creuse, Limousin Region, France
5. Pazardjik agglomeration area (AA)	Central Region, Bulgaria
6. Hajdúszoboszló Local Labour System (LLS)	North Great Plain Region, Hungary
7. Karcag Local Labour System (LLS)	North Great Plain Region, Hungary
8. Bistriţa-Năsăud county	North West Region, Romania

Table 2. Presence in each case study area of sector-specific factors affecting employment in rural areas. See Table 1 for identities of case study areas

Sector	1	2	3	4	5	6	7	8
Agri-food and forestry supply chains								
• Opportunity / Strength	♦	♦	♦	♦	♦	♦	♦	♦
• Threat / Weakness	♦		♦	♦	♦		♦	♦
Energy and water supply chains								
• Opportunity / Strength	♦		♦	♦	♦			
• Threat / Weakness	♦	♦			♦			
Tourism and leisure								
• Opportunity / Strength	♦	♦	♦	♦	♦	♦	♦	♦
• Threat / Weakness		♦	♦	♦	♦	♦		♦
Financial services, manufacturing, construction, trade, transport and communication								
• Opportunity / Strength	♦	♦	♦	♦	♦	♦	♦	♦
• Threat / Weakness	♦	♦		♦	♦		♦	♦
Health and social work and other public services								
• Opportunity / Strength	♦		♦	♦				♦
• Threat / Weakness	♦	♦	♦	♦	♦		♦	

Figure 1. The DPSIR framework applied to employment
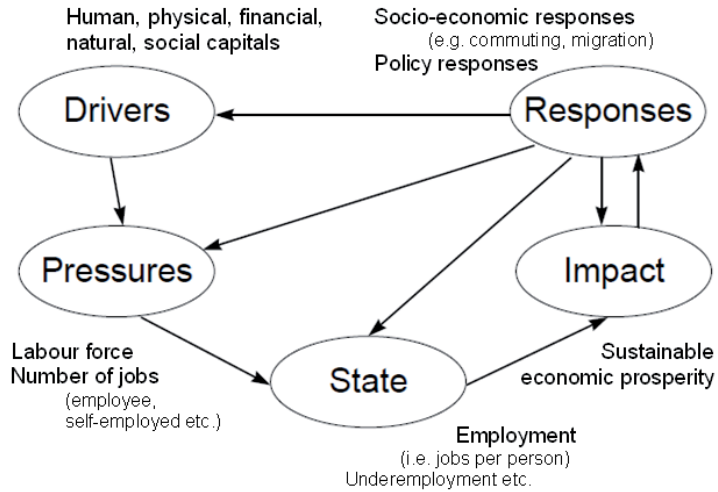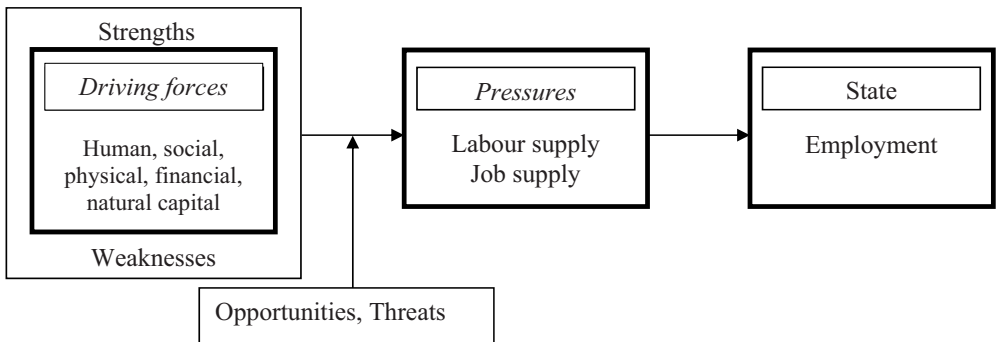[based on a Figure from Smeets and Weterings, 1999]

Figure 2. Relationship between the components of the SWOT analysis and the
DPSIR loop

Prof. PhD.Věra Majerová,
Czech University of Agriculture, Prague

14. The role of social capital in the regional development. The case of Vysocina Region[50]

14.1. Introduction

Regional development has a number of dimensions. Some of them mingle the other ones complement or exclude each other. The fundamental goal of regional development is the quality of life improvement; that is why the social context of every dimension must be taken into account. The variety of factors, which shape the everyday life of inhabitants, can be followed at the case of Vysočina Region.

The term of "social capital" from the sociological point of view emerged in the publications J. Coleman [1980] and P. Bourdieau [1986]. Later is this concept developed by R. D. Putnam [1993, 1999, and 2002]. The different definitions of social capital are based on diverse aspects. Some of them prefer the emphasis of social networks which determine values, norms and sanctions. The others accent the institutional framework of social capital and the quality and quantity of social interaction in the society. The important point is also the existence of understanding that facilitates a co-operation inside the groups as well as among them. We can find many detailed views in the literature. They correspond in the fact, that the concept of social capital can be studied at the level of individuals, small as well as larger social units.

The role of the social capital in the regional development is influenced by the socio-demographic structure of the observed territory. Social capital can be examined in several extents: the first are the formal and non-formal networks; the other dimension is the trust and shared understanding and attitudes of most of the individuals and the social groups. The fundamental forms of social capital are *bridging* networks that are typical by the weak relations that go through the different social groups. They allow accepting all sorts of individual opinions. They don't form closed communities, where the strong trust would be only among the members of the group. On the other hand, the *bonding* social networks are connected with a high level of trust inside the network and accordingly create a high degree of an inner group loyalty. As a rule, it can result in the antagonism and restrain the consistency of a civil community. The examples are: families, clans, nationally oriented groups inside a country etc. Bridging and bonding networks can occur, in certain extent in every regional grouping.

14.2. Regional policy of the Czech Republic

A crucial document of the regional policy is the act 759/1992 „Principles of regional policy in the Czech Republic". In the second half of the nineties, the main principles, procedures, goals and aims started to specify themselves in the regional politics. The law Nr. 248/2000 – is the Collection of Laws about the support of regional policy. It forms together with other laws[51] a fundamental legislative and institutional framework of the regional policy in the Czech Republic. A national and multinational level is defined as well as the conception of the European demands.

14.3. The relation of economic and regional development of the Czech Republic

From the economic and social aspect there is a considerable regional disparity in the Czech Republic. The extensive restructuring of economic and social sources proceeded after the year 1989 which was caused by a cancellation of a centrally planned economic system, introduction of a market economy and opening of free market of labour force. Rural regions were shaped by the influence of different development trends. The conditions of employment of rural population were getting worse from several reasons: the role of agriculture, as a main source of livelihood decreased; rural population commuting to big industrial complexes lost the employment possibilities after the factories went bankrupt or introduced a reduction programmes; socio-demographic structure of rural inhabitants limited the possibilities of the creation of new entrepreneurial subjects; limited opportunities of the rural infrastructure did not draw any qualified labour force; growing unemployment deteriorated life conditions of rural inhabitants. There is no doubt that the economic conditions of regions have the important influence on a creation of the social capital. The possibilities to use EU structural funds after the joining of the Czech Republic to European Union helped to stop some unfavourable developmental trends. Especially the LEADER programme was focused on the building of social networks and ties on the village. Its contribution to the regional development is remarkable.

14.4. The relation of social capital and regional development in the Czech Republic

Creation and stabilization of social capital in the regions are determined by many factors. Post-war arrangement of Czechoslovakia was influenced by war losses, by selective slaughter as well as by massive displacement of original inhabitants. Analogously to other European countries which were hit by the WW II.,

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[51] Law Nr. 128/2000 Sb., Law Nr. 129/2000 Sb.,Law Nr.132/2000 Sb.

also in Czechoslovakia some groups of population were affected and died more frequently – Jewish and Romany inhabitants, intelligence, anti-fascists, civic activists, war rebels and others. In other words, persecuted were both the active organized social groups, connected with the certain ideological backgrounds, and the passive groups which happened to be deliberate or casual victims of occupational repressions. Post-war displacement of German inhabitants from the border-line area caused vacuum in the geographical map which was gradually re-filled by settlers. Co-existence of the original population rests, (Czechs, Slovaks and anti-fascist Germans), together with resettled nationally mixed population (repatriates from Romania, Bulgaria, Soviet Volyne, Hungary and other countries) as well as migrants – Czech inlanders, was relatively difficult. The building of the new social ties and networks had specific features. They appear in this territory even nowadays. That is why there are much more significant disparities in the border regions, than in the inland regions. The typical example is the different social and economic development of the Czech North and South.

14.5. Characteristic of Vysočina Region

Vysočina Region is from this point of view different. It is purely an inland region with the high share of agriculture and arable land. There is a big share of small municipalities and it has got the lowest density of population from all Czech regions (data to 31.12.2008). From the economic aspect, the region is rather below-average, with the low level of salaries; the subnormal educational level of population is typical from the socio-demographic indicators.

There are 43 micro-regions that operate in the Vysočina Region[52]. The activity of regions is not directly connected to the territorial segmentation and belonging to the certain region. It happens very often that there are municipalities from different (neighbouring) regions in the bunch, and so it comes to overlapping.

The number of municipalities, which are in the particular micro-regions represented, is very heterogeneous. From the smallest bunches, created by 4 municipalities up to a grouping of 55 municipalities. Except micro-regions, there are other local actors in Vysočina Region, which try to develop its territorial scope. There are 16 local action groups (LAG) that operate in the Vysocina Region. The same number of lags is only in two other Czech regions – South-Bohemian and Zlín´s region. It means, the Vysočina Region is among the ones, where a significant amount of lags functions[53].
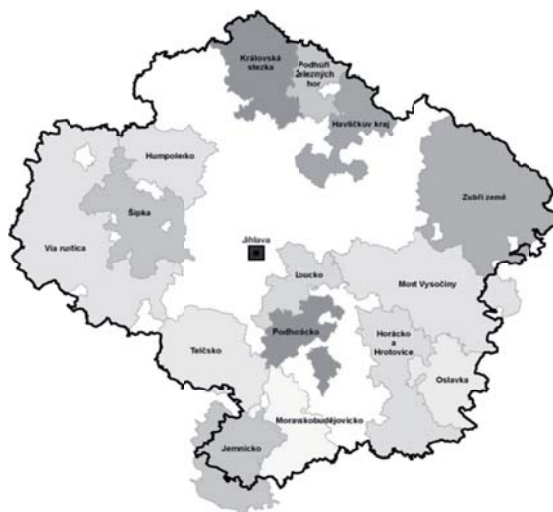
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[52] Their detailed view is state for example on www.risy.cz; www.uur.cz; www.kr-vysocina.cz.
[53] Detailed listing of LAGs in the region is possible to find on
http://leader.isu.cz/regiony.aspx,
http://www.czso.cz/xj/redakce.nsf/i/abecedni_seznam_obci_(k_1_1_2009), LEADER - budoucnost venkova 2009, publikace MZe, 2009.

Local Action Groups in Vysočina Region – Territorial Scope

Also the area of particular groupings (i.e. cadastral area of municipalities, which are the MAS members) is very heterogeneous. The largest territory has got the Via rustica o.s., more than 734 km^2, the smallest has got the Podhůří Železných hor o.p.s. With 129 km^2. All LAG´s based on the LEADER principles, were established in the period from the year 2003 and 2008 in Vysočina Region.[54] Majority of them was establishing in the years from 2004 to 2006, it means 13 from total number of 16 lags. Only two lags were established between the years 2009 to 2010. Majority of LAG has been operating in the region already for many years.

14.6. Field research of lags

The following LAG´s criteria were used for the field research:

- Size and structure of LAG – even representation and number of subjects from the particular sectors (municipalities, entrepreneurs, hobby clubs and associations, ngos, other subjects);
- Position in the region framework – LAG without the territorial overlap to other regions, possibility of an activities influence of LAG (e.g. distance from the regional capital Jihlava);
- LAG´s activity – if is the grouping dynamic, how successful are its project activities, frequency of applications, obtaining of financial means (at the national as well as the European level).

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[54] Data drawn from http://leader.isu.cz and websites of particular LAGs.

Two lags correspond to those demands (Havlíčkův kraj o.p.s. and LEAD-ER Loucko o.s). There were performed three group talks – two in LAG Havlíčkův kraj (municipalities Přibyslav and Ždírec nad Doubravou) and one in LEADER – Loucko o.s. (municipality Luka nad Jihlavou).

LAG Havlíčkův kraj o.p.s.

Founded:	2006
Address of LAG:	Školní 500, 582 63 Ždírec nad Doubravou
Contact (website):	www.havlickuvkraj.cz
Structure of LAG members:	14 towns, municipalities and small towns; 5 CB (entrepreneurship); 5 PE (entrepreneurship); 7 clubs and interest associations; 1 others[*]

Notice: CB – corporate body, PE – personal entity.

*) Parish of Evangelic Moravian Church in Krucemburk.

Territorial localisation: LAG Havlíčkův kraj o.p.s. – Member municipalities

Source:http://www.havlickuvkraj.cz/upload/hajkova/STRATEGICKY_PLAN_LEADER_2007_ Havlickuv_kraj_-_konecna_verze.pdf.

LEADER – Loucko o.s.

Founded:	2004
Address of LAG:	Nám. 9. Května 675, 588 22 Luka nad Jihlavou
Contact (website):	LAG has not got an own website; basic information on www.lukanadjihlavou.cz
Structure of LAG members:	7 towns, municipalities and small towns[*]; 3 CB (entrepreneurship); 1 others[**]

*) Part of LAG is the Micro-region Loucko.

**) School of renewal and rural development - Luka nad Jihlavou.

LEADER - Loucko o.s.

Structure and characteristics of focus group members
(Přibyslav, Ždírec, Luka)

	Přibyslav	Ždírec n. D.	Luka
Number of FG participants	6	5	8
Men and women proportion	4 : 2	4 : 1	4 : 4
Professional and functional representation of municipality and LAG area	• Entrepreneurial sphere • Non-disengaged major • Disengaged major • Director of cultural organization • Representative of agriculture company • Vice-major	• NGO • Major (2x) • Agricultural company • Evangel. Vicar	• Former major (2x) • Disengaged major • Active members of LAG (4x) • Representative of a regional agency

Source: own processing.

The main discussed theme was the regional development of Vysočina, together with the emphasis on the exploitation of inner sources of the region and the identification of a social capital influence, as one of the main factors which participate in an origin of regional disparities. Interviews also covered the existence of social capital and its characteristic features in Vysočina Region, types of disparities and their impacts on the population, present tools of regional policy, evaluation of its efficiency, existence and activity of lags, civic participation in LAG and feeling of belonging to the place of domicile.

Discussed sectors in the localities (Přibyslav, Ždírec, Luka)

Locality and LAG area development	Identification of participated subject from aspect of their functions, interests and activities
	Imagination about a development of LAG area
	Subjective opinion concerning the priorities of the future development
	Evaluation of an actual financial support of the region
	Evaluation of LAG members´ activity
	Pros and cons, which arise in a territory from a LAG activity (well-balanced relationship between economic and social development and quality of life of inhabitants, tolerable rate of development activities, keeping of nature preservation standards etc.)
	Keeping of defined development regional activities
Co-operation and communication inside as well as outside of LAG	Reasons of LAG rise (pragmatics or spontaneity)
	Ways of co-operation and communication among the LAG members
	Intensity of relations among LAG members
	Existence of proved ways of cooperation and solving of disagreements
	Passivity and activity of LAG members, the space to express their attitudes and opinion
	Initiators identification of LAG activities and project authors
	Experience with regional/national authorities at the project creation
Belonging towards the place of domicile	Pros and cons of life in a municipality/region
	Personal and familial relation towards the place of domicile
	Reasons of possible migration from a municipality/ a region
	Interest in an active help to a municipality/region and their development

14.7. Summary and conclusions of the field research

All three discussed ranges thematically connect to each other and show the mutual conditionality. A specific feature of rural municipalities is the non-anonymity and a long-time mutual knowledge of a majority of the actors. All basic personal as well as group characteristics appear in their mutual rela-

tions – age, education, marital status, special knowledge, life experience, relation to neighbours or municipality as well as the responsibility for its future.

We can divide the findings from the discussed topics into two ranges:

- Economic conditions of development (i.e. the elements, which fundamentally determine the development of a locality/region).
- Social conditions of development (i.e. social preconditions primarily influencing the development of a locality/region).

All performed group talks bring very similar findings; experience of particular Lags is only different in a few details. We can presume, that problems about which the respondents talked, are more general and some of them touch also other Czech regions.

Economic conditions:

A basic precondition for development is a possibility of an employment of economically active population in a village and close surroundings. Czech countryside was not fully dependent on agriculture not even in the past. More than half of the population commuted from countryside to bigger municipalities or towns to work there.

Anyway, a current differentiated rate of rural population unemployment increases the commuting distance as well as its financial demands. The impact is both higher family costs and the reduction of leisure time which employed people can spend not only for a family, children but also for social activities in a municipality. Employees must conform to a time-regime of employers. Entrepreneurs assign a time-regime themselves; however, it is not less time demanding. As a rule they are so fully occupied by their own business that they have not enough time and power for common village activities. The agricultural subsidies are for them more important than the participation in the developing projects of municipalities.

Prosperity of economic subjects and basic facilities of rural communes are perceived by population as a necessity. Without them the local life cannot work and develop other activities – cultural, hobby and social ones. A Care for landscape comes to the second place.

Small municipalities manage only with very limited budgets. Project co-financing conditions are very hard for them. They can gain bank loans only with difficulties and the high bank interests burden them for a long time. However, the municipalities dispose of a communal property, that is why they are, in most cases, the only trustful partner for banks and they carry the responsibility for the project preparation and implementation.

Social conditions:

Social conditions can be looked at from two aspects – personal and social. The close neighbourhood, relatives and neighbours, are important for an indi-

vidual and his family. Family and neighbourly relationships are a starting point for a co-operation in the community framework. The common future depends on their frequency and quality.

Countrymen have a very strong relation to their communities and regions. They appreciate above all the diversity of nature, as well as the fact, that they are socially embodied in the village. There are good relations and cooperation prevailing among people, but also disputes and misunderstandings appear among them. Agricultural enterprises also operate in the territory of municipalities and their owners do not live there; that is why the success of their entrepreneurship is more important for them than the development of a community. They almost do not join the common activities of a village.

The program LEADER, which initiates and co-finances the developing activities, is based on co-operation ideas. Success of developing projects depends on the knowledge and skills of all organizational components – at the national, regional as well as the local level. At the national and regional levels the difficult administration, uneasy orientation in the laws and rules of project preparation and sometimes also the ignorance of responsible officers is criticized. Successful applicants consider the selective committees as fair, unsuccessful applicants, on the contrary, point to the non-transparency of the selection procedures and they are afraid, the choice is politically manipulated. A control of these selection procedures is insufficient. The applicant very often gets to know only the result, but unfortunately not the classification and the reasons of a disproval.

The co-operation among LAG members as well as outside subjects is good at the local level. The main problem is the lack of qualified and active people, who have time and are willing to participate in the project preparation. There are too little managerially capable people in the villages. If they are efficient, they pay the effort to their own entrepreneurship. The most important persons, on them the developing activism depends, are majors, disengaged as well as non-disengaged. Non-disengaged majors are naturally very time-occupied and they perform all duties only with difficulties.

Nevertheless, the cooperation in the framework of LAG depends on the qualification, knowledge and ability of its members. Without the mutual support and collaboration it is not possible, neither to plan nor to implement the projects. If the village is to be functional, it must create acceptable conditions for all the social groups (economically active as well as non-active persons, children, youth, young as well as older families, lonely seniors, handicapped persons, natives as well as incomers. Financial resources from the LEADER programme significantly supported developing activities. Learning of mutual collaboration, finding of compromising solutions of common problems and strengthening of social relations inside and outside the village are considered to be a big contribution of LAG existence and activity.

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Dr of Economics Sergey A. Volodin
Associate Member of National Academy of Agrarian Sciences of Ukraine,
Director General of the Institute of Innovative Providing

15. Innovative development as a basis for the competitiveness of the agricultural sector

15.1. The strategic way of development of agro-industrial complex of Ukraine in transition to innovation and investment model

It needs determination of principles of branch scientific and technical policy, agro-industrial complex economics formation as intellectual system of new knowledge production, their transformation in innovations, investments involvement and their realization on market with integrated science and production organizations.

The problems that restrain innovation and investment development of this branch are: lack of proper regulation of market of science-intensive technologies of agro-industrial complex, undeveloped control system of investment providing of "breakthrough areas", uncertainty of mutually beneficial state-private partnership as a basis for integration of science, business and government. Problem solution envisages systematic approaches providing concerning coordination of innovative development process of agro-industrial complex, solution of economic, law and technological security issues of science-intensive agricultural market, creation of conditions for development of selection, seed breeding, pedigree, modern veterinary medicine and biotechnologies, protection from unfair competition, intellectual property management, technologies transfer, providing of monitoring and conceptual foresight of scientific and technical progress of agro-industrial complex.

According to objectives of the National Academy of Agrarian Sciences of Ukraine research activity of the Institute of Innovative Providing is aimed at the solution of these urgent issues.

15.2. Principles of state innovative policy

Principles of state innovative policy in agricultural sector of economics of Ukraine are determined by the Ministry of Agricultural Policy and Food of Ukraine and the National Academy of Agrarian Sciences of Ukraine.

- The Aim – transformation of agro-industrial complex into effective, competitive in domestic and foreign markets sector of economics by means of technological and technical re-equipment of the most important branches of agro-industrial complex.

- Priority task – providing of constant highly-productive, profitable, science-intensive ecologically safe agriculture and food sector, creation of conditions for their innovative, investment and integration development.
- Science tasks – scientific providing of development of agro-industrial complex branches, research of already existing and creation of new technologies, on the basis of obtained knowledge development of scientific elaborations concerning innovative development of agro-industrial complex, which are able to provide competitive agricultural products.
- Expected results
  - ➢ Production capacity increase, specialization and concentration of agro-industrial production.
  - ➢ Creation of innovations and according to research results their transfer to agricultural production and processing industry, formation of innovative resources market and commercial output.
  - ➢ Investment providing of priority agro-industrial branches development.

15.3. Realization of agro-industrial complex innovative development

Realization of agro-industrial complex innovative development envisages:
- State innovative policy *is aimed* at *stimulation* of innovative development *through:*
  - ➢ Regulatory-legal providing of innovative development;
  - ➢ State order for scientific and innovative products;
- *Realization* of innovative scientific potential through increase of scientific elaborations implementation particularly *by means of*:
  - ➢ Innovative transformations of agricultural science and education system;
  - ➢ Implementations of methods of program-target scientific and innovative production of competitive elaborations.
- Providing of innovation market formation on a basis of entrepreneurial infrastructure according to activity areas:
  - ➢ Market innovative infrastructure development;
  - ➢ Implementation of market mechanism of innovations transfer.
- *Conditions creation* for innovative products release *as a basis* for high-effective agricultural production, *including:*
  - ➢ Development of integrated innovative-active agricultural enterprises;
  - ➢ Involvement of venture investments into investments mastering;
  - ➢ Scientific provision of model realization, held by the Institute of Innovative Providing of National Academy of Agrarian Sciences of Ukraine, is held within three directions.

15.4. Creation of competitive scientific and innovative products

Creation of competitive scientific and innovative products *within the following stages*:
- Research of scientific elaborations potential, *in particular*:
  - Scientific and technical elaborations of domestic scientific institutions and educational establishments;
  - Science-intensive technologies of leading foreign developers and implementers;
  - Modern processes of agricultural production and needs of their technical and technological provision.
- Transformation of scientific elaborations in innovative products:
  - Selection of scientific elaborations with innovative potential;
  - Approbation of innovative products (elaborations, resources, services) in terms of production conditions.
- Formation of innovative offerings for agricultural market:
  - Market presentation of innovative proposals for their further implementation in agro-industrial production;
  - Protection and safety of intellectual property rights;
  - Expertise and evaluation of economic part of innovative proposals, capitalization of their intangible assets.

15.5. Transfer of innovative products within venture business projects

Transfer of innovative products within venture business projects *envisages:*
- Innovative planning of agricultural technologies:
  - Research of optimal conditions of innovative products transfer to agrarian market in project format;
  - Development of innovative technologies transfer business projects, their technical and economic background and evaluation;
  - Realization of business projects concerning commercial implementation of innovative projects.
- Investment provision of innovative projects:
  - Research of investment attractiveness of innovative projects;
  - Development of project offerings concerning involvement of venture capital in objects of innovative development;
  - Business planning of protection and payback of investments;
  - Conducting of transactions of innovative projects investment involvement.
- Infrastructural provision of innovative projects:
  - Transformation of scientific institutions and their experimental and production base into agricultural market formations;

- ➢ Involvement and accreditation of innovative projects providers;
- ➢ Corporatisation of state-private partnership relationships of joint project realization members.

15.6. Cluster models

Creation of cluster models of scientific and production integration *in agricultural sector as exemplified by integrated model* "Scientific park Biosystem", *which is worked out* on the basis of Institute of Bio-energy Crops and Sugar Beet of National Academy of Agrarian Sciences. *Distribution of members of scientific park is the following:*

- Scientific institution stimulates development and realization of:
  - ➢ Biologically adaptive resource-saving technologies of sugar beet growing;
  - ➢ BA – new generation hybrids of sugar beet ;
  - ➢ Resource-saving technologies of bio-energy crops growing and their processing into bio-fuel.
- Research stations and farms *provide:*
  - ➢ Approbation of new genetic materials and technologies;
  - ➢ Production of BA-hybrids of sugar beet seeds;
  - ➢ Production of genetic phyto-resources for bio-energy crops growing;
  - ➢ Production of bio-oils and bio-fuel.
- Connection with market environment is held by Innovative business-incubator, created by Institute of Innovative Providing of National Academy of Agrarian Sciences. His functions are:
  - ➢ Market expertise and evaluation of innovation potential of science-intensive agricultural technologies;
  - ➢ Elaboration and implementation of innovation and investment business projects in agro-industrial production;
  - ➢ Creation and conducting of activity of innovation providers of scientific park projects.
- Direct entrepreneurial activity on the market is held by venture enterprises, which take part in:
  - ➢ Technical and technological re-equipment of agricultural production by means of investments;
  - ➢ Supply of material and technical resources on the basis of forward conditions;
  - ➢ Contracts creation and realization of science-intensive and commodity products;
  - ➢ Expected science-innovative results of scientific park activity.

- In sugar beet sphere:
  - Increase of realization of sugar beet seed of domestic selection from 20% in 2010 up to 50% in 2015;
  - High level of sugar with potential of 18-20% of sugar outcome;
  - Provision of productivity up to 10-12 tons of sugar per hectare.
- In bio-energy sphere:
  - Selectional and technological provision of 30% of bio-energy crops market;
  - High-level phyto-resources yield (6-25 t/ha);
  - Production of ecological bio-fuel from biomass on low-yielding soils.

15.7. Background for European cooperation

Presented priorities of innovative development of agro-industrial complex of Ukraine create a background for European cooperation. Experience of Euro integration of Poland in agricultural sector is of prime importance and can be a guideline for eastern European Union partnership. According to the research data of Institute of Agricultural and Food Economics - National Research Institute (IAFE-NRI), publication 184.1., consequences of inclusion to common EU space can be the following:

- Growing importance of agricultural manufacturers, considerable production expansion for foreign market needs;
- Restructuring of agricultural sector. Extrusion of farms and their cooperative societies by big private holding groups and companies;
- Main priority in investment support for big agricultural enterprises, which presented ambiguous results in investment effectiveness;
- Products price increase and sometimes their quality deterioration.

Attract attention separate factors of productivity and effectiveness increase:

- Investments expansion to financial assets;
- Investment orientation for innovative development, including reclamation of biotechnologies in plant-growing and animal breeding, organization of implementation of new technique and technology in agro-industrial production by improvement of organizational management, social capital increase.

15.8. Directions of cooperation in the framework of European integration

Poland experience is very important for Ukraine within the framework of Euro-integration processes. Whereas Ukraine can become very important partner for Poland and other EU-members on the way to west partnership. Directions of cooperation in the framework of European integration envisage:

- Joint agricultural researches in European research zone within the program Poland SCAR Membership. *The directions are*:
  - ➤ Development of viable agricultural industry;
  - ➤ Biotechnology, bio-adaptive agricultural crops;
  - ➤ Qualitative food network, safe and functional products;
  - ➤ Alternative and renewable energy source (green energy).
- Participation in current and expanded common projects within the Agreement on Partnership and Cooperation Ukraine-EU is promising according to the following directions:
  - ➤ Assistance for farms;
  - ➤ Investments involvement in priority sphere of agro-industrial production;
  - ➤ Implementation of Poland experience in creation and development of integrated large-product agricultural formation of production, processing and realization of agricultural products and food.

15.9. Institute of Innovative Providing – reliable partner

On this way the Institute of Innovative Providing is your reliable partner. The Institute is established as non-governmental scientific institution in the system of agricultural science for its structural reformation on the market principles, provision of entrepreneurial relationships of scientific institution with innovation providers and venture investors of science-intensive agricultural market. The Institute's activities include: agricultural market research, creation and transfer of science-intensive technologies in the sphere of agricultural products manufacture, its processing and realization, security and protection of intellectual property objects, their evaluation and conduction in the process of capitalization and commercialization within business-projects. The Institute provides legal and financial support of investment projects concerning definition of agro-industrial objects of priority innovative development in Ukraine, analyzing of possibility of involvement and effective use of venture capital, creation of integrated systems of production and realization of agricultural output.

Dr Pierre Yves Lelong
Centre Economique Rural en France

# 16. The agricultural social insurance system in France

16.1. Introduction

The French farmers expressed their initial demand for establishing a national occupational organisation in the second half of the 19th century. The first social insurance, imposing an insurance obligation on all employees, shared by employers, was introduced in France under the acts dated 5 April 1928 and 30 April 1930. This insurance covered the following risk types: sickness, maternity, death and old age. The said acts, together with family allowances, initially provided to employees and then also to farmers, paved the way for establishing the Mutual Agricultural Insurance Fund, referred to as MSA (Mutualite Social Agricole). However, it was not until 1940 that the said institution, operating under the auspices of the Ministry of Agriculture, was recognised as a valid occupational organisation, the objective of which was to manage all social risks faced by the insured farmers.

Under the regulation of 4 October 1945, which recognised the principles of common social insurance, providing for a multiple-system operation, the Mutual Agricultural Insurance Fund conducted its activity in the agricultural domain, and in 1949 a separate election system was introduced. This means that, since its beginnings, this institution has been managed on a democratic and professional basis. In subsequent decades, the Mutual Agricultural Insurance Fund evolved towards enriching the range of insurance provided to employees or farmers with new elements: 1951-1958: gradually introducing the old-age insurance of agricultural workers; 1952: establishing the old-age insurance for farmers; 1960: establishing BAPSA (Budget Annexe pour les Prestations Sociales Agricoles) – the Supplementary Budget for Agricultural Social Benefits – together with undertaking a number of health and social actions; 1961: introducing the sickness insurance for farmers; 1966: introducing insurance against accidental events happening to farmers, by ensuring free choice of insurer; 1972: establishing a system of obligatory insurance, covering accidents at work, accidents on the way to/from work, and occupational diseases of agricultural workers; 2002: reforming and revalorising obligatory coverage in respect of accidents at work and the occupational diseases of farmers conducting economic activity, together with establishing an occupational risk prevention fund, the management of which was entrusted to MSA (Mutualite Social Agricole); 2003: establishing a supplementary obligatory system for the managerial staff of agricultural holdings or enterprises, which provided, among other things, for free-of-charge additional obligatory retirement payments to managers of agricultural holdings and enterprises, upon fulfilment of certain conditions.

16.2. Financing structure

Special attention should be given to establishing, pursuant to Article 58 of the Financial Act for 1960, the Supplementary Budget for Agricultural Social Benefits, referred to as BAPSA (*Budget Annexe des Prestations Sociales Agricoles*). This was connected with a very unfavourable demographic structure in agriculture, given that the functioning of the entire social insurance system of farmers was hugely dependent on a solidarity agreement with both other systems and taxpayers. It should be stressed that BAPSA is not an exception, as there are numerous special insurance systems in France that use state subsidies to maintain the equilibrium, at the same time not generating any additional budget. In 2005 it was replaced by the Social Benefits Fund in Agriculture, referred to as FFIPSA (*Fonds de Financement des Prestations Social Agricoles*). FFIPSA is a public institution, intended to finance sickness benefits, family benefits and retirement payments, provided to persons conducing economic activity in agriculture, i.e. mainly to agricultural holdings. In 2007 FFIPSA indicated total expenditures of EUR 16.542 billion, total receipts of EUR 14.313 billion, and a deficit of EUR 2.229 billion. From 2008, due to this rather unfavourable situation, FFIPSA used loans to finance social benefits provided to farmers. Until 2008 FFIPSA transferred the acquired resources to the Mutual Agricultural Insurance Fund (MSA), which managed the social benefits of persons conducting agricultural economic activity. The demographic correlation between premium payers and insured persons explains the structural deficit of the system, and the necessity to refer to external financing sources. These account for over 82% of the entire system burden (Figure 1), with the inter-system demographic compensation constituting the principal source.

Figure 1. The sources of financing the social insurance system of persons conducting agricultural economic activity in the years 1995-2009
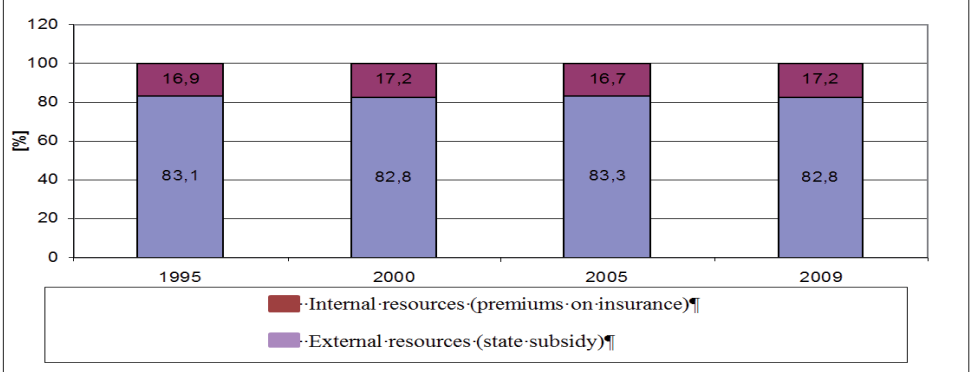
Source: own study based on MAAPRAT.
Legend: external resources / occupational resources).

16.3. The grounds for the functioning of the social insurance for farmers

The historical conditions of social insurance in the French agriculture constitute the grounds for the functioning of the Mutual Agricultural Insurance Fund. Its philosophy is based on the notion of mutual assistance, oriented towards widely-understood solidarity, comprising:

- Intergenerational solidarity,
- Solidarity between various agricultural domains and auxiliary professions,
- Solidarity between high-productivity and underdeveloped agricultural regions,
- Solidarity between people who are able-bodied, and those who are sick or disabled.

The Mutual Agricultural Insurance Fund – MSA (Mutualite Sociale Agricole) is an institution providing obligatory insurance to agricultural workers and to owners of agricultural holdings in France. It comprises the traditional agricultural sector (agricultural economy, landscape architecture, forest economy, etc.), auxiliary domains (occupational organisations in agriculture, such as Crédit Agricole, Groupama, etc.), and agricultural and food industry sectors. Network restructuring eventually led to decreasing the number of funds from the 78 entities operating up to 2010, to 35 remaining after 2010. Each of the 35 funds holds the sufficient financial means and resources to allow the conducting of complex legislative activity, subject to continual changes, and for meeting the expectations of fund members. Each fund consists of 2 or 3, and in special cases of 4, departments, which makes it possible to comply with one of the key MSA assumptions, i.e. a small distance from the client. Administrative panels also play a decisive role in mitigating crisis consequences in agriculture, assisting the families which have fallen into trouble by considering their applications for spreading the liabilities in time, or for returning insurance premiums.

In 2010 around 1800 administrators were appointed to perform the said tasks. 27 thousand cantonal representatives work in rural areas within the MSA network. Practically speaking, there is one MSA representative for one commune. This network is composed of cantonal or multi-cantonal cells in all funds. Each cell is in charge of implementing local MSA tasks in the fields listed above. The MSA network restructuring was a risky venture, which could weaken the relationship between the fund and the insured persons. Avoiding such a danger by MSA was possible due to the act of law which provides for the establishing of departmental cells. So far such cells have been established for 12 funds, covering numerous departments. Their activity does not boil down to mirroring the activity of administrative panels at the departmental level, but it focusses on preserving the organised MSA representation, consisting of the persons appointed by way of election, at that level. This proves to facilitate the connection between the rural revival policy, as well as health and social inter-

ventions, implemented by the administrative panel with its subordinated area. The administrative model presented is efficient, which results from a multi-levelled election system. The insured persons are locally represented by representatives whom they often know personally. Such representatives elect fund administrators from among themselves, who in turn appoint members of the Central Administrative Panel. The advantages of this system include establishing a local network of persons whose rights are legally justified, and imposing a requirement that each member of the administrative panel must first act as a representative in a given area. The system discussed allows MSA to perform the role of an organisation in charge of social assistance, which does not lose its capacity to assess the realities of a given area. The attendance of the persons insured in the agricultural system, connected with the said administration model, reached 50% in the last election.

On 1 July 2008, MSA introduced an institutional audit function at a central level. This was in line with the attempts made by the Accounting Court, outlined in the social insurance report for 2007. The purpose of internal audits is to keep the domestic accountant and the Managing Director of CCMSA posted on the procedure of establishing a complex accounting system of the Mutual Agricultural Insurance Fund units. The new statutory provision grants to the MSA Central Fund the right to supervise both the MSA funds, and the groups and societies that control them. The act of law provides that CCMSA "may also audit the accuracy of the liquidation operations on insurance premiums and social insurance benefits, performed by the MSA funds."

Fighting social benefit fraud takes place on an ongoing basis for three major reasons:

- for MSA, this is an opportunity to prove that it conducts its public mission both professionally and diligently,
- in the public's opinion, and especially in the opinion of insured persons, this is a concrete means of verifying the operations of the institution, to which everyone is connected, and which reflects two underlying principles of the economic mutuality, i.e. solidarity and responsibility,
- for public authorities, this is a means of achieving the public benefits equilibrium, as well as of verifying the proper application of various acts and regulations by state bodies.

16.4. The idea of agricultural activity

The Mutual Agricultural Insurance Fund is a social assistance system addressed both to persons conducting economic activity (owners of agricultural holdings, auxiliary professions, and partly agricultural craftsmen), and to employees (due to their own activity, or the activity conducted by their employers).

This implies that the social insurance subsystem of farmers, similarly to other insurance systems in France, is occupation-oriented. This subsystem is an integral part of the insurance system, though it was separated on a statutory basis. In accordance with the principles and statutory provisions adopted in the social insurance system, three categories of activity are distinguished:

- Generic agricultural activity,
- Auxiliary activity,
- Agricultural activity within the statutory meaning.

Agricultural activity "within the statutory meaning" is the agriculture-oriented activity that comprises various activities implemented by enterprises for agricultural purposes, including:

- Agricultural work within the animal or plant production cycle,
- Soil-improving and auxiliary work necessary to perform agricultural work,
- Work conducted with creating, recreating and maintaining parks and gardens.

Notwithstanding agricultural insurance, rural craftsmen are also covered by other insurance systems, according to the risks regarding the following benefit types:

- Family benefits: subject to agricultural social legislation,
- Old-age insurance: excluded from the agricultural system and covered by the "retirement benefits system for craft professions",
- Sickness and maternity insurance: covered by the system of own-account workers outside agriculture.

The agricultural social insurance system, in accordance with the Act of law, covers employees of various occupational groups and agricultural institutions, such as the Mutual Social Insurance Fund, the Mutual Agricultural Social Insurance Funds, agricultural credit funds, agricultural cooperatives, agricultural trade unions, agricultural chambers, licensed management centres, and management and accountancy centres whose statute provides for establishing a management board mostly composed of members appointed by agricultural occupational organisations or agricultural chambers, etc.

16.5. Social benefits from the agricultural social insurance system

Benefits from the French social insurance systems of farmers are paid through two parallel subsystems, addressed to agricultural workers and to persons conducting agricultural economic activity. In 2010 the total value of benefits paid to both subsystems amounted to EUR 27.7 billion, EUR 11 billion of which was allocated to the agricultural workers' system, accounting for 40% of the benefits paid from the MSA fund. In contrast, the benefits to the persons conducting agri-

cultural economic activity amounted to EUR 16.7 billion, i.e. 60% of the total sum of benefits in the agricultural social insurance system (Figure 2).

Figure 2. Social benefits of MSA in 2010 (in billion EUR and in %)
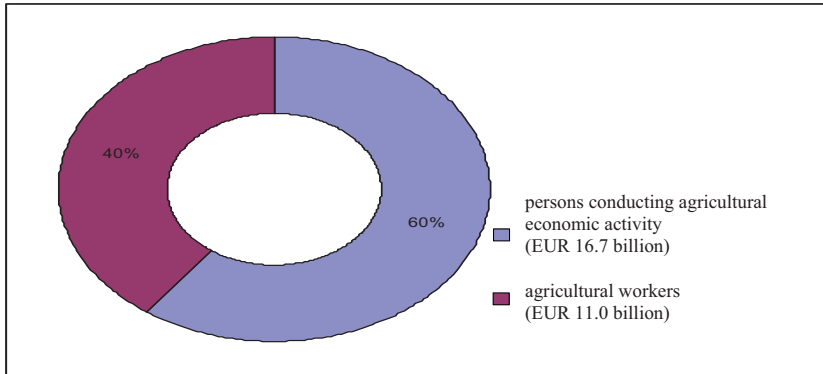
Source: own study based on the MSA data.
Legend: Social benefits by subsystem: EUR 27.7 billion for 2010 / Metropolitan France + overseas departments; 60% to persons conducting agricultural economic activity – EUR 16.7 billion; 40% to agricultural workers – EUR 11 billion.

The retirement pay of owners of agricultural holdings is based on three pillars:
- The basic system,
- The supplementary obligatory system,
- The supplementary voluntary system.

Before 1990 retirement entitlement was granted to owners of agricultural holdings only through the basic system, whose functioning differed from other retirement systems. The basic system for persons conducting agricultural economic activity comprises two subcategories, i.e. a lump-sum payment and a pro-rata payment. The lump-sum retirement payment is a lump-sum benefit unrelated to the amount of contribution paid through premiums. Its calculation is based only on the number of years worked. The pro-rata retirement payment retains the features of the supplementary obligatory retirement pay. It is based on scores which depend on the income of the farmer concerned. The supplementary obligatory retirement payment, introduced in 2003 with the purpose of ensuring full retirement pay (the basic system + the supplementary obligatory system), equal to at least 75% of the minimum net pay (SMIC net), to persons working as agricultural holding managers upon termination of their employment.

The system functioning is similar to other retirement systems that cover different activities, and the processing of past data allows the thorough and accurate indexation of retirement payments, provided to former managers of agricultural holdings. Before 2003 there was no supplementary obligatory system.

An extension of the supplementary obligatory retirement pay to cooperating spouses, and to domestic servants, is a proof of the clear-cut reforms. The supplementary voluntary retirement payment forms the third retirement pillar, which is most similar to the insurance systems applicable to other professions. It can be proposed by insurers as a collective insurance agreement. It should be noted that, with time, the retirement structure covering persons conducting agricultural economic activity, previously so much distinct, seems to come more and more close to the solutions applied in the employee systems.

16.6. Insurance premiums and the common social insurance premium (CSG)

In 2010 insurance premiums of persons conducting agricultural economic activity and common social insurance premiums (CSG) provided a total income of EUR 3.7 billion. Insurance premiums paid by persons conducting agricultural economic activity amounted to EUR 2.6 billion in 2010, and to EUR 2.8 billion in 2009. The said premiums are deducted from the income generated by managers of agricultural holdings and enterprises in respect of conducting agricultural economic activity, and they are allocated to the financing of retirement benefits. For most owners of agricultural holdings, the premium calculation basis, applied in 2010, reflected their average income earned in 2007-2009 from agricultural economic activity, and it was approximately 10% lower than the calculation basis applied a year earlier. The general basis applicable to the income from agricultural economic activity, used to calculate the insurance premium in 2010, was established at EUR 6.2 billion. Depreciation of the profitability drop in farmers' premiums in 2010 (-7.7%) resulted from applying the minimum premium calculation basis, or the lump-sum premium calculation basis. It is also worth noting that decreased income, resulting in lower premiums paid in 2010, indicates a certain trend that emerged already in 2005. In 2005-2010 the differences in the level of insurance premiums amounted to approximately 10 percentage points. Nevertheless, from 1990 to 2009, the premiums paid by owners of agricultural holdings considerably increased (Figure 3), which was mostly due to:

- A reform in the premium calculation basis: a transition from the "cadastral income" calculation basis to the calculation basis using income from agricultural economic activity or lump-sum income;
- A transition made by many farmers from the lump-sum income calculation basis to the calculation basis involving a real profit earned from agricultural economic activity, as a result of changing the taxation system.

Figure 3. Changes in the level of premiums paid by owners of agricultural holdings in the years 1990-2009
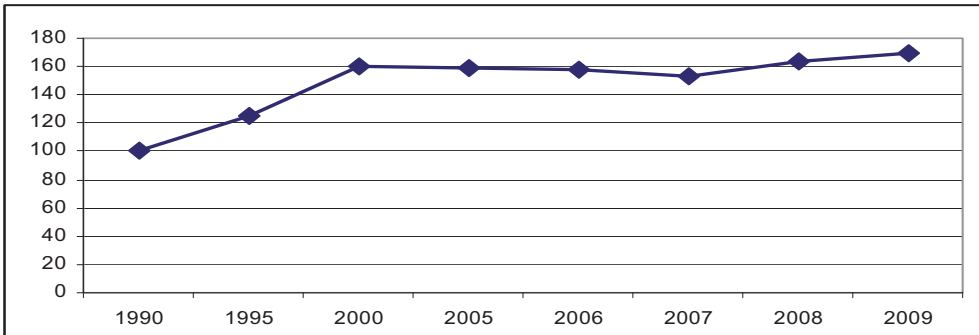
The CSG income allocated to the financing of sickness benefits in the social insurance system of persons conducting agricultural economic activity amounted to EUR 1.1 billion in 2010. The common social insurance premium (CSG) has existed since 1991. It contributes to the financing of the obligatory sickness insurance system. The amounts of the CSG premium collected by the agricultural system are determined in the regulation. In 2010, for the entire agricultural system (comprising persons conducting agricultural economic activity and agricultural workers), they amounted to EUR 2.5 billion, increasing by 5.4% in relation to 2009. Receipts from insurance premiums and CSG premiums in 2010 totalled EUR 3.7 billion, which accounted for 19% of the entire receipts into the system. Assessing the functioning of the social insurance system for persons conducting agricultural economic activity, and its impact on public finances In the current economic situation, the governmental attempts at fulfilling its obligations and at solving the deficit problem, occurring in the sickness and old-age insurance sections of the social insurance system of persons conducting agricultural economic activity, are considerable, though not sufficient. The measures taken in the draft Act of 2009, concerning the financing of social insurance, aimed at reaching an interim solution to the deficit problem of health and retirement insurance in the social insurance system of persons conducting agricultural economic activity, fall within the assumptions that do not compromise, but further strengthen, the abilities of MSA in the managing and providing social benefits in all domains, as well as in collecting premiums and charges due. A tremendous success accomplished by MSA was assigning the entire debt to the state (EUR 7.5 billion in 2009), which was accompanied by the liquidation of FFIPSA (the Social Benefits Fund of Persons Conducting Economic Activity).

As regards debt transfers, the financing scheme is different for retirement and sickness insurance, specifically:

- Sickness insurance: a continual sickness insurance equilibrium is ensured by allocating new financial resources, coming from taxes on company cars (amounting to EUR 1.2 billion), and – where necessary – by paying a subsidy from the general system, administered by the National Employee Health Insurance Fund (referred to as CNAMTS). The methods adopted to equalise health insurance raise some controversy, as, logically speaking, it would seem reasonable to establish a common financial fund for all systems, given that the right to benefits in kind is identical for all system participants (as proven by the reform implemented in Germany).
- Retirement insurance: this insurance group currently provides for no receipts, and MSA will be forced to finance its tasks through bank loans, as was stipulated in the Draft Act on Social Insurance (PLFSS). MSA hopes that a suitable solution to the structural deficit within this insurance group will be found soon, as promised by the state authorities.

16.7. The proportion of social insurance premiums in the income of persons conducting agricultural economic activity

The premiums paid by persons conducting agricultural economic activity are determined using the income generated from agricultural work, to which the minimum and/or maximum basis may be possibly applied. The workers' premiums are determined through the limited or unlimited wages and salaries fund. The income of persons conducting economic activity, providing the premium calculation basis. As there is no minimum or maximum rate in the family insurance section, the premium calculation basis reflects the basis for calculating the gross "income from salaried work" of persons conducing agricultural economic activity, though with a one-year or three-year shift in respect of the said year. The income earned from salaried work is determined as a lump sum or real income of a person running an agricultural holding. The income from agricultural economic activity, providing the premium calculation basis, includes:
- the income from agricultural economic activity subject to IRPP (personal income tax), comprising BA – the agricultural income taxation system, BIC – the income taxation system in agricultural industry, or BNC – the commercial income taxation system (applicable to tourism, agricultural enterprises, horse breeding, etc.),
- remuneration paid to managers and partners conducting agricultural economic activity in the companies which are subject to corporate taxation.

The premium calculation basis is equal to the taxation basis in a given year. The lump-sum basis applies when the income earned in a given year is unknown, and it relates to:
- persons starting a new job,

- spouses of managers of agricultural holdings, starting a new job,
- partners subject to corporate tax: family allowances concern only the partners of owners of agricultural holdings, who did not receive remuneration.

The premium calculation on a lump-sum basis for persons "starting a new job" is subject to separate regulations when the regular premium calculation basis is unknown.

Solidarity premiums apply to small structures, such as:
- small agricultural holdings, the area of which ranges from 1/8 to ½ of the minimum holding area,
- small enterprises in which the labour input corresponds to at least 150, but no more than 1200, hours.

Premiums paid to the agricultural social insurance, referred to as ASA, comprising sickness, retirement and widowhood insurance, are based on the remuneration paid to agricultural workers by employees, who are covered by the agricultural insurance system. The wages and salaries fund in 2009 amounted to EUR 17.3 billion, indicating an increase of 0.8 percentage points in relation to 2008. Nearly one-third of the fund comes from the premiums paid by persons employed in the crops and breeding sectors.

16.8. Insurance premiums

The premiums applicable to persons conducting agricultural economic activity amounted to EUR 2.6 billion in 2010, and they were 7.8 percentage points lower than in 2009. The premiums coming from agricultural workers amounted to EUR 6.4 billion, and they were 1.1 percentage points higher than in 2009. These premiums in total accounted for 82% of the entire receipts from premiums. Since 2006 any operations aimed at decreasing the premium rates, in line with the low pay measures, are no longer covered by the state, but they are compensated from tax receipts. The value indicated, concerning the general premium decrease, reflects the costs of such operations, and not the expected tax receipts. The target decreases refer to rural revitalisation areas, to areas where a temporary exemption from taxes and charged is applied, etc. The amount of premiums paid to the social insurance system by farmers conducting economic activity accounts for approximately 33% of the "occupational income" calculation basis. This value is obtained in the following way:
- EUR 2.6 billion in respect of premiums paid by persons conducting agricultural economic activity × 82% proportion of premiums paid to MSA/EUR 6.3 billion of the premium calculation basis applicable to persons conducting economic activity = 33%.

These premiums are paid by persons conducting economic activity in the following way: 50% of the premium is paid in March, 25% in June, and the remaining part (the balance) in November.

In 2010 owners of agricultural holdings paid premiums to the social insurance system of farmers, in the amount of 35-36% of their holding income, whereas the CSG and CRDS tax accounted for 8%. These payments constituted the so-called revenue-earning costs, except for CSG at 2.4%. The compilation of all premiums paid to the insurance system by owners of agricultural holdings is included in Table 1.

Table 1. The compilation of insurance premiums in 2010 paid by owners of agricultural holdings

AMEXA	Sickness	10.84 %
AVI (limited)	Individual retirement pay (lump-sum pay)	3.20 %
AVA (limited)	Agricultural retirement pay (pro-rata pay)	11.17 %
AVAD	(solidarity pay)	1.64 %
RCO	Supplementary obligatory retirement pay	3.00 %
AF	Family allowances	5.40 %
On accidents at work		From EUR 331 to 360
CSG		2.40 % non-deducted 5.10 % deducted
CRDS		0.50 %
VIVEA net	Permanent occupational training	0.49 % (min. EUR 47) (max. EUR 260)

The upper limit of social insurance for 2010 was EUR 34 620, whereas in 2011 EUR 35 352. Insured persons and recipients of the social insurance system in agriculture. The total number of economically active people in agriculture, conducting economic activity, and the number of agricultural workers, amounted to 1.2 million in 2010, indicating a drop of 1.1% in relation to 2010. The number of persons conducting only agricultural economic activity amounted to 548 696 (Figure 17). It should be added that this group also includes managers of agricultural holdings and their partners, irrespective of their status, as well as domestic servants.

In 2010 a further demographic drop in the number of owners of agricultural holdings was recorded, though the drop rate was slower than in the preceding years. It was due to the fact that, on the one hand, service enterprises, including especially those dealing with landscape architecture, indicate a growing dy-

namic, which partly mitigates the demographic decrease in the number of owners of agricultural holdings. On the other hand, going on early retirement was stopped in 2009, which limited the abandonment of an active economic life by owners aged 57-59. Such an immediate stoppage in the process of going on early retirement caused a potential decrease in the acquisition of agricultural holdings by new managers.

The number of economically active persons conducting agricultural economic activity has been dropping annually: in 2010 a drop of 2.3% was recorded, and in 2009 of 2.7% in relation to 2008. In the period from 1992 to 2010, a drop in this number was recorded from 1 million to approximately 0.548 million (i.e. approximately 49% in 18 years). The number of managers of agricultural holdings for the first time dropped to the level of 0.5 million in 2010.

16.9. Conclusions

This social system is complemented by a voluntary health insurance system as the benefits received from the social system in case of illness do not cover all the costs.

Although the users of the social protection system consider the contributions to be "high", they are very "attached" to this system.

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