Challenges for the Agricultural Sector in Central and Eastern Europe

Monograph

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FOREWORD

Our book, *"Challenges for the Agricultural Sector in Central and Eastern Europe"* was designed to make an overview of the agricultural development processes in selected Central and Eastern European countries: Slovakia, Poland, Ukraine and Hungary.

This part of Europe has a huge potential and long time traditions in agricultural production. After the political and economical transformation in the 1990s, the structure of the agricultural sector has undergone fundamental changes. The problems of the financial background made the modernization and the development process more difficult. The EU accession has brought many opportunities for the new member states, but the realization of the possibilities could not be performed in every branches of the agricultural sector.

The book includes three chapters, which examine different levels of the agricultural sector. In the first chapter, the impacts of the changes in the agricultural policy are summarized. The authors of this chapter introduce the institutional background of the agricultural sector in the different countries, the specialities of the financing system, and the most important findings of researches on competitiveness and in aspects of sustainability are discussed.

The second chapter deals with the different sectors of agricultural production. Besides the most widely known sectors as vegetable production, dairy production or cattle breeding, the authors have drawn attention for the economic questions of less common fields, such as mustard seed production and the use of biomass, which may play important role in sustainable agricultural production.

The authors of the third chapter introduce farm-level management questions and some experiences about the utilization of European supports, and a very important but less known field of management topics: economics of animal health.

The book provides an important opportunity for students, academics, researchers and policy-makers to evaluate the present situation of the agricultural sector in this region. Hopefully, the work of the authors of this book will lead the reader to see the problems, the opportunities, the whole progress and to envision the possibilities and even to find some solutions for the future.

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CHAPTER 1

Agricultural policy and sustainable development in different CEE countries

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1.1. THE PRIORITIES AND CHANGES OF THE AGRI-FOOD SECTOR UNDER THE CONDITIONS OF THE COMMON AGRICULTURAL POLICY

Summary
Slovak agriculture and food production sector after the accession to the European Union is undergoing through meaningful changes. In this respect also in other EU-10 states are faced numerous challenges and changes which have significant impact on the economic and social development, agricultural and rural policies and on the human and institutional capacity building. The objective of this paper is to analyze the conditions of the development of agriculture and food production after EU accession, to identify its strengths and weaknesses, as well as advantages and disadvantages. The other objective is to evaluate the challenges, which are in front of the agrarian managers and individual farmers in connection to the upcoming new EU policy designed for 2014 – 2020. While after the accession the importance of agricultural sector is in national economies further declining, the positive trend is that importance of rural economies sector is gradually increasing and it is recognized by EU policymakers, as well as by some national governments. With EU accession from very outset have been connected great expectations, hopes, but also hesitations. However, despite the numerous doubts the EU enlargement has in general positive impact on agriculture and rural development, first of all from the farmer's income point of view. It has to be underlined that EU accession had great consequences on Slovak agriculture. Alongside of positive changes which brought to Slovakia new machineries, progressive more sustainable farming technologies and supported the rural development in Slovak countryside, there are also negative impacts.

Keywords: competition, challenges, EU accession, changes, strengths, weaknesses

Introduction

Before the accession to the EU, several prognoses were elaborated in relation to the agri-food sector. These prognoses varied from the most optimistic to the less favourable. Those of the most positive forecasted the growth of the agricultural production and the increases in the export with agricultural commodities. In frame of the less optimistic alternative was expected the failure of the agri-food sector, especially in the livestock production, foreign trade and also the low absorption capacity of the EU funds was forecasted.

Great expectations, hopes, but also hesitations were connected with the EU accession from its very beginning. 9 years after the accession, based on the achieved results, it is reasonable to state that the integration activity was the right decision.

Nevertheless, it should be noted that owing to some gaps in the institutional and administrative capacity building, but first of all due to diverse approach to the implementation of the CAP, in relation to the new EU states, the development in the agri-food sector also noted certain negative tendencies, which were not forecasted in any pre-accession scenario. The most surprising was the sharp decline of the food security and the significant increase of negative trade balance of agricultural commodities.

In the Slovak agri-food sector is notable decline of food security from 87 to 45-47 percent, the number of employees declined from 110 000 to 44.000, the enterprise's legal forms have been more atomized from earlier prevailing cooperatives on other forms, mainly on limited liability companies and the aging of the farmers is increasing.

Our research dealing with impact of EU enlargement in the individual countries has confirmed that the effects of accession have been influenced by different starting conditions, especially the pre-accession investments into the agricultural and food processing sectors. The EU accession scaled-up the investment inputs to the agrarian sector, on the other side it was confirmed that EU-10 states pose with lower potential for competition with their more experienced EU-15 partners, despite that some agricultural commodities have lower production costs in comparison with the EU-15 states.

Materials and methods

The objective of this paper is to identify the strengths and weaknesses, as well as the advantages and disadvantages of our accession to the European Union in the frame of the agricultural sector. Furthermore, we analysed challenges which are staying in front of sector's managers in connection of the new EU policy designed for the years 2014 – 2020. Important is also to outline the conditions of effective approaches to the foreseen changes in institutional and administrative capacities. Furthermore, the essential task is to study the external environment in which are recently operating farms and agricultural enterprises. In this paper have been applied the methods of comparison analysis and synthesis. The time horizon of the researched period involves years 2008 – 2011. The secondary statistical data was retrieved from the FAOSTAT, EUROSTAT, Slovak Statistical Office, Farm Economics Brief (2011) as well as from the Green Reports of the Slovak Ministry for Agriculture and Rural Development. In this paper are used the comparisons of data with starting positions of sector and its continuous development up to 2011 with the aim to define the impact of the EU accession on the agricultural and food sector.

The strengths and weaknesses of Slovak accession to the EU

At the outset of this paper, it is very important to highlight, that alongside with the transition process in food and agricultural sectors, the EU accession was the most significant process of turbulent changes in the first two decades of political and social transitions in Central and Eastern European states. The food and agricultural sectors have been able to deal successfully with the almost all related challenges. Despite of

this, there was noted a loss of their comparative advantages in comparison with agrarian sectors of the most developed economies in EU. It is well known that in Central and Eastern European states the agricultural production in general declined about one third in both crop and animal productions as the consequence of transition process. Despite of this, within Central European states the food security remained well balanced until the accession to the EU. In 1994, the food security in Slovak Republic was secured on the level of 87 %, while up to 2012 dropped on the 45-47 % as the consequence of the open market and lower ability to compete with EU-15 food producers.

In the pre-accession period as the competitive advantages of Slovak food and agricultural sectors were considered following characteristics:

- Rich diversity and availability of natural resources,
- Educated, skilled, experienced and devoted working forces in sector,
- Good quality and safety of the food commodities,
- Competitiveness in the trade with crop commodities,
- Opportunities for organic agriculture,
- Meaningful potential for rural tourism and other non-agricultural activities,
- The diversity of the local, regional and traditional food.

In contrary, there have been evident several weaknesses which had the meaningful effects on the overall performance of the sector after its accession to the EU. Among the others should be mentioned the followings:

- Minimum investments into the sector,
- High interest rates and limited access of farmers to the credits,
- Low profitability, high input prices, low farm gate prices and high insolvency,
- Outflow of the qualified working forces,
- Absenteeism of the vertical commodity chains,
- Limited experience in the field of international trade with agro- commodities,
- Lower negotiating capacity during the pre-accession period.

In the last years the development of the sector confirmed that majority of strengths have been rebounded in good direction of Slovak agriculture within the frame of new economic and social EU environment. Contemporaneously, it was proven that weak sides of sector have been reflected in the lower performance, particularly in animal production as well as in the foreign trade with agri-food commodities.

Priorities of the Slovak accession to the European Union

In connection with the accession of the Slovak Republic to European Union, it is worth to mention the expectations and priorities linked to this process, as follows:

- the highest importance dominated the need to ensure food security by enhancing productivity through research and innovations;
- provision of a safe, healthy choice of food at transparent and affordable prices;
- to deal with economic challenges generating income, profit, rural employment and to scale down the negative effects of price volatility through market management and ensuring food chain transparency;

- ensuring sustainable use of the land;
- to promote the activities which will sustain rural communities and the countryside to understand rural policy as the driver for development opportunities for rural economy in strong coordination and synergy with other European policies;
- to address the needs for territorial challenge of preserving the specificities of the different regions of Europe; CAP transparency and simplicity;
- to strengthen the competitiveness of Slovak food and agricultural sectors;
- to give greater importance to non-market items, such as environment, quality and health standards and sustainability.

In international circumstances, the typical feature of current agriculture is that this sector is strongly influenced by the EU membership and consequently under the impact of the CAP is becoming more uniformed, simplified and less diversified. This refers to the all-new member states. Another significant change is that the sector representatives as well as the leaders of agricultural chambers or farmers unions became more collaborative at their initiatives to get across the common interests during the negotiations with European Commission. This approach is particularly typical at the preparation of the new CAP for 2014 – 2020 when they are requesting the elimination of the dual treatment of farmers from EU-10 and EU-15 with prioritization of founding member states and also the preferences for smaller farms against of larger agricultural enterprises from Central and South part of Europe.

The effects from the EU CAP are diverse among the members, and some researches are indicating that the reasons are stemming from the level how the new states have been prepared on the EU accession, as well as from the volume of the investments into both agricultural and food sectors production (Csáki et al., 2010 and Kadlečíková and Kapsdorferová, 2011).

Table 1: Agriculture in Slovakia (Selected Indicators)

Indicator	Year						
	2000*	2004*	2007*	2008	2009	2010	2011
I	1164,08	1663,65	25964,77	2908,51	2782,22	3119,88	3723,16
E	605,49	1142,47	19273,00	2036,77	1932,80	2162,02	2918,64
TB	-558,59	-521,18	-6691,77	-871,74	-849,42	-957,86	-804,52
E/I	52,01	68,67	74,23	70,03	69,47	69,30	78,39
LF	77332	49938	41723	38370	35023	31685	29724
A/GDP	3,98	3,65	3,63	3,75	3,08	2,56	3,11

Legend: I – imports of agricultural commodities in million EUR,
E – exports of agricultural commodities in mil EUR,
TB – trade balance in million EUR,
E/I – exports of agricultural commodities as a percentage of imports,
LF – labour force in agriculture,
A/GDP – the share of agriculture, forestry and fishery in GDP in %, * 1 EUR = 30,1260 SKK

Source: Zelená správa SR 2002 – 2011, Štatistický úrad Slovenskej republiky: Zahraničný obchod Slovenskej republiky, Štatistický úrad Slovenskej republiky: SLOVSTAT

At the analysis of advantages and disadvantages from EU accession of new member states has to be taken into consideration the major differences among new member's states and EU-15. Meanwhile, in EU-15 are cultivated 145 million ha of agricultural land, in EU-10 this number represents just 37 million ha. In the first group the number of sector employees is attaining 6,2 million. In the EU-10 it is more or less the same: 6,32 million.

With regard of the legal forms of enterprises and holdings in Slovakia are prevailing cooperative farms which average size is 1254,55 ha and in total they are cultivating 37,87 % of arable land. The cooperative farms are followed by limited liability companies with average size 414,87 ha and with share on cultivated land – 35,02 %. Shareholding companies in majority originally formatted from the former state farms are cultivating 7,38 % of total arable land with average size of their business units – 1254,91 ha. The individual holdings are represented by share of 16,55 % on total arable land with average size 64,49 ha, while the other forms of farm businesses have no typical enterprise features. They are, mainly concentrated on the subsistence activities with average size 5,19 ha cultivating in total 3,18 % of arable land.

The human resources

In the former EU states from the total working forces only 3,7 % are working in agriculture, while in new member's states this number represents 9,3 %. Another words the 100 ha of agricultural land is cultivated by 5 workers, while in EU-10 by 6,25 workers. If in the first group of farmers one farmer is taking care about the food of 63 citizens in the second group this indicator is significantly lower, when one farmer is feeding 16 citizens.

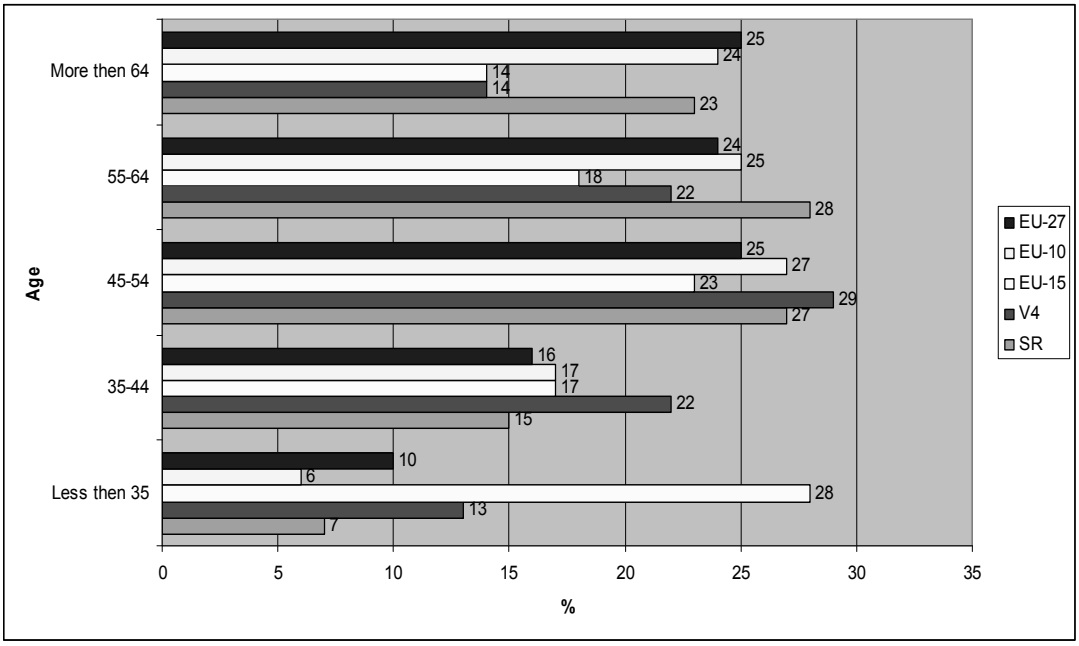
Every human activity is requiring strategic approach, which has to be in line with entrepreneurial activities of respective business and in conjunction with its mission, in order to attain the identified objectives. Modern philosophy of human resource management in agriculture is based like in the other sectors on the assumption that people are not only representing additional costs, but that they are real assets which are taking active part on the creation of the farm success and its values. Human resources in Slovak agriculture always played significant role and simultaneously agriculture meant for them the most important working opportunity, including of the Roma minority. In 1936 in agriculture was employed 3,4 million people. With gradual industrialization of Slovakia, particularly after Second World War, the number of employees in agriculture has rapidly declined on the level of 330 000 in 1989. This indicator after transition process in agriculture as well as after EU accession has declined on 44 000 people. This is causing serious social problems, especially among the most fragile groups of citizens as does represent Roma minority, respectively people who are living in the outskirt regions of Slovakia, for whom agriculture always meant reliable source of the job opportunities.

With regard of the sector's human resources, the serious challenge is unfavourable age structure. From Figure 1 may be seen that in comparison with the four Visegrad countries and EU-15, as well as with EU-28, the lowest share of young people up to age 35 years (7%) is working in Slovak agriculture, while in EU-15 this indicator is

representing 28%. Analogical situation is in the scale from 35 to 44 years age, in which are registered only 15%. Significantly stronger is age category from 45 to 55 years – 27%, and the Slovak Republic is becoming leader in the age category from 55 to 64 years with 28% share. Identical situation is with age category beyond 65 years with 28% share, while in the EU-15 the same indicator representing only 14%. It is worth to mention that in Slovak Republic in the countryside is living about 23% more population as in the EU-15. From this point of view in the rural side we can observe aging of the people, especially those who are dealing with agriculture and rural development activities. The natural consequence is low labour opportunities, and poverty. According of latest survey 14% of Slovak population is living in poverty.

It is obvious that this unbalanced development is not favourable either, and the government in cooperation with European Union has to apply the effective measures which will attract more young people to the working activities in countryside linked to the agriculture, rural development and to the development of rural infrastructure. Actually there is the government plan to employ in the frame of next coming four years (until 2017) 20 000 young farmers.

Figure 1: Age structure of farm managers in the European Union in 2010 (in %)

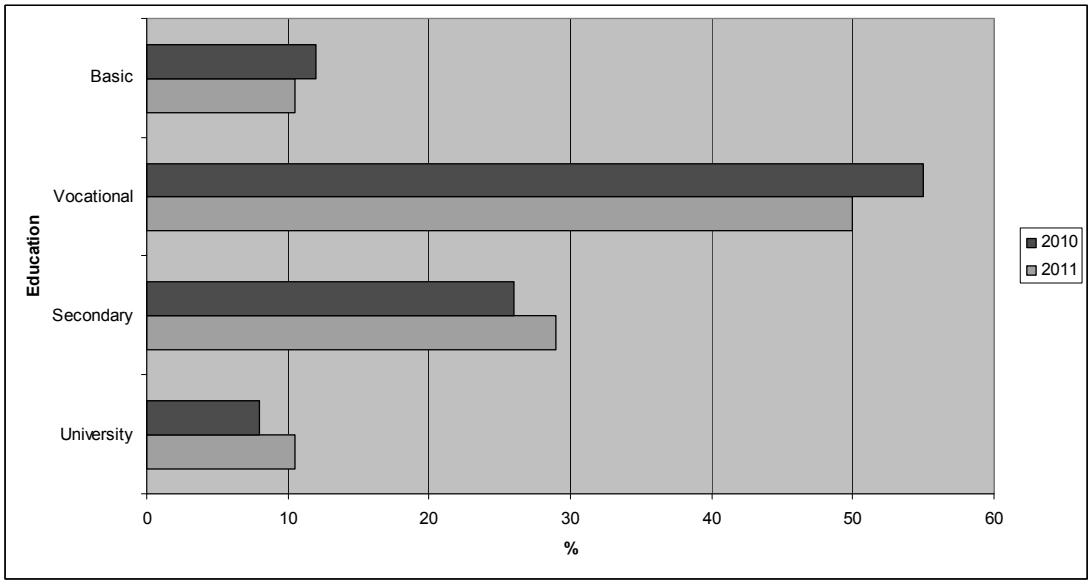


Source: Eurostat - farm Structure Survey

With regard of the sector's educational level is situation more favourable (see Figure 2.). 11% of working sources have the university education, 29 % posing with secondary education and more as 50% have completed one or two study branches on the vocational schools. In Slovakia altogether are operating 63 vocational schools in which is possible to study alongside of the other non-agricultural study branches also subjects connected to the agriculture, rural development, food processing, etc.

The above-analysed level of educational structure is good basis for implementation of modern, sustainable and economically reasonable agricultural production and rural development.

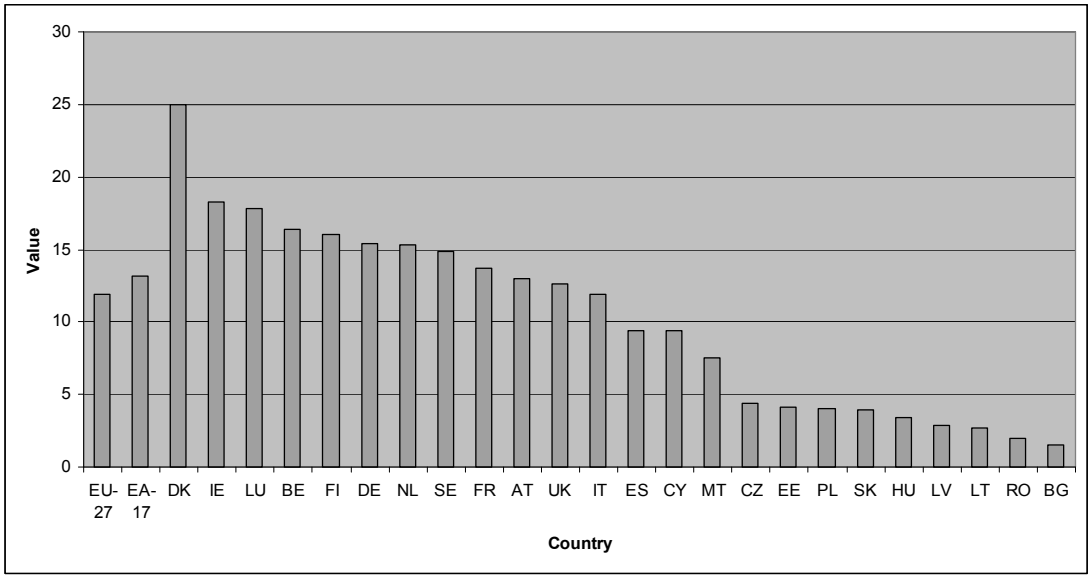
Figure 2: Education structure of employees in agriculture in the Slovak Republic (in %)



Source: Green Report 2012 – Report about agriculture and food staff in the Slovak republic in 2012

While speaking about living standard in Slovak Republic, it has to be underlined that situation is not optimistic. According of the Eurostat (2011) the average of the living standard in our country by comparing this indicator with other states is significantly lower with EU-15 (Figure 3).

Figure 3: Average gross hourly earnings in EUR



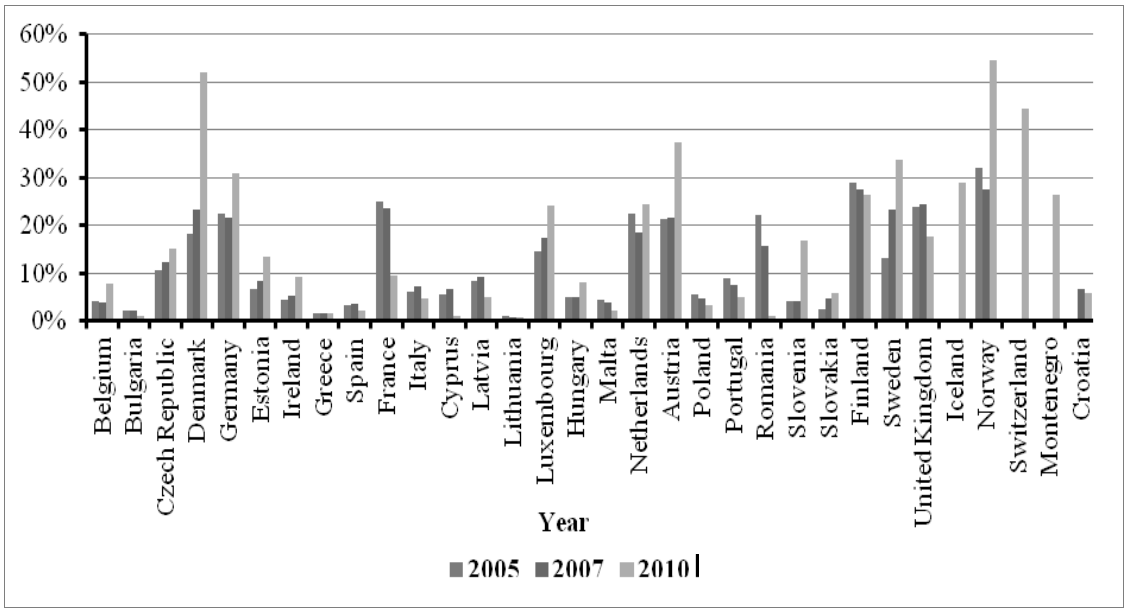
Source: Eurostat- Earning Statistics

While median of the earnings per hour in Denmark is 25 EUR, in Belgium 16,4 EUR, in UK 12,6 EUR, in Slovakia this is just 3,9 EUR. Behind Slovakia are listed only Hungary, Latvia, Lithuania, Poland and Bulgaria. This is the additional reason that why Slovaks, especially young people prefer to work outside of country and that why the working activities in the countryside are less attractive, since the average income there is lower about 20% in comparison with other industrial sectors and IT business. From the above-mentioned considerations the positive development is the opened labour market for young educated people. On the other side critical situation is that the majority of them outside of Slovakia are employed in the working places requiring minimum educational level, another words their personal capacities are under- utilized.

The farm diversification

With regard of the farm diversification in combination with other non- agricultural activities, it has to be highlighted that the slight, however positive development, was noted in this field (Figure 4).

Figure 4: Agricultural holdings with other gainful activities directly related to the holding, in percentage of the total number of holdings



Legend: 0 – data is not available

Source: Eurostat: Farm Structure Survey

After the transition process the farm diversification which was the one of strongest sides of the economic development of former cooperatives and state farms, almost had stopped its further development. This was due to that these non-agricultural activities produced high profits, therefore for them was more reasonable to split out from their former legal body and to privatize non-agricultural activities as the individual business bodies. However, after the EU accession, benefiting from diverse EU funds, including

of LEADER program funs dedicated for regional, respectively rural development helped to revitalize non-farming activities alongside of agricultural production. In the scope of years 2007-2010 the diversification in Slovakia is significantly increasing. In 2010, it achieved 5,93%, while in 2005 it was just about 2%. From this point of view, the EU accession means positive impact on the revitalization of rural economic activities, as well as on the support of infrastructure development and on the generation of new job opportunities.

The starting points for EU accession

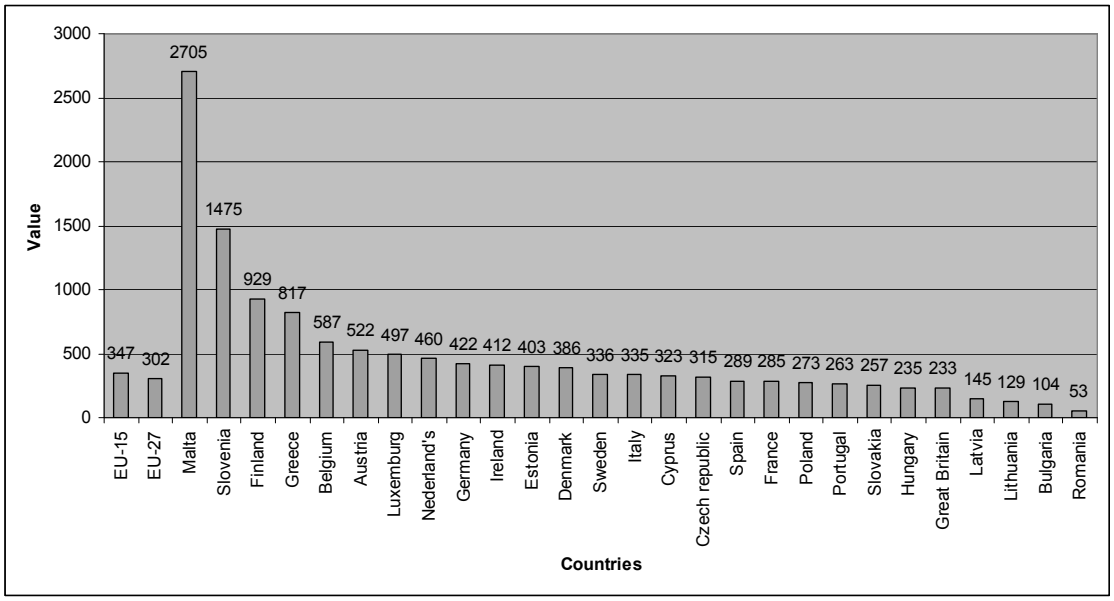
The consumption power of the first group of states represents 390 million consumers, in the second case this is 100 million. The consumption food baskets are significantly varying between two groups of states in favour of more developed economies. In 2007, the household expenditures in EU-15 represented only 15%, while in EU-10 countries about of 24-28%.

The diversity effects of the new members in the EU are given by different starting conditions. Slovak Republic had a share of agriculture, forestry and fisheries in the total GDP of 3,11% in the year 2011 (see Table 1 on p. 14.). The sector's performance in Slovak Republic after the EU accession was growing, particularly when the total incomes are taken into account. However, the Slovakia from the outset failed to meet the one of its priority to strengthen the competitiveness. According of research made by FAO 2010, the states with the highest benefits from the EU CAP after 5 years of the membership have been Poland and Slovenia. The cereal's production in Slovakia Republic after the EU accession was stabilized, even started to have the growing trends. As concerns of production per ha it was even higher as prior accession. The positive impact of this process was influenced by the higher level of farm prices, partly caused with high food price crisis in 2007-2008.

On the other hand, the meat production scaled down. In the pork meat production was noticed the lowest farm gate prices. Analogical development was evident at the milk production as well. However, the added value of the agri-food products has been only moderately increased. If into consideration is taken the direct payment per ha, then in Slovak Republic is ranked as the sixth country from bottom of the scale with 257 EUR per ha, while e.g.in Slovenia the same indicator is achieving 1475 EUR, in Finland 929, or in the neighbourhood Austria it is 522 EUR. According to Csaki and Jambor (2009), the highest additional payments from the state budgets have been noted in the Czech Republic, Slovenia, Latvia Estonia and Hungary. In front of the Slovakia is also placed Lithuania. It should be highlighted that the distribution of direct costs among EU-15 and EU-12 caused further differentiation between new and original states. In Denmark the direct payments are achieving 70% of farmers' income. In EU the farmer's income in average from direct payments is achieving 31%, while in new EU member's states just 19%. The architects of the new CAP are aware that these challenges have to be mitigated. The substance of this challenge is that at the architecture of the new CAP have to be taken into consideration also the strengths of the EU-12 as their priority.

The overall subsidies (see Figure 5) directed into the agriculture both from EU as well as from the Government of Slovak Republic have a meaningful share on the overall incomes of the agricultural large enterprises and individual holdings. The data of Table 2 are calculated as the average from four years results (2006-2010). The highest share is noted from non-investment subsidies – 23,66%, followed by the direct payments per ha of cultivated land (SAPS) – 7,87%, supplementing national direct payments 4,67%; support for animal production – 3,03%, agro-ecological measures – 2,65% and POP – 1,53%.

Figure 5: Total support in EUR per hectare of agricultural cultivated land in 2011 (%)



Source: Green Report 2012 – Report about agriculture and food staff in the Slovak republic in 2012

Table 2: Subsidies as % share on the total incomes and revenues, selected sample

Indicator/Year	Share on Incomes					Average share	
	2006	2007	2008	2009	2010	Income	Revenues
Non-Investment Subsidies	20,38	21,87	21,56	29,60	26,15	23,66	35,47
SAPS – Single Area Payment Scheme	6,00	6,15	6,62	10,40	10,96	7,87	11,80
Additional State Direct Payments	3,29	5,03	4,89	5,96	4,26	4,67	7,00
POP	2,44	1,81	1,58	4,41	0,28	1,53	2,29
Animal Production	0,53	3,22	3,24	4,40	3,95	3,03	4,54
Agro-Ecological Measures	3,20	3,21	2,91	4,05	2,65	3,18	4,77

Source: Information letters of MARD SR, years 2006 - 2010

In this connection, the interesting role is played by the size of agricultural farms and individual holdings. The average size was unanimously considered as the comparative

advantage of the pre-accession period with assumption that Slovak farmers will be more competitive in comparison with small family farms from Western Europe. This assumption was partly materialized in the first years after accession when until 2009 the Slovak farms benefited from direct payments; especially the larger farms were capable to fulfil the conditions required by the EU for the direct payments and funds. Alongside of this, it was revealed that larger farms are able in more effective way to deal with crisis management in comparison with smaller holdings. They are more reluctant towards of the different shocks caused by the volatile food prices, as well as they are more resilient against of the natural disasters, also they are more flexible to diversify their production.

In addition to this, the larger farms are doing acquisitions of smaller holdings and as the consequence the average size of the farms is continuously increasing. From this point of view the size of the agricultural holdings should be considered as important factor, but in the frame of changing agricultural policy is dominating the tendency to prioritize with direct payments the farms with lower average size.

Among the weaker sides of our agrarian sector, we can list the countryside which in recent multiplied economic and Eurozone crises undergoing the serious recession as in Slovak Republic, so in the other new EU states, as well. From the above mentioned crises as the first started the crisis of the high food prices which was launched to the end of 2007 and which culminated in 2008. In our circumstances it had a positive effect on the strengthening of the farming activities, since the farm gate prices were significantly higher. Even after the first wave of this crisis, the level of food prices continued to be higher in comparison with the pre-crisis period. It is worth to mention that the prices of the basic foodstuffs did not returned to their previous level. In this connection it should be underlined that during this period the inputs prices have been scaled up in the meaningful way. However they moderately decreased in the beginning of 2009 and so far no dramatic development was noted with this phenomena. The more negative and significant impact have been caused by global financial and economic crises, which started to be visible the one year after they both appeared in other sectors of our economics, however, so far they do have undesirable impacts on the producers and consumers behaviours.

As the consequence of climate change in our circumstances is dominating the volatile climate food prices which is interlinked with lower crop yields, global development of agricultural and food commodities and energy prices. These all the factors have the serious consequences on the production of agricultural commodities. This particularly means that there are numerous factors which have to be taken into the consideration at the new CAP as well as in its implementation into the real life of the individual holdings and agricultural enterprises.

Quo vadis? Slovak agriculture and rural development under the changing CAP

What everything has to be done in our agriculture, in order this sector will be well prepared for the increased competition in frame of EU? First of all, the CAP philosophy has to be strengthened and in this connection go back to its most essential reasons of establishment among which is dominating the food security. This was valid

in the post-war time, meanwhile it was achieved the intensive agricultural growth typical with overproduction of food, so also with need to implement non-economic tools which led to the scaling-down of agricultural production. All this happened despite of the fact that in the world the number of the people started to grow in dramatic way. Paradoxically the Europe, including of the EU countries is challenged by globalization of world economy as well as by growing integration of financial markets. European food security is in great deal depending from its ability to adapt on the climate changes. The direct payments in relation to the rural areas are playing so far the positive role and this is foreseen for the future. They should play a role of protective and social nets against of the price instability, insufficient food production, price volatility, speculations in trade transactions or in the other unfavourable developments. Therefore, EU has to continue with support of the farming schemes at the management of the risky production which will be in the forthcoming period even more challenging. Farmers have to have prepared themselves on the mitigation of the negative impacts of the climate changes, what practically means further investments into the production and in this direction have to be strengthened basic and applied research. Another kind of question is the establishment of the food inventories through the state food reserves. It became evident that not so former EU countries, but especially new countries after the EU accession have neglected their basic tasks towards of the ensuring the food security.

Concerning of the EU endeavour to decline its priorities for larger agricultural enterprises will lead to the numerous challenges from the side of new EU states. It should be recognized that Slovakia is the state in which the highest share (12,41%) of farms are with average of 100 ha of agricultural land. Slovakia is followed by the Czech Republic with share of 89,69% of enterprises having the size beyond of 100 ha, then follows Hungary with 68,33% and after these countries are ranked Estonia, Romania, Lithuania, Latvia and Poland. The lowest average is in Slovenia with share of 3,78% enterprises having more than 100 hectares. This reality has to be taken into consideration, since not only the Europe but the rest of the world are evolving in favour of the larger individual holdings and agricultural enterprises.

In Slovak Republic prior to the start of the new CAP will be important to realize following measures:

1. Agriculture and rural development should be considered as the strategic sectors of the national economy, which can influence significantly the creation of new job opportunities through the entrepreneurial activities and to strengthen the nature of the agricultural landscape.
2. To elaborate the medium-term concept of agricultural and food development until 2020, including of the rural economies development with objective to set up the sector development towards of the most effective use of CAP from 2014.
3. To scale-up the country food security. The prices of agricultural commodities will further increasing, but at the same time would have a volatile development. Particularly from the above mentioned, there will be practically impossible to rely on the import, because beside of the already mentioned factors will worsen a foreign trade balance. Especially, resulting from high food prices, it has to be also

taken into consideration that with import of the food prices are separating local working forces from job opportunities.

4. To elaborate effective tools for crisis management in order to mitigate the consequences of the risks (yield's insurance, special financial packages, as well as the social nets).
5. In agriculture will be important to carry out technological and institutional changes. The production has to be less costly; the input-output prices should be more balanced. This process would require acquisition of more environmentally friendly technologies. In addition to this, important will be strengthened investments into agriculture and food sectors.
6. To the growth of quality in agri-food sectors and to the food security, will in meaningful way help, the higher investments into the research, education and agricultural extension.

Conclusion

The EU enlargement has in general view the positive impact on agricultural and rural development, first of all farm income and profit's point of views. The development in some states was not uniformed due to the pre-accession and post-accession policies as well as activities and the diverse starting positions of agricultural sectors. It was confirmed that the consolidated larger holdings and agricultural enterprises have certain advantages, while the small holdings are facing certain challenges. However, in the EU-10 countries was also confirmed that they are posing with low potential for competition with more experienced partners from EU-15 states in the arena of the open market.

The EU accession has scaled-up the investment inputs into the agrarian sector. The cultivation programs in crop production are more simplified with regard of the number of cultivated crops and with use of more environmentally friendly technologies. In the strong competition environment the negative impact was noted in animal production, where the production of meat had significantly declined (pork, beef, and poultry). The decline was about of one third.

Moreover, it is worse to mention that from the strategic management point of view, the sector paid lesser attention to the EU accession. The strategic management tools have to be utilized in favour of the increase of Slovak export capacity towards of the EU countries, CIS as well as to the emerging economies.

New conditions which will stem out from changed CAP will after 2014 in substantial way impact the agricultural activities in the agricultural holding and enterprises. The agricultural producers have to be prepared for those changes. It should be noted that the information campaign have to be improved, government has to prepare rational sets of economic and social measures and tools which will support effective use of Slovak crop and food genetic resources and widely benefit from its internal and external environment's comparative advantages.

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1.2. COMPETITIVENESS OF HUNGARIAN AGRICULTURAL ENTERPRISES AT DIFFERENT FARM TYPES

Summary
Nine years has passed since the EU accession, thus, it is possible to make an objective evaluation about the impacts of the accession. Several reviews were made in this topic, but most of them made their assessment at macroeconomic level. This research focuses on the impacts of accession at farm level, using the data of the EU Farm Accountancy Data Network (FADN) database. The main goals of this research were to explore the impacts of the accession on different farm sizes and types of farming and to find which types of farming were the 'winners' or the 'losers' of the accession. For the research, the primary data of the Hungarian FADN database were used (between the years 2002 and 2009) created by the Hungarian Research Institute of Agricultural Economics. Based on the domestic and international sources, the ROE ratio was chosen as a top-indicator for measuring profitability, and was used during the further examinations. Based on the research results I show how the profitability of different farm types and farm sizes have been changed and which farm types and sizes may be considered more and less successful since the date of EU accession.

Keywords: EU, competitiveness, agricultural enterprises, farm types

Introduction

The EU accession has brought not only new opportunities, but also many challenges for the new member states. Nine years after the first round of the EU enlargement, the new member states are able to examine and evaluate the impacts of the accession. The scientific reviews of this field discussed the problems and the results mostly at macro-level and examined the general macroeconomic impacts of the accession in the agricultural sector (see among others at Wilkin, 2007; Doucha és Foltýn, 2008; Csáki and Jámbor, 2010 and 2012; Kapronczai, 2011; Popp and Székely, 2011). The main objective of our research was to make this evaluation at farm level.

EU accession has brought many changes and many questions. What changes and what type of development can be observed in the agricultural sector and among the farms after the accession? Which types of farming could take the advantages of the accession, which could work successfully and became competitive and which ones became the losers after the accession?

When examining competitiveness, we have to consider the basic statements of Porter (1980), who described the microeconomic business environment by his five forces model, where the connections and the rivalry between the players of a given industry were illustrated. According to Porter (1990) three levels of competitiveness may be differentiated, the level of enterprises (micro-level), regions or sectors

(meso-level) and nations (macro-level). At macro-level, those countries may be competitive, which have more – and enduring – competitive advantages at industrial and corporate level. On the contrary, according to Krugman (1994), competitiveness cannot be measured at the level of nations; it may be evaluated only at corporate level.

Hoványi (1999) recommended that the evaluation of the international competitiveness of a company should be started by the evaluation of its international environment, and introduced the so-called "triple diamond" model, with three different levels. At the first level, the closest economic environment of the company shall be examined and the most important tendencies shall be recognized. At the second level, the reasons of these tendencies must be explored, while at the third level the global tendencies are to be discovered.

Mizik (2004) stated that the competitiveness of the enterprises is directly connected to its profitability, but he highlighted that the two expressions shall not to be considered as synonyms. Chikán and Czakó (2007) examined the companies' competitiveness based on a comprehensive survey of Hungarian SMEs. In their research, they examined different aspects: company operations and functions, production, business strategy, cooperation, and innovation attitudes.

Udovecz et al. (2000) focused on the competitiveness of agricultural enterprises. According to their opinion, the competitiveness of the agricultural enterprises shall be differentiated according to time periods. In short term aspects, the competitiveness in the agricultural sector is determined by the income and marketing possibilities of the farms, while in long-term aspects the competitiveness of a product is determined by its quality, price and the connected services, moreover, competitiveness is also influenced by the organizational level of the sector.

The Hungarian agriculture was one of the most important players of the European agriculture for many decades. After the political transition in the 1990s, the former system of the Hungarian agriculture has undergone fundamental changes. As in all CEE countries, the agricultural sector had to face serious problems: structural changes, need for modernization, financial problems and the loss of the former Eastern markets. In Hungary, the food processing industry started to collapse, the processing plants has lost their well organized former suppliers – the cooperatives and state farms – and most of them could survive only with foreign financial help. The financial and structural problems also affected other fields of the agricultural sector, such as technical development. Without modern technical solutions, agricultural enterprises are nearly unable to survive the hard circumstances, to be stable, to develop their business, and to improve their competitiveness (Daróczi, 2005), while Husti (2013) added that Hungarian agriculture was only able to be successful when the players of innovation processes could manage their activities in a harmonized way. Another possibility for improving the performance is increasing the quality of the products by added value or getting a higher quality level. It may be conducted by modernization of the technology. (Ubreziová, 2005)

Some authors underlined the importance of organizational problems. According to Jámbor et al. (2008) the state and EU supports, the improved quality and ecologic features of the production may improve the competitiveness of the farms, but they underlined the importance of organizational management and the role of cooperation.

Popp and Székely (2011) suggested renewing or establishing new vertical connections between the players of the whole supply chain, in order to improve the bargaining power of the producers. Lakner et al. (2007) highlighted that the most important problem in the Hungarian agriculture and the whole food chain, is the dominance of the processing industry and the retailers (some examples: late payment, forced price reduction, slotting fee, etc). This dominance in many cases can destroy the liquidity of the producers and make their operation nearly impossible.

The competitiveness of the Hungarian agricultural sector was also examined in financial aspects. Borbély et al. (2011) and Baranyi et al. (2012) underlined that the unfavourable tendencies of the profitability, efficiency and financial position of the Hungarian agricultural enterprises have started after the political changes, and the financial performance of the Hungarian agricultural enterprises have not improved significantly in the examined period (between 2002 and 2009). They observed that the accession has influenced the ratios of the agricultural enterprises only for short time, the number of the businesses increased, but they had been established with low issued capital. The retained profit of the years slightly increased, especially in 2005 owing to favourable agricultural output prices. Some of these effects was only temporary and their influence was eliminated after 2006. The results of the cited authors show that assets – primarily fixed assets – and the investment activity also show an increasing trend because of the new credit facilities and EU support possibilities. One of the greatest problems is the high rate of stocks and receivables; the financing between creditors and receivers has many problems. Most of the agricultural enterprises have liquidity problems. (Baranyi et al., 2012)

Hustiné (2012) analyzed the performance of the Hungarian agricultural enterprises and the food-processing sector. According to her results, most of the agricultural enterprises cannot take the advantages of several supports (e.g. tax allowances) because of their poor financial performance. Törőné (2012) highlighted that there is a significant difference between Hungarian agricultural enterprises according to their size; the small sized enterprises (mostly family farms) are unable to develop and they are lagging behind the better-developed large agricultural companies.

Material and methods

This research work was conducted in two steps: at first, an evaluation was made at international level, in which the FADN (Farm Accountancy Data Network) data of the Visegrad countries (Czech Republic, Hungary, Poland and Slovakia) were examined, analyzed and compared to the average of the FADN data of the EU-15 member states. A part of the results of this stage has already been published (Illés et al., 2012; Törő-Dunay et al., 2012).

After the international comparison, a detailed analysis of the Hungarian farms was conducted, based on the primary data of the Hungarian FADN system. The ultimate goal of this stage of the research was to explore which types of farming may be considered as most competitive, which sectors became the “losers” and which became the “winners” of the accession. The results of both research stages confirmed the

hypothesis that different farm types could use differently the available EU supports and they could take the advantages of the EU accession in a different way.

The research data for the international comparison were imported from the secondary data of the FADN international public database for the four Visegrad countries and the EU-15 countries.

In accordance with the definition of Annex II of Commission Regulation (EEC) No 2237/77, data in the farm return concern exclusively the agricultural holding, they refer to activities of the holding itself, including forestry and farm tourism if they are managed as part of the holding. Non-farming activities of the farmer and his family are not included. (Official Journal, 1977)

The FADN, which was established in 1965, is a survey carried out by the Member States of the European Union. Every year it collects accountancy data from about 80.000 agricultural holdings in the member states. The FADN is the only source of micro-economic data that is harmonised (the bookkeeping principles are the same in all Member States) and is representative of the commercial agricultural holdings in the EU. Holdings are selected to take part in the survey on the basis of sampling plans established at the level of each region in the Union. The Community typology defines the (economic) size of an agricultural holding according to its potential gross added value (total standard gross margin). Specialisation (i.e. the type of farming) of the farms is determined based on the contributions of the different lines of production to the total standard gross margin (SGM). In the past years the system has changed the base of the calculations for standard output (SO) but in the period of the research only the SGM was in use. The holding's economic size is expressed in European size units (ESU). (EC, 2007)

For the international comparison and the analysis of the Hungarian farms, the same methods were used. After the data procession, a detailed financial analysis of the examined enterprises was completed and the results were controlled by statistical methods. The statistical analyses were taken by the SPSS 18 programme, the differences were verified by one-way ANOVA.

For the analysis of the financial situation of agricultural enterprises, 20 indicators were determined and classified into the five groups: indicators of capital structure, profitability, efficiency, liquidity and special indicators for EU supports.

According to the results of the former, international comparison, the support policy of the CAP could just slightly improve the financial situation of the agricultural enterprises, but it was not enough to increase competitiveness and efficiency of the farms. In case of small farms, this help was enough to maintain their operation and production, but it was not enough to improve their production. The advantages of the accession – the expanded market, the co-financed investments and modernization programmes, the higher income level increased by the payments etc. – could not been utilized by most of the farms. (Illés et al., 2012)

As the results of this international comparison Hungary showed the worst results among the V4 countries, therefore the more detailed data of the Hungarian farms were taken into further investigation.

The primary data of the Hungarian agricultural enterprises were imported from the Hungarian FADN database on the courtesy of the AKI (Research Institute of

Agricultural Economics). The Hungarian FADN system consists of approximately 1900 sample farms. The sample represents nearly 90 thousand agricultural enterprises over 2 ESU. The Hungarian FADN makes accrual accounting not only for corporate farms but also for individual farms. (Keszthelyi and Pesti, 2010).

As the main goal of this research stage was to evaluate the impacts of the EU accession on the different farm types, a common basis should be selected for comparison. Different literature sources suggest using financial performance indicators for comparing the different enterprises, because financial performance may be linked to the assessment of the profitability, efficiency and competitiveness of the enterprises. The comparison may be conducted using so-called top-indicators and indicator systems, which provides information in a concentrated way about the financial performance. Based on the domestic and international sources (Körmendi and Tóth, 2003; Milbourn and Haight, 2005; Kresalek, 2007), the ROE ratio (Return on Equity) was chosen as a top-indicator, and its values were used during the examinations.

The ROE values were calculated by the following formula from the original farm data:

$$ROE = Net\ income / Equity$$

After filtering the databases, a complex financial analysis of the agricultural enterprises were conducted. 22 indicators were determined and calculated, which were classified into five groups: capital structure, profitability, efficiency, liquidity indicators, and special indicators for EU supports.

The results of the financial analysis were controlled by statistical methods. The statistical analyses were taken by the SPSS 18 (PASW Statistics 18) for Windows programme; where we used cross table analysis (Chi-square tests), one-way and multi-way ANOVA, and regression analysis methods.

Results and discussion

At first, the original database should be filtered, because the research was focused only on those farms, which provided data for the FADN in the whole examination period (between 2002 and 2009), therefore the original database of the Hungarian FADN farms were reduced, and only 742 farms were chosen for our further researches. By this selection, the distorting effects of the changes among data suppliers could be avoided.

Data processing (Hungarian FADN database)

The main objectives of the research were to explore the impacts of the accession on different types of farming. Types of farming were determined in accordance with the FADN principles (European Commission, 2007), but for this research, the groups were aggregated in order to provide the correct sample size, thus the following farm type groups were examined:

- fieldcrops,
- horticulture, grapes, fruit production, permanent crops,
- dairy farms,

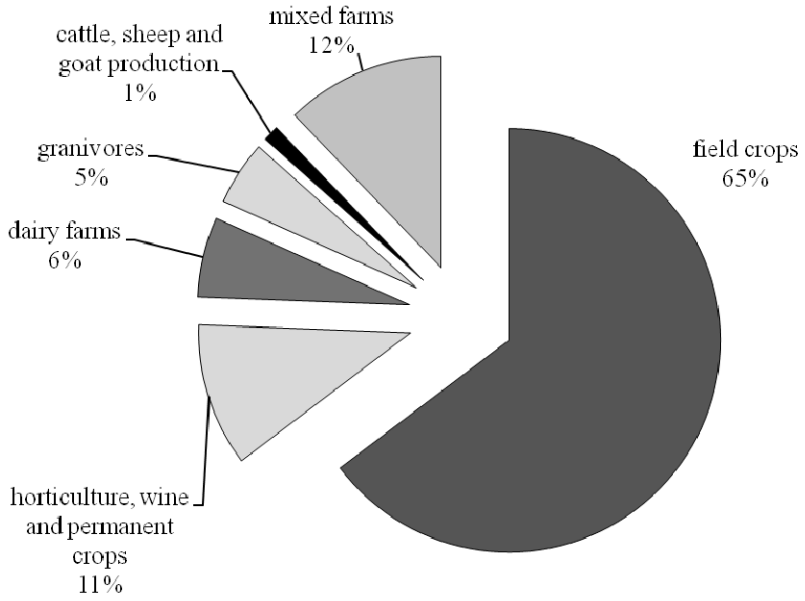
- cattle, sheep and goat production,
- granivores (pig and poultry),
- mixed farms.

The basic concept of the research was to disclose the distorting effects of the different years (e.g. the different weather conditions, prices, inflation) as much as possible, in order to evaluate only the impacts of the EU accession. Therefore, two periods were formed from the original eight-year long period – before and after the accession – and the arithmetic average values of ROE were calculated for both periods. The pre-accession years were represented by the data of 2002 and 2003, while the years between 2005 and 2009 were used as post-accession period. The year of the EU accession (2004) was not classified into these periods, as the EU regulations were not in force nearly in the first half of the financial year, which could have been an additional distorting effect.

In order to make better comparison, only those farms were selected into the further examinations, which production structure and their size was not changed. Only 499 of the original 742 farms did not change their farm size, and only 329 of them did not change their farm type either. These 329 farms were drawn into the further examinations because they can be considered as the most stable farms.

The 329 farms were ranked according to their average ROE ratios, and by appointing the quartile values, the farms were ranked according to the quartile groups (lower 25%, lower middle, upper-middle, upper 25%). The assessment was conducted according to these quartile groups.

Figure 1: Share of different farm types in the examined sample (Hungarian FADN system)



Source: own calculations based on the Hungarian FADN database

Figure 1 illustrates the share of different farm types in the sample of 329 Hungarian farms. The greatest share (64,7%) of the farms was specialized in field crops production, the second largest groups were farms with horticulture, wine and permanent crops, and the group of mixed farms, they are followed by the dairy and pig and poultry farms (granivores) and the smallest share represents the cattle, sheep and goat production.

Impacts of the types of farming on the profitability of agricultural enterprises by evaluating the average ROE values

The distribution of farms according to types of farming given by the quartile groups according calculated with the average ROE values are detailed in Table 1, for both periods (pre-accession: 2002-2003, and post-accession: between 2005 and 2009). Analysing the values of Table 1, in the pre-accession period (2002-2003) the dominance of the field crop producing farms may be observed in the upper 25% group, which means that more than 75% of the most successful farms were specialized in field crops before accession to the European Union. Horticulture, wine and permanent crop producing, dairy farms and the granivores production represent nearly the same share in the upper 25% quartile group (6-7%), while cattle farms are not represented at all among those farms, which may be regarded as most successful.

In the lower 25% and lower-middle groups – that means less successful farms – the share of horticulture, wine and permanent crops and the mixed farms was much higher than their share in the total sample (given by Figure 1), which implies, that most of the horticultural and mixed farms were not among the most successful farms before the accession.

Table 1: Distribution of farms according to types of farming by quartile groups according to average ROE values

Farm types	Period	Lower 25%	Lower middle	Upper middle	Upper 25%
Fieldcrops	2002-2003	57,3%	59,0%	65,9%	76,8%
	2005-2009	37,8%	66,3%	74,4%	80,5%
Horticulture, grape, fruits	2002-2003	14,6%	14,5%	7,3%	7,3%
	2005-2009	25,6%	7,2%	4,9%	6,1%
Dairy farms	2002-2003	2,4%	4,8%	11,0%	6,1%
	2005-2009	8,5%	4,8%	4,9%	6,1%
Cattle, sheep, goat	2002-2003	2,4%	1,2%	1,2%	Not repr.*
	2005-2009	2,4%	1,2%	1,2%	Not repr.*
Granivores	2002-2003	6,1%	3,6%	3,7%	6,1%
	2005-2009	9,8%	3,6%	1,2%	4,9%
Mixed	2002-2003	17,0%	16,9%	11,0%	3,7%
	2005-2009	15,9%	16,9%	13,4%	2,4%

* Not represented

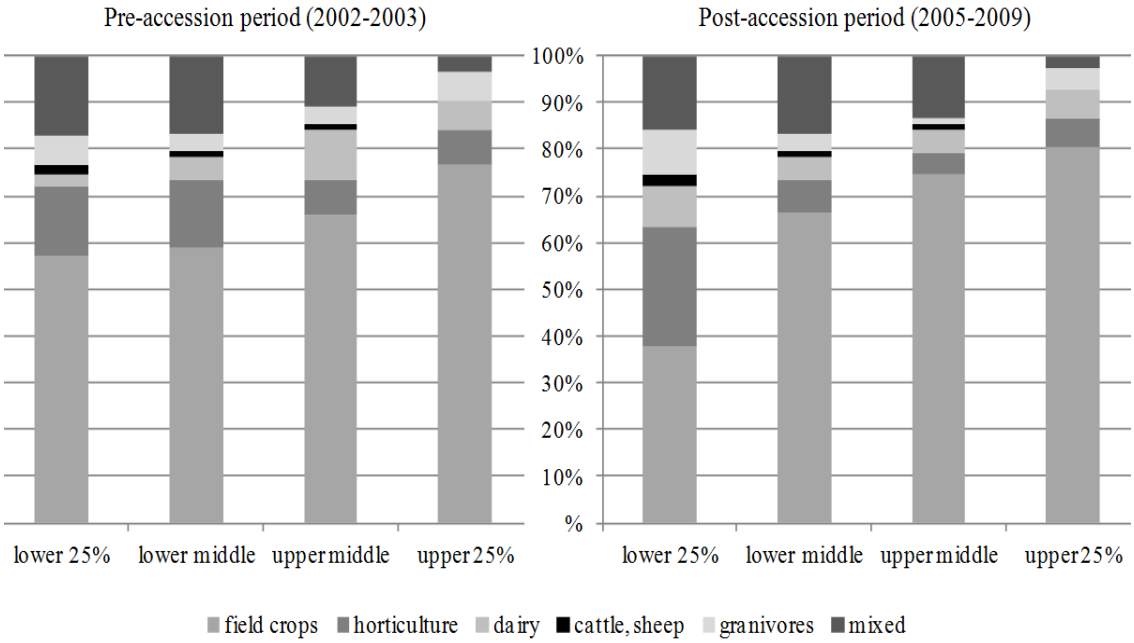
Source: own calculations based on the Hungarian FADN database

After the EU accession (between 2005 and 2009), many changes could be observed (see Table 1.). The most obvious change in the post-accession period is the significant decrease (by 20%) of the field crop producing farms in the lower 25% quartile group (from 57,3% to 37,8%). This suggests the stability and the more favourable situation of the field crop farms, in comparison with the other farm types.

In the lower quartile groups – that means, in the less successful farm types – the share of horticulture, wine and permanent crop farming enterprises increased significantly (these farms represented 14,6% in the pre-accession period, and more than 25% after the accession). The share of dairy farms and granivores producing farms also increased in the lower quartile groups after the accession (from 2,4% to 8,5% and from 6,1% to 9,8% respectively).

The dominance of field crop farming is obvious in the most successful group (i.e. in the upper 25%), and it shows a slight increase after the accession, meanwhile the share of all the other farm types has been reduced. These changes show a clear evidence of the success of field crops farming. On the contrary, the decrease of the specialized, labour- and capital-intensive farm types (such as horticulture, wine, dairy farms) and the granivores production (which has no EU-supports is also significant in the upper 25%.

Figure 2: Distribution of farms according to types of farming by quartile groups according to average ROE values in the examined period



Source: own calculations based on the Hungarian FADN database

Figure 2 illustrates the changes between the two examined periods. The diagram shows clearly the decreased share of fieldcrop producer farms in the lower quartile, which implies the stability and the greater chance of these types of farms for being competitive. The situation is reverse in case of horticultural farms, their share increased in the lowest 25% group. The dairy farms and the pig and poultry

(granivores) producing farms has also increased their share in the lower 25%, which shows their relative unsuccessfulness.

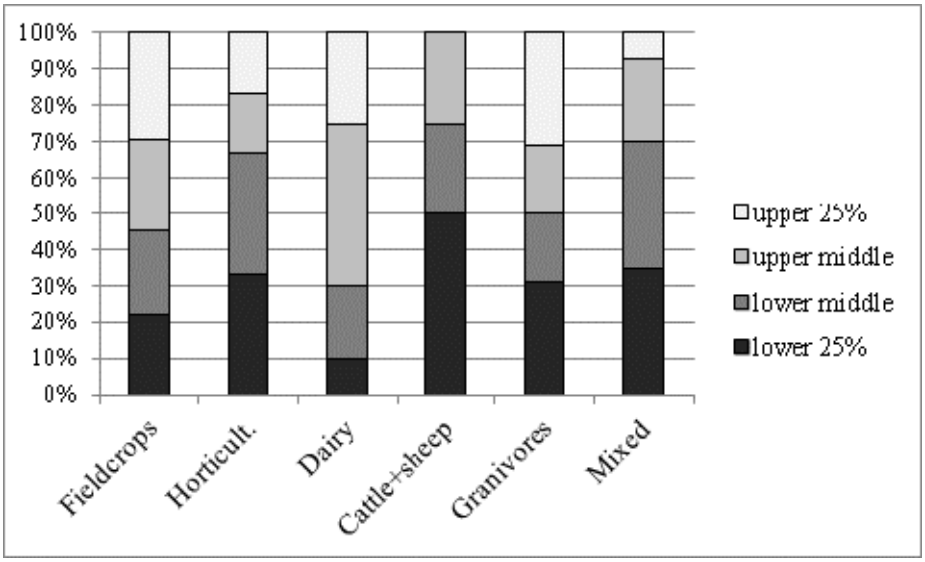
If we examine the distribution of the different quartile groups calculated by the average ROE values of the farms, it is also be observed that in the pre-accession period, the highest share in the upper 25% was represented by field crop farms, dairy farms and granivores producing farms. (See Figure 3 for the pre-accession period and Figure 4 for the post-accession period.)

The share of dairy farms was outstanding in the upper middle quartile group. In the lower 25% the share of cattle, sheep and goat producing farms was the highest, while the dairy farms represented the lowest ratio.

After the accession, the share of farms in the lower 25% (black colour) and lower-middle group (dark grey colour) have increased in all farm types, except for fieldcrop producing farms. It means that field crop producers were could improve their profitability better than farms operating in other farm types. The most radical decrease may be observed in horticulture, dairy farms and in granivores production, where the share of farms in the lower quartile group has increased dramatically (from 20% to nearly 60% in horticulture, from 10% to 35% in dairy farms, and from 30% to 50% in granivores production.

The upper quartiles (upper 25% and upper middle groups) may be considered as the 'successful' group; with higher average ROE values (see white and light grey columns). The changes were not significant in the upper 25% in all farm types, which means that the most profitable farms could be probably stable. The changes are more remarkable in upper middle category (light grey coloured columns), where the most significant decrease may be observed in dairy farms and granivores producing farms.

Figure 3: Distribution of farms according to the quartile groups calculated by the average ROE value by types of farming (pre-accession period: 2002-2003)

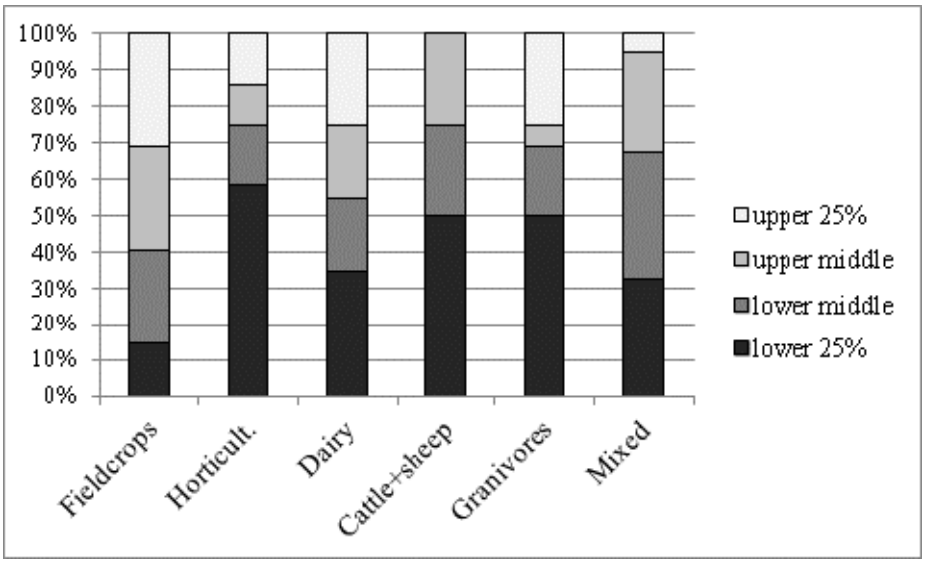


Source: own calculations based on the Hungarian FADN database

The situation of cattle, sheep and goat producing farms remained nearly unchanged, and the changes of mixed farms show only a slight decrease in the upper 25%, but it also may be considered as relatively stable.

According to the results given by Figure 3 and Figure 4, we can state that the changes between the two periods are likely to be observed in the share of farms in the lower quartile groups. The share of horticulture, grapes and fruit producing farms, dairy farms and pig and poultry (granivores) farms increased significantly, which means that they lost their former profitability position.

Figure 4: Distribution of farms according to the quartile groups calculated by the average ROE by types of farming (post-accession period: 2005-2009)



Source: own calculations based on the Hungarian FADN database

Summary of the results

As it has already been mentioned, the results of our research – the changes in the ROE values of the farms – can be considered as the impacts of the EU accession, which brought different market and economic conditions and a new supporting system, because:

- those farms were excluded from the examinations, which changed their size categories and types of farming, and
- the positive and negative impacts of the different years (weather, prices, inflation) were excluded by using the average data of the two periods.

The examinations carried out by the average ROE ratios have resulted that the position of field crop producing farms strengthened; the role of cattle and mixed farms remained unchanged, the importance of granivores decreased slightly, while the horticulture, wine and permanent crop producing farms and dairy farms may be considered 'unsuccessful' as they lost their role after the accession. These changes are summarized by Table 2, where the arrows show the direction of the changes, i.e. the increase or the decrease of the share of different farm types in the given quartile group.

We also examined the distribution of farms according to the different quartile groups, which also confirmed this observation.

Table 2: Changes in the share of farms according to types of farming, based on quartile groups calculated by average ROE values between pre-accession and post accession period

Quartile groups	Types of Farming					
	Field crops	Horticulture, grape, fruits	Dairy	Cattle, sheep, goat	Granivores	Mixed
Lower 25%	↓	↑	↑	—	↑	↓
Lower-middle	↑	↓	—	—	—	—
Upper-middle	↑	↓	↓	—	↓	↑
Upper 25%	↑	↓	—	*Not repr.*	↓	↓

Legend: ↑: increase; ↓: decrease; – : no change; Not repr: not represented
Source: own calculations based on the Hungarian FADN database

Other Hungarian authors (Keszthelyi and Pesti, 2008) have given similar conclusions, when they had examined the possible changes of the EU supports by the introduction the SPS system. According to the results of their model, the 'winners' of the new system could be the fieldcrop producer farms, while the greatest 'losers' would be the granivores producers. This situation is very strange, because according to Illés (1998), granivores production sector is more flexible then other livestock sectors, and reacts well to the changes of the economic environment.

It is suggested that the agricultural strategy should pay a special attention on these unfavourable changes. Hungarian authors also concluded that one of the most important factors that determine the profitability of the farms and the production structure is the supporting system, but the general economic factors (supply and demand conditions, prices, etc.) play a similarly determinant role.

Conclusions

In Hungarian and international literature sources the impacts of EU-accession were evaluated mainly at macroeconomic level, where the assessment of farm-level impacts were determined as only as partial objectives. The researches connected to this paper clearly focused on the farm level impacts.

In Hungary, after the accession, the EU support policy could slightly improve the financial situation of the farms, but it was not enough to increase competitiveness and efficiency in every type of farms and every size categories. For small farms, this support was enough to maintain their operation and production, but it was not enough to improve their production.

As a result of the examinations, which were conducted on the database of the Hungarian FADN system (years between 2002 and 2009), significant differences may be distinguished in the profitability of agricultural enterprises according to types of farming.

The ROE ratio was chosen for a key element of the financial comparison, for which a detailed analysis was conducted based on the data of the different farms. By the results of statistical examinations of the ROE ratio, we could determine the 'winners' and 'losers' of the accession according to types of farming.

Examining the six most important farm types (fieldcrops, horticulture, grapes and fruit producers, dairy farms, cattle, sheep and goat farms, pig and poultry producers (granivores) and mixed farms) the significant expansion of field crop producing farms was determined.

According to the results, it can be stated that the position of the fieldcrop producing farms has been strengthened, and this type of farming can be considered as the most successful sector of the Hungarian agriculture.

The 'winner' position of the fieldcrop producing farms is may be caused by the less market risks, as the storage of the products of this type of farms can be well managed because cereals are non-perishable products. The market possibilities are wider, as the products may be sold at the stock market as well, and besides the mill-industry, the rest of the products may be used in livestock farming sector. Fieldcrops have relatively less fixed costs when compared with livestock farming farm types. In summary, field crop farming is more flexible for changes after unexpected problems (i.e. weather damages), this flexibility may allow the use of different technology options (for example secondary crops).

The relative disadvantages of the livestock sector were also confirmed by these calculations. From the livestock sector, the dairy farms showed the strongest decrease, the share of the cattle, goat and sheep sector has not been reduced, but its share was very low even before the accession. The pig and poultry producer farms also has lost their former presence among the more successful quartile groups (upper-middle and upper 25%), which may be resulted by the lack of supports, the compulsory modernisation processes (for example animal welfare measures) and the market problems.

The 'loser' position of the livestock sector is highly determined by the less flexible production structure, the higher production costs (mostly increased by the high feedingstuff prices) and the quality features of the products, which are below the international average results.

The horticultural farms are also among the 'loser's' group, which is also due to the high production costs, the lack of modernization, the out of date variety structure and quality problems.

A general problem of the sectors belonging to the 'losers' is the lack of investments, the unfavoured financial situation, and the less value added of the products. For improving this situation, the improvement of the cooperation between the producers is inevitable, because without cooperation along the whole supply chain the development process and improving competitiveness will not occur.

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1.3. ENVIRONMENTAL FINANCING IN THE EUROPEAN UNION AND UKRAINE

Summary
The aims of this paper are to analyze and estimate the financing system of environmental protection in Ukraine and studying the experience of EU countries. Analyzing the costs used for environmental protection activities will give an idea about that which funds, in which way – directly or indirectly – in which sectors spent money for environmental protection. The efficiency of financing the environmental activities may be estimated by the impacts of financing the measures on reducing pollution.
In coming years, the development of financing the improvement of ecologic situation in Ukraine is associated with the development of environmental funds. Currently in Ukraine, a number of state-operated environmental funds are in operation. These funds were formed at the expense of the environmental taxes, fees for special use of natural resources, penalties for violation of rules and regulations on the protection of the environment and the damage caused a violation of the legislation of environmental protection. Mentioned taxes and fees will lead exclusively fiscal direction and will ignore regulatory, a restrictive and stimulating functions that is not conducive to the effective use of natural or ecological benefits of social production.

Keywords: environmental protection, environmental protection expenditures, ecological payments

Introduction

The main aim of this paper is to analyze and evaluate the financing system of environmental protection in Ukraine and studying the experiences of EU countries. The financing system of environmental protection will show us what funds, in which way – directly or indirectly – spent money in which sectors for environmental protection. The efficiency of financing the environmental activities may be estimated by the quantitative impacts of environmental activities on reducing pollution.

We have read the scientific works about the potential dangers of the future. Global warming is real hazard; we shall consider its possible negative effects. We have heard the warnings, and unless we act now, we will face serious consequences. The good news have nearly lost in the debates, that we can do something, and more easily, and at far less cost, than most of us could imagine.

In this process, it may help to have a vision of how the future might look if we succeed. That is not merely a cleaner, healthier, more secure world for all. Handled correctly, our fight against global warming could set the stage for an eco-friendly transformation of the global economy – one that spurs growth and development rather than crimps it, as many nations fear.

We have witnessed three economic transformations in the past century. At first, the Industrial Revolution occurred, and then the technology revolution came, then our

modern era of globalization. We stand at the threshold of another great change: the age of green economics. (Ban Ki-moon, 2007)

In coming years, the improvement of the ecological situation in Ukraine is associated with the development of environmental funds. In Ukraine, a number of state-financed Environmental Funds have been established and still are in operation. Mentioned funds are formed at the expense of environmental taxes, fees for special use of natural resources, penalties for violation of rules and regulations on the protection of the environment and the damage caused a violation of the legislation on environmental protection. Mentioned taxes and fees will carry exclusively fiscal direction and will ignore regulatory, restrictive and stimulating functions that are not conducive to the effective use of natural or ecological benefits of social production.

Environmental protection expenditure is the money that society spends on protecting the environment. Nowadays, the protection of the environment is integrated into all policy fields with the general aim of reaching sustainable development. Clean air, water and soils, healthy ecosystems and rich biodiversity are vital for human life, and thus it is not surprising that our societies devote large amounts of money to curbing pollution and preserving a healthy environment.

Environmental protection expenditure (EPE) is that amount of money which is spent on activities directly aimed at the prevention, reduction and elimination of pollution resulting from the production or consumption of goods and services. These are, for example, waste disposal activities and wastewater treatment activities, as well as activities aimed at noise abatement and air pollution control. Environmental protection expenditure does not directly take into account the expenditure for the sustainable management of natural resources (Environmental statistics and accounts in Europe, 2010).

All economic sectors and businesses in agriculture, industry and services as well as in the public sector and households spend some money on reducing, preventing and eliminating their pressures on the environment. For instance, both businesses and households pay for disposing the waste in a safe way, production activities spend money to mitigate the polluting effects of production processes and governments pay to provide environmental public goods, such as the basic levels of sanitation required to safeguard health. Governments subsidise the environmentally beneficial activities and use public funds to make it easier to borrow money on the financial markets for environmental projects, through measures such as risk sharing, credit enhancement or subsidies to lower the costs of borrowing in communities that cannot afford the full costs of investments for environmental projects. The demand for goods and services to prevent or treat environmental damages due to socioeconomic activities coming from the growing expenditure the economy will encourage the supply of environmental goods and services and stimulates the development of a ‘greener’ economy in all sectors.

This chapter provides details on the expenditure carried out by three sectors: public sector, private and public specialised producers and industry. These sectors account for most of the environmental expenditure. The public sector includes mainly central, regional and local public administration. Specialised producers are public or private businesses that provide environmental services, such as waste or wastewater

management, as their principal output. Industry includes all activities in mining and quarrying, manufacturing and electricity, gas, and water supply sectors. Apart from legislative and regulatory tasks, the public sector monitors environmental performance, provides grants and subsidies to encourage environmentally sensitive behaviour and funds research and development activities.

In most European countries, public administrations, such as municipalities, can also provide environmental protection services, such as waste management or wastewater treatment, directly. These services are generally provided by public corporations, whose activities are differentiated from other governmental administrative tasks. In some countries, however, governments delegate the provision of environmental services to private or (semi-)public corporations whose main activity is directly aimed at protecting the environment. These corporations are called specialised producers and they provide public utility services and typical environmental services, such as waste and wastewater management and soil protection and remediation, as their principal output. The specialised producers are then either public or private corporations. Industry also plays a role in the protection of the environment. Most industrial activities take internal measures to reduce the environmental impact of their production processes: they invest in cleaner technologies to reduce emissions into air, water and soil and they organise their own waste management services, etc.

The analysis of spending on environmental protection has a strategic interest. For example, it allows the evaluation of the positioning of environmental policies already in place with respect to reference models such as the ‘polluter pays’ principle. For example, the growth of government-supported environmental expenditure can indicate a situation in which the government, rather than polluters, increasingly intervenes in the environment, and is therefore often indicative of a reality in which this principle is insufficiently applied.

At the same time, a low level of expenditure does not necessarily mean that a country is not effectively protecting its environment. In fact, the indicator tends to emphasise clean-up costs at the expense of cost reductions, which could be due to reduced emissions or more effective protection measures. Environmental expenditure may be broken down in order to analyse its main components. Total EPE is the sum of investments and current expenditure for industry and specialised production sectors, and the sum of investments, current expenditure and subsidies/transfers in the public sector.

Current expenditure includes recurrent spending or, in other words, spending on items that are consumed and only last a limited period of time. These are items that are used up in the process of providing a good or service. Current expenditure would include wages, salaries and expenditure on consumables. Investments are tangible fixed assets created to protect the environment from harmful impacts occurring during the production process. Examples of investments from the waste management sector are storage facilities and collecting points, separation plants and shredders and crushers. Environmental expenditure can also be classified according to which environmental domain is the objective of the expenditure: protection of ambient air and climate (air protection thereafter), wastewater management, waste management, protection and remediation of soil, groundwater and surface water, noise and vibration

abatement, protection of biodiversity and landscapes, protection against radiation, research and development and other environmental protection activities. Air, wastewater and waste are often referred to as the core domains. The other environmental domains are grouped as the non-core domains.

Today of humanity critically faces the problem of overcoming the consequences of pollution of environment.

Like any other country, Ukraine did not avoid this problem. Problems with the state of environment arose as a result of activities both inside the country and beyond its borders. For this reason, the state is forced to carry out financing of measures on the removal of negative consequences for environment inflicted not only in the country but also abroad.

In the past, comprehensive environmental management has often been seen as a priority of the international donor community. Developing countries rightly claimed that development was the first priority and that during this process part of the protection of the environment should be paid for by the international community.

This perception has changed greatly over recent years. Few will be now in doubt that a healthy environment is the key for socio-economic development, and that environmental degradation can undermine and even reverse economic benefits. The current climate change debate is a good illustration of this strong awareness that sound environmental management is a condition sine qua none sustained economic growth is not possible.

Material and method

Many developing countries have made great strides in incorporating environmental management in their daily activities. These efforts should be supported and augmented. Environmental financing can no longer be seen as a donor supported activity but must become a part of national budgets and international financing.

Developed countries spend between 3% and 5% of their GNP on environmental management. In many developing countries, this percentage is less than 1%. Moving from 1% to 3% cannot been done in short terms, and a systematic process needs to be put in place that gradually, perhaps taking 10-15 years, will introduce the necessary institutional, regulatory, legal, and market based changes that will enable countries to fulfil their own environment management needs. The question is how should the international community help countries achieve this transition?

Official development assistance (ODA) funds in the past have often been used to help countries to address their most urgent environmental needs. This help shall be continued and additional resources need to be made available to help countries in the further transition from an environmental financing system that is depending on support to an environmental financing that is part of the national and local budgets.

New and additional ODA funds should be directed towards helping countries to access, integrate and sequence the different international environmental funding sources to redirect domestic (public and private) and international (IFI and private) funding towards sustainable investments (http://www.oecd.org/dac/environment-development).

The time for this shift of paradigm is due at the present because of two reasons:

- We have the knowledge, the tools and the experience.
- The emerging financing system against climate change problems offers a unique opportunity to make this shift.

Five critical steps are needed to make the paradigm shift at the national level.

Step 1: Comprehensive review: National reviews of all environmental flows are needed, for incomes and expenditures, and covering domestic and international financing, from both public and private sources. The methodology for carrying out such comprehensive review in an inclusive manner already exists; it has been tested and can be applied.

Step 2: Realistic, long term planning. Based on the review and the available environmental finance toolbox, comprising more than 360 tools, from taxes and subsidies to municipal bonds and public private partnerships, realistic, doable plans need to the developed to set in place the institutional, regulatory and market based changes that are needed to move over time to sustainable domestic financing. Quick wins should be identified to provide the political support for the changes.

Step 3: Well considered investment plans, that helps countries move forward towards long-term sustainability and the achievement of the MDGs.

All too often, the investment decisions are divorced from the strategic planning decision and they are governed by different processes and interests. A much closer relationship is needed between sustainable development planning and investments, including foreign direct investment, trade, technology choices etc.

Step 4: Sound pre-investment studies and project pipelining: To move towards sustainability, alternative solutions need to be considered prior to making the investment decisions, particularly in light of the challenge to address climate change. Business as usual might provide the quickest short term returns on investments but might not represent the most sustainable solutions or longer term benefits. More effort needs to be devoted to assess and implement alternative investment solutions that serve the double dividend: economic growth and poverty reduction.

Step 5: Redirect international development aid to support countries to make this paradigm shift. Considering the plethora of development demands, many countries do not have the resources to initiate, let alone to institutionalize, this paradigm shift. While not overly expensive, new and additional resources are needed to assist countries. The UN is uniquely positioned to deliver this support, but this will require a shift in the way the UN conducts its business.

In addition, five concomitant actions are proposed by UNDP (United Nations development Programme):

Action 1: Move to a continuum in service delivery: from policy planning and capacity development to investments and their evaluation. The need to integrate all environmental finance sources and align it with development goals at the national level, should be mimicked at the international level. A closer cooperation between the GEF and the UN supported programmes at the national level is emerging. This closer cooperation and integration of all development support, from policy setting to investments, should receive priority attention, particularly at the national level, and in the emerging response to climate change.

Action 2: A new compact between the IFIs (International Financial Institutions) and the United Nations. The current agreement on how the UN works with the World Bank stems from 1946. Surely, there are compelling reasons to review this agreement. The UN is the only global system where all countries, donors and beneficiaries sit around the table as equal members. A privileged positioning and role that many financial institutions do not enjoy. Combining the development expertise of the UN with the investment expertise of the IFIs might result in a quantum leap forward in achieving the Millennium Development Goals (MDGs).

Action 3: A coherent delivery of environmental finance and investment support by all international development agencies, IFI, UN, bilateral donors, the NGOs and private sector. Currently great strides are being made to improve the capacity of the UN to deliver as one. This initiative should urgently be expanded to involve the financial mechanisms. The UNDG (UN Development Group) system at the national level could be expanded to incorporate all major financial actors, so as to provide e an integrated response to the country priority needs; it is incompliance with the Paris declaration on aid effectiveness.

Action 4: A strengthened system of international environmental finance support at the national and regional level. The current capacity of the UN to implement the suggested comprehensive and integrated financial support to countries is rather limited. The knowledge and expertise, in my assessment, certainly exist in UNDP, but the "boots on the ground" to deliver it is just not there. The demand is great; the supply site is stretched to a maximum.

Action 5: A watchdog function. To keep us honest and to provide guidance to public and private sector investors, a watchdog body, along the lines of Transparency International might need to be set up. We need to know where the major flow of finance is going and if it is directed towards sustainability and less carbon intensive development paths. We need to keep ourselves accountable and honest and review our actions to ensure the sustainability of the Earth.

The climate change challenge offers us the opportunity to do it. The cost to set up such a regime is modest compared with the costs that will be incurred if we continue to lack an improved environment finance management system by 2020. UNDP, as part of a cohesive UN wide response to the climate change challenge and in full cooperation with other UN agencies, is preparing itself to respond in a pro-active and coherent manner to these emerging opportunities and to position itself as the development agency that promotes, supports, catalyses and coordinates the establishment of long-term sustainable environmental financing practices at the national and local level. To be successful, the extensive expertise from different parts of the UN system needs to be called in. For example the FAO expertise with the FAO Investment Centre and forest and land management, the UNIDO technological expertise, the UNEP work on developing alternative technological and financial approaches.

UNDP can be the trusted and needed partner of national and local governments to help governments: (1) put long term sustainable environmental finance mechanisms in place, (2) decide on long term sustainable investments, amongst others through providing governments with (a) sustainable alternatives to business as usual (b-a-u), (b) conducting pre-investment studies, (3) developing project pipelines for private

sector implementation; and (4) providing governments with the necessary tools, expert networks and capacity to make sustainable choices. This, I believe, is what is needed to help countries access, integrate and sequence international environment financing in line with the Paris Declaration on aid effectiveness (Environmental financing: A UNDP perspective).

The government of every state is to finance the charges of budget in support of the conditions of environment or overcoming of negative consequences. This specified obligation of Government of Ukraine is prescribed in the Article 16 of the Constitution of Ukraine, where it is said that providing of ecological safety and maintenance of ecological equilibrium on the territory of Ukraine, overcoming of consequences of the Chernobyl' catastrophe – the catastrophe of planetary scale, maintenance of gene pool of the Ukrainian people are the obligations of the state.

Protection of environment, the rational use of natural resources, providing of ecological safety of activities of man is an integral condition of steady economic and social development of Ukraine. The analysis of dynamics of absolute and computer-integrated indexes of the technogenic loading on environment testifies that the ecological situation in a natural environment, as vitally important environment for existence of man, remains difficult enough.

Financial support for environmental activities is established by law sources and forms of financing of environmental protection environment (Veklich, 2009).

In recent years, fiscal measures have been recognized as one of the primary tools in this economic strategy. Because most countries at first heavily relied on direct regulation and only recently have begun to adopt economic measures on a broad scale, it will be useful to recapitulate the strengths and weaknesses of direct regulation as background for our consideration of fiscal measures for environmental policy (Sanford and Westin, 1991).

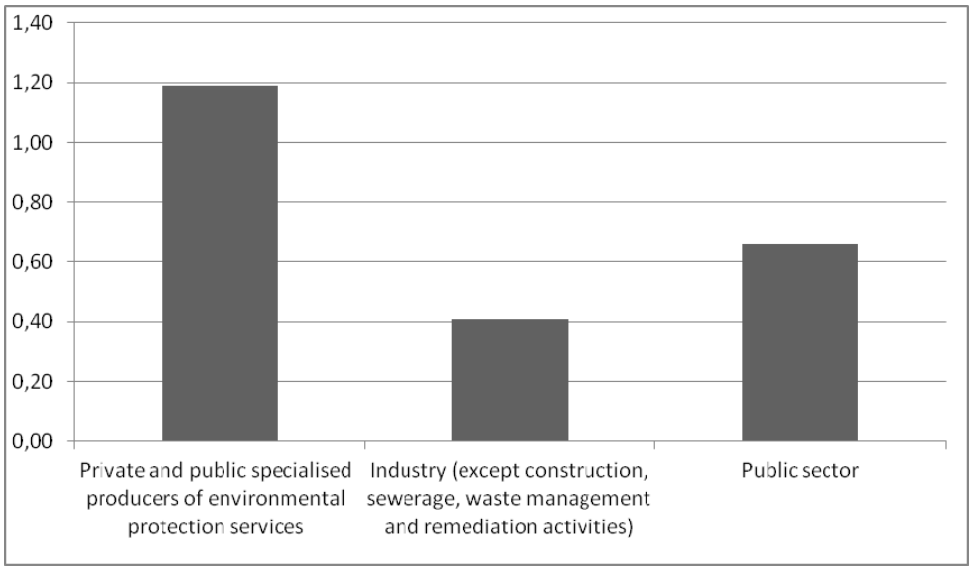
Results and discussion

In order to compare expenditure in the different European countries as well as over time, EPE (Environmental Protection Expenditures) can be expressed in EUR per capita and as a percentage of GDP (or Gross Value Added – GVA – when discussing EPE in the industrial sector).

When expressed as a share of GDP, EPE is an indicator of the total resources a sector is devoting to protecting the environment. As Figure 1 shows, in 2011, specialised producers spent the most on environmental protection in the EU‑27.

Their expenditure accounted for 1.19 % of GDP, which was equal to EUR 300 per capita. Industry and the public sector spent roughly the same (0.41% and 0.66% of GDP), which is equal to EUR 104 and EUR 166 per capita respectively. Summing up the expenditure of the three sectors gives a total of 2.26% of the EU‑27's GDP allocated for protecting the environment in 2011. Between 2006 and 2011, EPE grew in the three sectors in absolute and per capita terms.

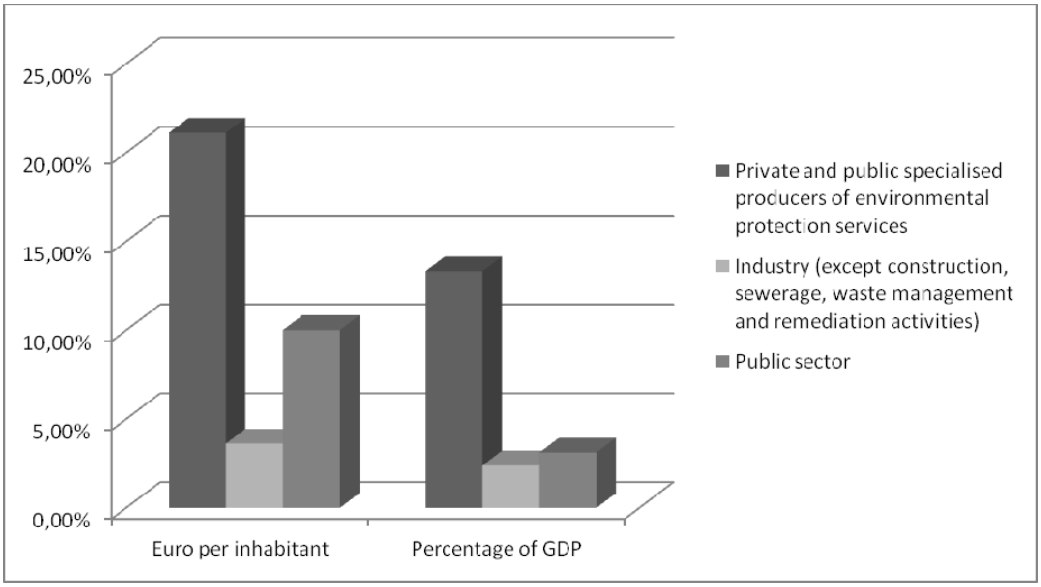
Figure 1: EPE by sectors, EU-27, 2011 (% of GDP)



Source: Eurostat (env_ac_exp1), Eurostat (env_ac_exp2) and Eurostat estimates.

For specialised producers, on the other hand, the EPE grew as a share of GDP (Figure 2).

Figure 2: EPE's change by sector, EU-27, 2006 and 2011 (%)



Source: Eurostat (env_ac_exp1), Eurostat (env_ac_exp2) and Eurostat estimates.

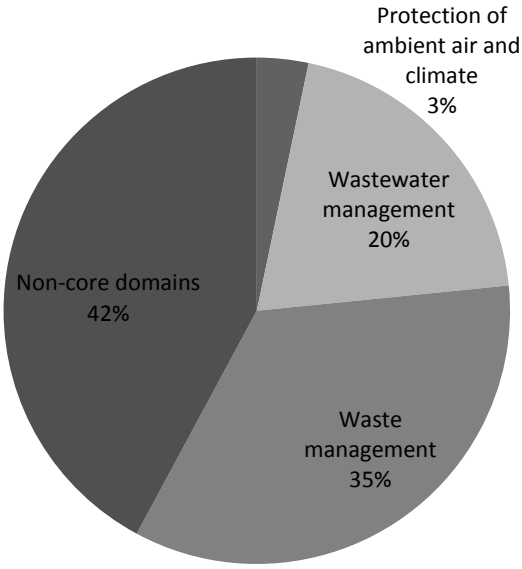
These trends have to be interpreted with caution due to the fact that the share of GDP tends to fall if data on EPE are not adjusted for inflation. Nevertheless, the increase of specialised producers' EPE as a share of GDP could be due to the privatisation or semi-privatisation of some environmental activities such as wastewater

treatment or waste collection in some countries. These environmental activities were mainly carried out by municipalities, and were then turned into private and semi-public corporations so that they now fall into the specialised producers group. The following part of the chapter will explain in detail the evolution and the structure of the EPE within the public sector, specialised producers and industry.

In the EU‑27, most of the money spent by the public sector in 2011 went towards providing waste management services, as well as activities related to soil, biodiversity and landscape protection, protection against radiation and research and development. Spending was mostly related to current costs, rather than to investments or subsidies/transfers.

In 2011, 42% of investments and current expenditure made by the public sector in the EU-27 towards protecting the environment against pollution were devoted to non-core domains, 35% to waste management activities and 20% to wastewater management (see Figure 3).

Figure 3: Public sector investments and current expenditure by environmental domain, EU-27, 2011 (% of total public sector investments and current expenditure)



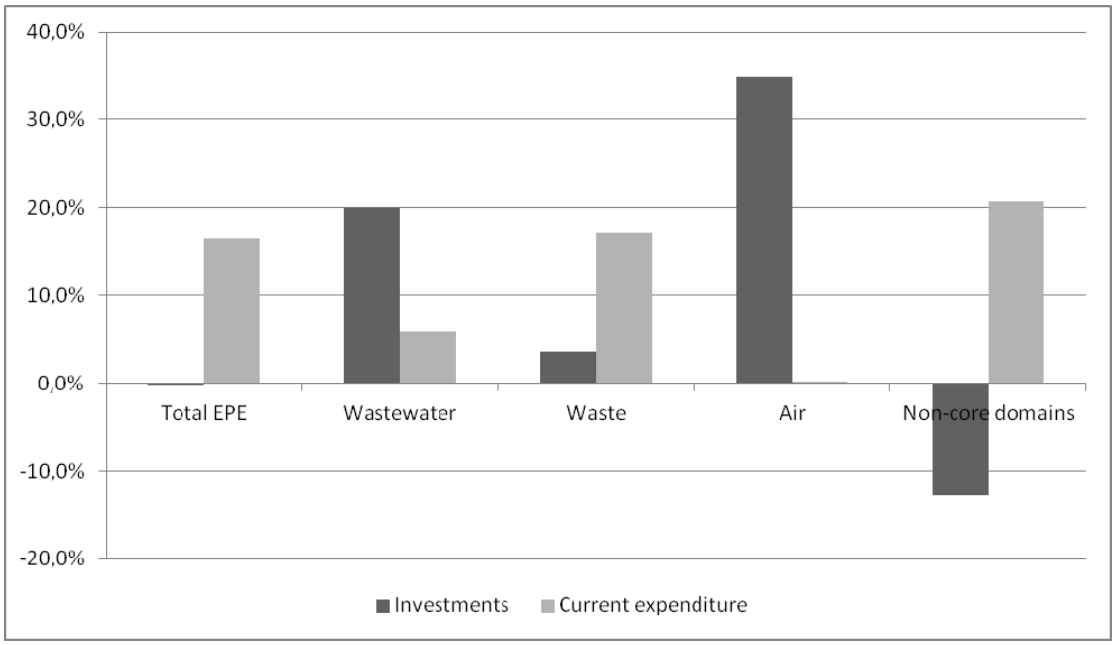
Source: Eurostat (env_ac_exp1) and Eurostat estimates.

Only a fraction of all general government expenditure went towards air protection activities. These activities are in fact mainly carried by industry, since mostly they have to make changes in the industrial production processes in order to reduce and prevent air emissions. Generally speaking, current expenditure has the biggest share in EPE compared to investments and subsidies/transfers. Between 2006 and 2011, the repartition of investments and current expenditure for environmental protection between core and non-core domains remained unchanged.

The main change in the composition of the public sector's investments and current expenditure for environmental protection occurred inside the core domains and relates

to a shift from wastewater management and air protection activities towards waste management activities (Figure 4).

Figure 4: Public sector EP investments and current expenditure change by environmental domain, EU-27, 2006 and 2011 (%)



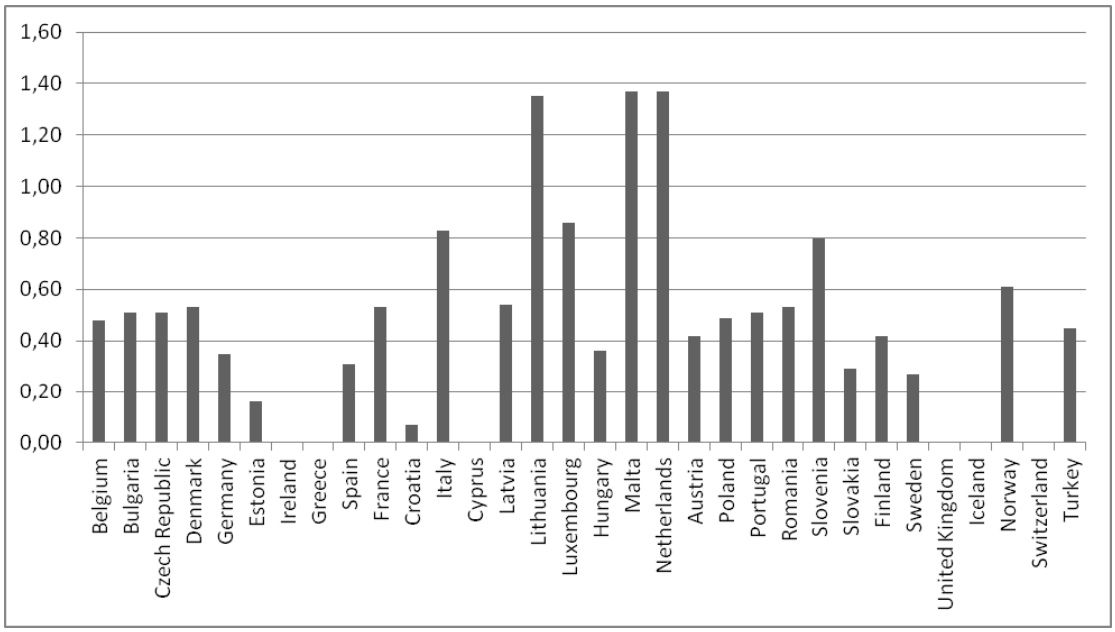
Source: Eurostat (env_ac_exp1) and Eurostat estimates.

In 2011, compared with 2006, investments for environmental protection slightly dropped by 12% for the non-core domains, while current expenditure grew, by 20,7%. The dynamic of the public sector's investments and current expenditure for environmental protection can be explained by the fact that the public sector has begun to devote resources to the environmental domains which first received greater regulatory attention, such as problems related to waste, wastewater and air pollution. The implementation of these regulations has strongly relied on investments in end-of-pipe equipment, such as wastewater treatment plants and collecting systems, which now require few additional investments and mainly current expenditure to be carried out. Furthermore, with the increasing presence of specialised producers, the public sector has been investing less and less in environmental protection, as these producers increasingly take over the activities in the waste and wastewater management domains. Public administrations are nowadays shifting their attention and their budget towards other environmental problems such as biodiversity conservation, soil remediation and the reduction of noise. Furthermore, the implementation of the 'polluter pays' principle could be responsible for the reduction of the expenditure in the core domains, since the responsibility for the pollution of air and water and the generation of waste are more easily identified than in the case of biodiversity losses.

In most European countries, the public sector spent between 0.2 and 0.6% of GDP in 2010 in terms of environmental protection investments and current expenditure. The

Netherlands, in 2010, devoted almost 1.4% of its GDP, while in the same year Croatia allocated only 0.07% of its GDP (Figure 5).

Figure 5: Public sector investments and current expenditure for environmental protection, 2010 (% of GDP)

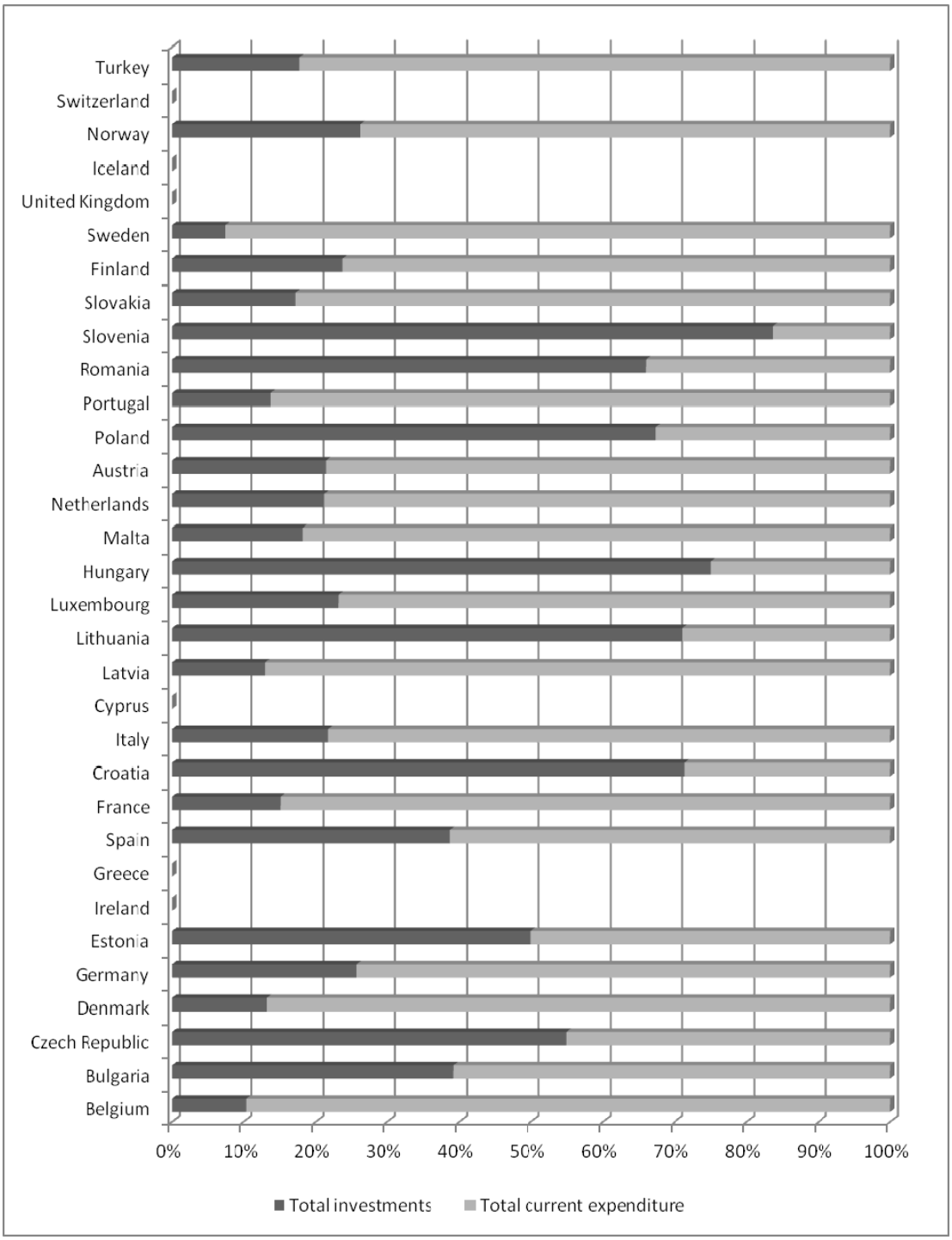


Source: Eurostat (env_ac_exp1)

The share of investments in 'total current expenditure + investments' in most of the new Member States is well above the 25% EU-27 average (see Figure 6). This is probably due to the high level of expenditure in fixed assets needed to start off activities required by the more stringent EU environmental legislations. For EFTA countries and Turkey, the share of investments in 'total investments + current expenditure is more or less close to the EU-27 average, while in Croatia it is over 95%.

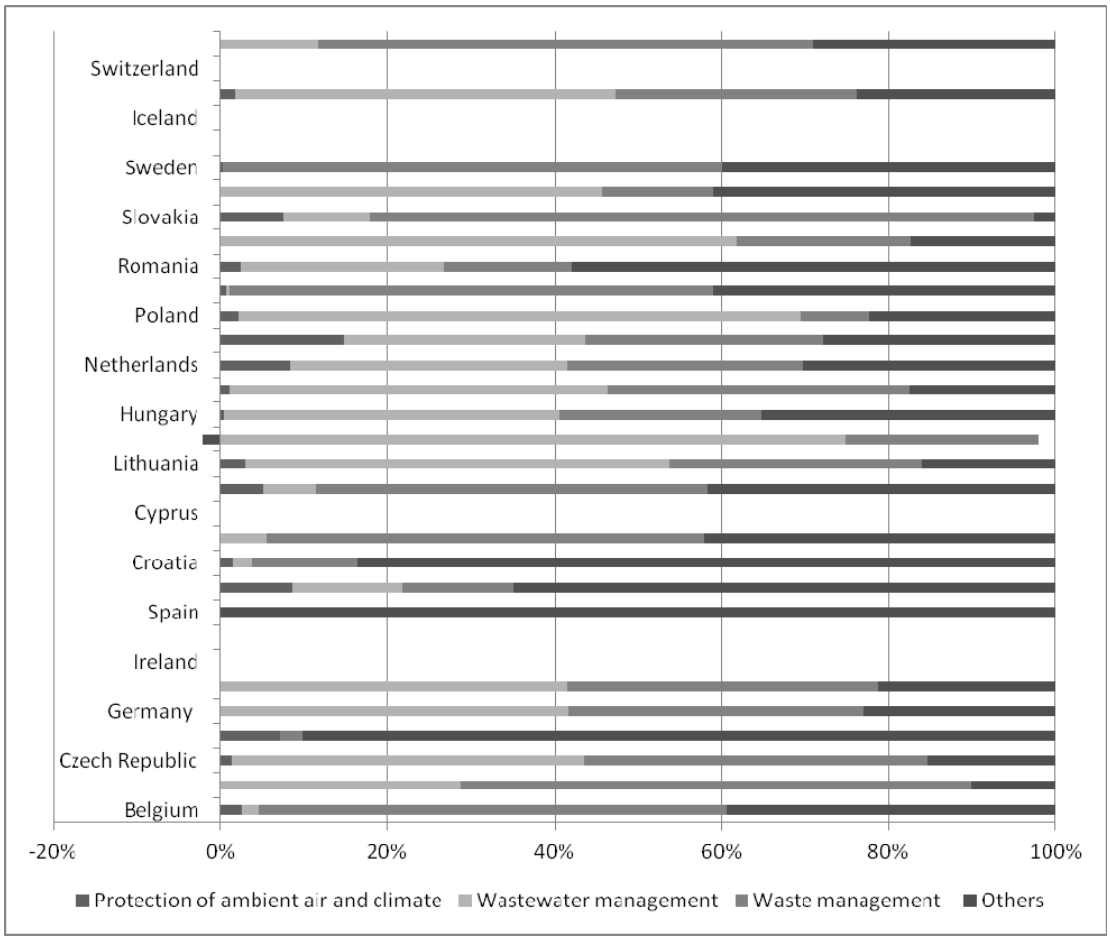
Wastewater treatment and waste management are generally the main domains in which the public sector spends. However, according to Figure 6, some countries' public sectors spent the most in other domains. This is the case, for example, in Spain, where the public sector principally spent on the protection of biodiversity and other environmental domains. Several countries, like Italy, Cyprus and Spain, classified a relevant part of their general government expenditures as 'other': this includes general environmental administration and management, education, training and information for the environment as well as activities leading to indivisible expenditure and activities not classified elsewhere. Another interesting trend can be seen in Croatia, where more than 95% of the public sector's investments and current expenditure were devoted to soil and groundwater protection.

Figure 6: Public sector environmental protection investments and current expenditure, 2010 (% of total investments and current expenditure)



Source: Eurostat (env_ac_exp1)

Figure 7: Public sector investments and current expenditure by environmental domain, 2010, share of total domains



Source: Eurostat (env_ac_exp1)

Environmental conditions get worse from year to year, it is shown in Table 1.

Table 1: Basic indexes of the technogenic impacts on environment in Ukraine, 2005-2011

Indexes	2005	2007	2008	2009	2010	2011
Emissions of contaminants in air, thousands tons	6615,6	7380	7210,3	6442,9	6678	6877,3
Emissions of dioxide of carbon, millions tonnes	152	218,1	209,4	185,2	198,2	234
Upcast of muddy reverse waters in the surface water objects, mln/cubic meter	3444	3854	2728	1766	1744	1612
Their part in a general drainage, %	38,7	43,2	31,5	23	21,4	20
Formation of wastes of I-IV classes of danger, thousands tonnes	---	---	---	---	419192	447641
Including I-III classes of danger	2411,8	2585,2	2301,2	1230,3	1659,8	1434,5

Source: http://ukrstat.gov.ua/operativ/operativ2012/ns_rik/analit/arhiv.htm

In a calculation per one square kilometre of territory of country, there are 11 tonnes of the contaminants thrown out in the atmosphere and 22 thousand tonnes of wastes. There is a permanent increase of volumes of pollution in absolute numbers.

The important problem of the use of money on the protection of the environment is absence of feedback, insufficient control of its use.

In Ukraine, financing of the programs of protection and rational use is carried out as capital investments and current costs, their volumes are presented in a Table 2.

Table 2: Dynamics of capital investments and current costs on protection and rational use of natural resources according to directions of nature protection activity

	2006	2007	2008	2009	2010	2011
Capital investments and current costs in total	7366,6	9691,0	12176,0	11073,5	13128,0	18490,5
Including						
protection of atmospheric air and climate	1589,3	2521,2	2826,3	2309,0	2454,7	4011,0
cleaning of reverse waters	3376,0	3904,8	4917,1	5189,0	5770,1	6109,7
handling the wastes	1669,7	2157,2	2738,2	2328,3	3075,2	5049,8
protection and rehabilitation of soil, underground and surface waters	400,6	615,4	1074,6	641,6	796,2	1231,9
reduction of noise and oscillation influence (except for measures for labour protection)	47,6	76,7	89,6	25,9	11,2	70,8
maintenance of biodiversity and habitat	97,4	139,6	210,4	225,9	255,9	347,3
radiation safety (except for measures for prevention accidents and catastrophes)	52,3	73,4	82,8	101,9	459,4	1347,0
research works in nature protection direction	18,4	38,0	50,6	57,1	65,3	61,4
other directions of nature protection activity	115,3	164,7	186,4	194,8	240,0	261,6

Source: http://ukrstat.gov.ua/operativ/operativ2012/ns_rik/analit/arhiv.htm

Analyzing charges on the protection of natural environment, their absolute increase should be noted. As in 2011, they amounted 18490,5 million hrn. the increase is more than in 2,5 times in comparison with 2006 (7366,6 million hrn.).

It is necessary to notice that the principal cost items on the protection of natural environment in Ukraine (as in 2011) are:

- protection of atmospheric air and climate (21,7%);
- cleaning of reverse waters (33%);
- handling wastes (27,3%);
- protection and rehabilitation of soil, underground and surface waters (6,7%);
- other nature protection activity (1,4%).

18,4 billion hryvnas was spent on the protection of natural environment by enterprises, organizations and establishments during 2011, of which 65% (12,0 bln

hryvnas) are current costs on nature protection, related to exploitation and maintenance of facilities of the nature protection importance. 32% (6,0 bln hrn) was for investments in the fixed assets directed on building and reconstruction of nature protection objects, acquisition of equipment for implementation of measures of ecological direction and 3% (0,8 bln hrn) are costs on major repairs of nature protection equipment. On the cost of funds of State and local budgets 9.81% of capital investments were developed and 13,93% of current costs were carried out, and the basic source of financing costs on environment protection, as in previous years, were the personal funds of enterprises, that means 66% and 86% respectively.

The state should raise the investment component in the environmental expenditures because maintenance is of such a high level of deterioration requires high operating costs, and their efficiency remains low (Kholod, 2010). One of the sources financing environment protection is ecological payments (see Table 3).

During 2011, the enterprises, organizations, establishments were charged by ecological payments for contamination of natural environment, violation of nature protection legislation in a total amount of 1825.6 million hrn., of them 71,8% (1310.9 million hrn.) is an ecological tax for emissions in the atmosphere from stationary and movable sources, 25% (455,4 mln hrn) are collections for placing of wastes and 3,2% (59,2 million hrn.) is an ecological tax for the upcasts of contaminants into the water objects. Lawsuits as for reimbursement of losses and expenses, caused as a result of violation of nature protection legislation, and fines for administrative crimes in the field of nature protection amount 6,4% (118,3 million hrn.) respectively.

Table 3. Dynamics of the produced ecological payments (mln hrn)

	2006	2007	2008	2009	2010	2011
Produced ecological payments total	871,4	980,3	1071,4	1209,6	1209,6	1844,0
of them						
collections for pollution of natural environments (there is an ecological tax since 2011) - total	863,5	955,7	1065,3	1198,7	1361,2	1825,6
Including						
for emissions of contaminants in the atmosphere	501,9	558,7	627,1	702,2	795,9	1310,9
for the upcasts of contaminants directly into the water objects	69,8	75,0	69,7	88,0	93,7	59,2
for placing of wastes (except for radio-active)	291,8	322,0	368,5	408,5	471,6	455,4
Penalty for violation nature protective legislation	7,9	24,6	6,1	10,9	147,5	118,3

Source: http://ukrstat.gov.ua/operativ/operativ2012/ns_rik/analit/arhiv.htm

The volumes of provided ecological payments are ten times smaller than expenses on protection and support of the environment. It can prove the present potential to the increase of ecological payments both in absolute and in relative expression in the structure of earnings of the state budget. Such increase is possible due to transferring

of the tax burden from labour and capital on ecological taxation, which will assist in strengthening of ecological function of taxes.

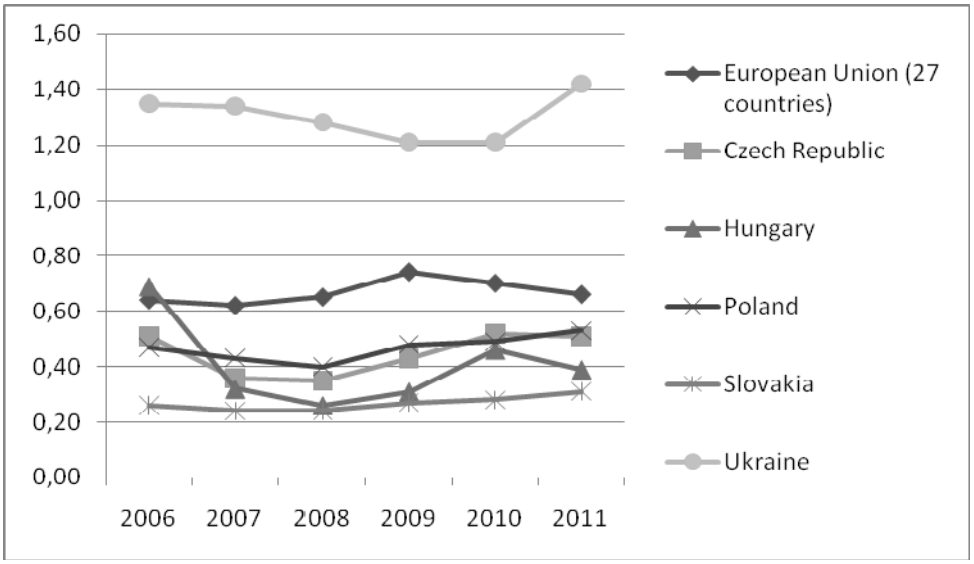
The increase of sum of financing of expenses on the protection of the environment cannot testify to their sufficiency, that is why we will compare the volumes of the noted expenses to data of some countries of EU, namely Poland, Czech Republic, Slovakia, Hungary and EU on the whole.

Current expenditure for environmental protection include payments to keep environmental departments running, staff costs and other costs for daily activities within the domain of environment.

In of order to compare expenditure in different European countries as well as over time, EPE can be expressed in euro per capita (Figure 8) and as a percentage of GDP (Figure 9).

When expressed as a share of GDP, EPE is an indicator of the total resources a sector devoted to protecting the environment.

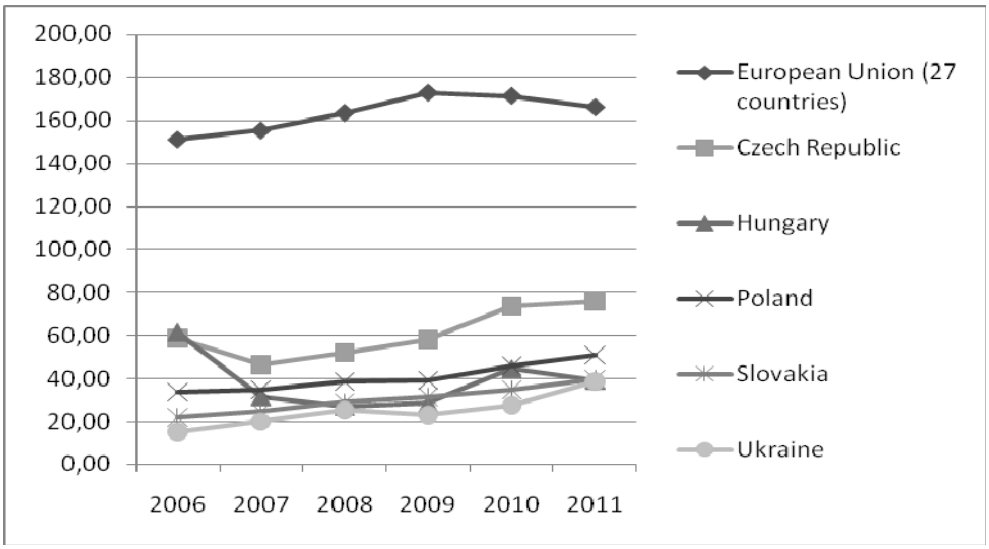
Figure 8: Environmental protection expenditure - indicators: % of GDP



Source:http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-32-10-283/EN/KS-32-10-283-EN.PDF and http://ukrstat.gov.ua/operativ/operativ2012/ns_rik/analit/arhiv.htm

Comparing of share of charges on protection of the environment in GDP testifies to its considerable advantage in Ukraine in comparing to all other countries (1,2-1,4%). The smallest share of expenses on protection of the environment is observed in Slovakia (0,2-0,3%). The middle level of expenses on protection of the environment in EU presents 0,6-0,7% during an analyzed period which is the greater index than in the studied countries of EU.

Figure 9: Environmental protection expenditure - indicators: Euro per capita



Source: http://epp.eurostat.ec.europa.eu/cache/ITY_OFFPUB/KS-32-10-283/EN/KS-32-10-283-EN.PDF and http://ukrstat.gov.ua/operativ/operativ2012/ns_rik/analit/arhiv.htm

When we examine the sums of expenses on protection of the environment in a calculation per capita, it is possible to witness a reverse situation than in % to GDP. Therefore, an index of Ukraine is the smallest among all the studied countries (about 40 Euro per capita in 2011). The highest index of expenses per capita among the considered countries is in Czech Republic, namely 75 Euros in 2011 meanwhile the sum of the noted expenses is considerably higher on the average in the countries of EU and presents 166 Euros in 2011.

Conclusions

Environmental protection expenditure measures include all actions and activities that are aimed at the prevention, reduction and elimination of pollution, as well as any other degradation of the environment. Thus, it is an indicator of the commitment of society to protect the environment. Three sectors – the public sector, private and public specialised producers and industry – account for most of the environmental expenditure. In 2011, the expenditure for protecting the environment in the EU-27 by these three sectors was equal to 2.26% of GDP.

In the EU-27 in 2011, most of the money spent by the public sector went towards providing waste management services and services in the noncore domains. The EPE of specialised producers was mainly directed towards waste and wastewater management activities. Industrial EPE in most European countries was evenly distributed among environmental domains. For many years, European statistical services have collected data on air pollution, energy, water consumption, wastewater and solid waste and on their management, in addition to environmental data of an economic nature, as environmental expenditure. The links between all these data enable policymakers to consider the environmental impacts of economic activities

(resource consumption, air or water pollution, waste production) and to assess the actions (investments, technologies, expenditure) carried out to limit the causes and risks of pollution. Eurostat has worked towards systematising the gathering of environmental statistics about the activities of all economic sectors within the EU. These statistics are used to assess the effectiveness of new regulations and policies. The second use of these statistics is for the analysis of the links between the pressures on the environment and the structure of the economy. Harmonised, comparable and comprehensive statistics about environmental expenditure and the sectors funding that expenditure should help to improve policy-makers' decisions.

Thus, it should be noted that the volumes of contamination in countries, which were selected for comparison, reduce on a background of the increase of GDP that can testify a more effective use of financial resources for environmental protection. GDP is the basic factor of possible increase of volumes of contamination. In Ukraine vice versa, together with the increase of volumes of financial resources on protection of the environment the volumes of contamination grow.

The above-mentioned proves, that in the considered countries of EU reducing of volumes of contamination of the environment is observed, and in Ukraine there is an increase; the relative value and absolute sum of expenses on protection of the environment grows in all the analysed countries; and finally, despite the prevailing relative share of expenses on protection of the environment in attitude to GDP in Ukraine, the noted expenses in an absolute sum per capita are the smallest, it can testify to potential increase of such expenses.

On a background of the increase of the volume of contamination in Ukraine during an analysed period, there is an increase of sum of expenses on protection of the environment, it can testify, on the one hand, about insufficiency of sum of financing, on the other hand, about inefficiency of such type of financing.

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1.4. ROLE OF PUBLIC RELATIONS IN THE SUSTAINABILITY MARKETING IN THE SLOVAK AGRIBUSINESS PRACTICE

Summary
The paper points at importance of Public Relations and its role in the sustainability marketing in the Slovak agribusiness practice. Strategically, the business must be centered on the customers more than the products. Public Relations help the companies target more on consumer´s needs. If the companies push more on the product and disregard consumers wants and the benefits they can get, company will lose the customers in no time.
Paper shows the selected successful stories of sustainability marketing in agribusiness in Slovakia and most popular types of PR – events and frequencies of their organizing in the agricultural companies with foreign participation and domestic ones as well as importance of using media for promotion. When reaching sustainability and business success, there are certain requirements that have to be met. In the business, the four Ps are used together with some more innovative solutions and approaches as public, politics, and some other external and internal factors. In addition to those factors there are in the paper shown certain requirements that have to be met in order to be successful in responsible business, marked with S as satisfaction, safety and sustainability are.

Keywords: sustainability marketing, Public Relations, events, media, agribusiness in Slovakia

Introduction

Marketing plays a great role in today's life. It includes the wide range of activities involved in making sure that companies are continuing to meet the needs of the customers. Thanks to marketing companies build the strong customer relationships and create value for their customers and for themselves. Marketing is the art and science of influencing consumer behaviour. Every aspect of marketing is inseparably tied to consumer psychology. From advertising and promotions to public relations, pricing and packaging, marketing strategies are designed with one purpose in mind: encourage habitual purchases. Understanding marketing and its important role in consumer behaviour is just as valuable to consumers in the marketplace as it is to business owners. Marketing is perhaps the most important activity in a business because it has a direct effect on profitability and sales. Marketing is a very important aspect in business since it contributes greatly to the success of the organization that covers advertising, promotions, public relations, and sales (Horská et al., 2011)

It is the process of introducing and promoting the product or service into the market and encourages sales from the buying public. Since the goal of marketing is to make the product or service widely known and recognized to the market, marketers must be creative in their marketing activities. In this competitive nature of many businesses,

getting the product noticed is not that easy. Strategically, the business must be centered on the customers more than the products (Kibicová, 2007).

Public Relations help the companies target more on consumers needs. If the companies push more on the product and disregard consumers' wants and the benefits they can get, company will lose the customers in no time. The sad thing is that getting them back is the hardest part. Storytelling has always been used to sell products and services, but messages that are more positive will yield better results when it comes to sustainability. Telling stories is just great for sustainability marketing. Companies have used story power to remember, entertain and persuade. Stories engage senses of customers, their fuel is emotion and the journey they take them on is measured in feelings and business success. Research has shown that threats – often used in areas such as climate change and safety ads – can instead of success cause resistance. Making customers feel bad about their lifestyle will not make them to change it. Instead they will probably like the company less and stop reading the story. Nike's Makers campaign is one example of where a strong sense of story helps the viewer believe in a solution the company has come up with. Rainforest Alliance's Follow the Frog video uses humour to deliver its message. These videos follow the advice "never put your story, your brand, or your product in the negative space". Especially if you want to change behaviours such as sustainability. Some great clues for successful storytelling for sustainability are as follows:

- Make people feel empowered, not guilty. Steer a wide berth around using inadequacy to promote sustainable behaviour.
- Cast people in the story as the hero-in-waiting. Help people to live the experience, but show them they are on the winning team.
- Help them to believe in the solution. Unite them with the other solvers. Show them where they have won before.
- Use metaphor and analogy to explain complex information to people, and make that metaphor relevant to them and their life (or job).
- Entertain, surprise, amuse, take people on a journey. Do not ever bore them. (Benett, 2013)

Marketers, as communicators and influencers of culture, are in a privileged position to make a difference to their companies' 'triple bottom line'. However, marketing departments have traditionally been quite reluctant to integrate CSR and sustainability agendas into their work.

Research showed that:

- 22 % of German and Spanish people take environmental aspects of products into account when shopping.
- in the UK, ethical consumer spending grew more than threefold between 1999 and 2006, from 9.6 to 32.2 billion GB£
- in France, 83 % of consumers approve of no longer using plastic bags in retail shops. (CSR Europe, 2013)

More and more consumers wish to reduce their environmental footprint, but to make this a reality consumption habits must change.

Marketers, as communicators and influencers of culture, are in a privileged position to make a difference to their companies' "triple bottom line". However, marketing

departments have traditionally been quite reluctant to integrate CSR and sustainability agendas into their work. (Ries and Ries, 2009)

Sustainable marketing is the process of promoting products that are environmentally safe at the retail level and touting a company's commitment to sustainable practices at the public relations level. It applies traditional marketing techniques but in a specific context.

Sustainability marketing integrates social and ecological criteria into the whole process of marketing. The conception of sustainability marketing consists of six steps: analysis of socio-ecological problems, analysis of consumer behaviour, normative sustainability marketing, strategic sustainability marketing, instrumental sustainability marketing and transformational sustainability marketing. (Belz and Birte, 2005; Belz, 2005)

1. Step: *Analysis of the social and ecological problems*, generally and specifically with respect to products which satisfy customer needs and wants.
2. Step: *Analysis of consumer behaviour* with special respect to social and ecological concerns.
3. Step: Corporate commitments to sustainable development in the mission statement, development of sustainability visions, formulation of sustainable principles and guidelines, setting of socio-ecological marketing objectives and goals (*normative aspects of sustainability marketing*).
4. Step: Socio-ecological product quality as well as sustainability segmentation, targeting, positioning, and timing of market entry (*strategic aspects of sustainability marketing*).
5. Step: Integration of social and ecological criteria into the marketing-mix, i.e. products, services and brands, pricing, distribution and communication (*instrumental aspects of sustainability marketing*).
6. Step: Participation in public and political change processes, which transform existing institutions towards sustainability (*transformational aspects of sustainability marketing*).

In which way does sustainable development change the nature of marketing? What is distinctive about sustainability marketing? There are at least six distinguishing features of the sustainability marketing concept (Belz, 2005):

1. *Ecological and social problems:* In conventional marketing literature, the ecological and social problems of products along the whole life cycle are hardly considered. Therefore, the analysis remains on a rather superficial level. Usually, the situation of the natural environment is briefly analysed as part of the macro environment of the company. The shortages of raw materials and increased pollution are mentioned without any further consequences for the conception of marketing. (Kotler and Armstrong, 2004; Peattie, 1999) In contrast, the analysis and identification of ecological and social problems are points of departure in sustainability marketing.

2. *Intersection:* The identification of the intersection between socio-ecological problems and consumer behaviour is crucial for sustainability marketing. Social activists with big hearts put a strong emphasis on the solution of socio-ecological problems, but widely neglect consumer wants and demand. They follow a kind of anti-marketing or alternative marketing approach. Mainstream marketing mainly focuses on

consumer demand overlooking the social and ecological environments. Sustainability marketing tries to find solutions to the socio-ecological problems and at the same time meet customers demand.

3. *Normative aspects:* In conventional marketing, the long-term aim is the building of profitable customer relationships. Traditional marketing goals are increases in sales, profits and market shares. In contrast, sustainability marketing aims at sustainable and profitable relationships with customers, the natural environment *and* the social environment, thus meeting the triple top line. Besides common marketing goals like sales, market shares and profits, ecological and social objectives are also important. Furthermore, sustainability marketing critically questions underlying assumptions and reflects key concepts of marketing (e.g. needs, wants, and consumer sovereignty).

4. *Information asymmetries:* Social and ecological qualities of products are often credence qualities (e.g. organic farming or fair trade products). The customer has to believe the information given by producers or third parties with respect to the social and ecological qualities of products. These kinds of information asymmetries open the door for opportunistic behaviour on the supply side, which may lead to scepticism on the demand side and, finally, to non-purchases and market failure. That is why signalling, credibility and trust are crucial in sustainability marketing.

5. *Time aspects:* Classical marketing is focussed on sales and transactions. It is rather short-term oriented and has a bias towards the present. Modern marketing represents a paradigm shift from transactions towards relations. That is why it is called "relationship marketing". (Christopher et al., 1991) It aims at building lasting customer relationships in order to produce high customer equity. Sustainability marketing goes much further. It aims at building lasting relationships with customers, the social environment and the natural environment. Thus, long-term thinking and futurity are fundamental components of sustainability marketing.(Peattie, 1999)

6. *Transformational aspects:* In conventional marketing, the macro environment is often taken for granted. Many companies regard external forces as uncontrollable elements they have to adapt to. In sustainability marketing, the macro environment is perceived as a constraint to overcome. Within the existing framework, there are few economic incentives to behave in a sustainable way, both for producers and for consumers. To change the existing frameworks in favour of sustainability, common efforts of governments, non-governmental organizations and companies are necessary, on local, national and international levels. (Kotler and Armstrong, 2004)

To implement the sustainability marketing strategies, an *instrumental sustainability marketing* (ISM) has to be developed, i.e. a comprehensive marketing-mix, which integrates social and ecological criteria. The sustainability marketing-mix includes sustainable *products, services and brands*; suitable and fair *pricing*; multi-channel *distribution* and credible *communication* between information and animation. (Belz and Birte, 2005)

Quite often, the marketing-mix is reduced to the fourth "p" – communication – but without an innovative sustainable product, attractive and fair prices as well as an effortless access to those products the sustainability marketing-mix would not be complete. Nevertheless, it is the bilateral communication between the company and its current and prospective customers, which builds and maintains any kind of

relationship, which again constitute the core of sustainability marketing. In general, the communications mix is composed of a specific combination of advertising, sales promotion, public relations, personal selling and direct-marketing tools in order to achieve the marketing objectives. (Kotler and Armstrong, 2004)

When talking about sustainability marketing, marketing mix, consisting of 4Ps: Product, Price, Place and Promotion has to work for 3Ps: People, Planet and Profit (Corporate Social Responsibility). There is an opportunity now for marketers to be at the heart of the Triple Bottom Line process where, alongside the normal financial bottom line, business is also required to think about both its environmental and social impacts, creating a complex arrangement of bottom-line deliverables. The customers who are driving the demand for companies to be more accountable and marketers are at the front line building relationships with these customers, identifying with them. Putting them in a strong position to take this customer insight to the rest of the company. Marketers impact on those areas critical to engagement with sustainability – processing, packaging and distributing a product. Their communication skills keep the customer and the rest of the company informed on the viability of sustainability practices. (Ábelová and Kádeková, 2011)

Companies who do not understand that CSR is about business sustainability and integrity as much as it is about social programs, often make the mistake of making CSR a marketing or PR program/problem. By doing so they essentially "green-wash" their company. In my opinion, PR should lightly handle CSR initiatives until the CSR program has momentum and there is something to actually celebrate and brag about. Celebrating decency and expected behaviour is not good PR on CSR. It is artificial and could cause more harm than good. PR should let the public know that there is a CSR program, that there will be a report, and what some of the programs are that are under development, or highlight ongoing/historical CSR efforts. (Rochte, 2009)

Following this trend, also the agribusinesses in Slovakia use the new forms of addressing customer. (Kleinová and Ürgeová, 2011) Only by using this way can be successful. Customers appreciate when a company from which they buy goods prefers green marketing and social corporate responsibility. However, people need to be informed about this. (Gaspariková and Nagyová, 2010)

The communication via advertising is not as effective, as everyone is exposed to several hundreds of advertising messages every day and this makes people bored. Marketers simply need to evaluate and consider new methods of obtaining customer focus, which is also a major challenge. (Horská and Ürgeová, 2009) The most important moment is therefore to find new ways and means to strengthen brand in people's minds. PR has an increasing role in the marketing mix, which builds and strengthens the brand of company without negative secondary effects that so often accompanies the ads. (Wells et al., 2002)

The problem is that marketers have created a position to think about the most effective communication mix and continue their habits even though the evidence speak against and also demonstrates the loss of efficiency. If there would be only a few TV stations, radio stations and newspapers, mass marketing would be very effective also in the way of supporting sustainability marketing. As the country has dozens of TV and radio stations is very expensive to reach a mass audience. The increasing

fragmentation of media audiences requires marketers to engage more targets into smaller groups, even on a one-to-one marketing. This will reduce the cost of promotion. (Horská et al., 2010) The great way how to reach the success is using Public Relations. Until now, the role of Public Relations was underestimated in Slovakia. Public Relations consist of several instruments: publishing, events - promotional events, news, retraction of community, identity formation, lobbying, and other social investments. PR has a better chance to elbow his way through the crowded communications and is much easier to break the communication gap. (Kubicová and Kádeková, 2011) What is more, the message may be more appropriate and credible. Public relations is the right tool to attract attention and motivate people not only to buy the product from the reliable company with a trustworthy name but also make them to change the behaviour in the meaning of sustainable marketing. (Kretter, 2010)

Material and methods

There is 219 agribusinesses registered is in the Business Register of Slovakia, with 20 or more employees and annual sales of own products and goods 5 million Euros and more. This number includes food-manufacturing companies, except companies with the production of tobacco products. Total number of agribusinesses in Slovakia divided by their legal forms, such as cooperatives, partnerships, legal persons and self-employed persons are not registered in the Business Register, their estimated number is 5221.

Within our research was asked 219 agribusinesses to fill out the questionnaire. Representativeness of this sample group was tested by the Chi-square test ($\chi 2$ test) which is based on a comparison of empirical and theoretical frequencies for each category of observed characters. Test criterion assumes independence between quality characteristics using the following relations (1, 2):

$$\chi^2 = \sum_{i=1}^{r}\sum_{j=1}^{c}\frac{(O_{ij} - E_{ij})^2}{E_{ij}} \qquad (1)$$

$$E_{ij} = \frac{(R_i) * (C_j)}{n} \qquad (2)$$

where:
Oij- empirical abundance in the cell in the i-th row and j-th column
Eij- theoretical abundance in the cell in the i-th row and j-th column
r- number of categories first (line feed) character
c -number of other categories (the bar) character
Ri- sum of frequencies in the i-th row
Cj -sum of frequencies in the j-th column
n - the total number of respondents

H0 (null hypothesis) implies the absence of dependence (association) between selected quantitative traits. *Alternative hypothesis H1* states that there exists dependence between characters:
H0: The row and column variables are independent.
H1: Row and column variables are dependent.

Calculated χ2 test criterion is compared with the tabulated values or p-value is compared to the level of significance α. If the p-value (the theoretical significance level) <alpha (0.05), we can say that between the row and column variables exists dependence.

In the paper was used also the association and contingency analysis by exploring the relationships and dependencies between the quality characteristics. Association examines the relationship between alternative characters with two variations, examines the relationship between contingency characters with more variations. At the beginning of the analysis are sorted input data and classification results are presented in contingency tables.

Frequency table shows the frequency distribution of values of one variable and then provides a breakdown of the categorical variable or numeric variable divided into categories. The table contains the absolute and relative frequencies. Frequency tables reveal defects that could significantly subsequent statistical analysis discarded. Contingency table shows the frequency distribution of two categorical variables.

Results and Discussion

Table 1 shows the result of Chi-square test. Based on a comparison of the calculated values of the test criteria and tabulated values do not reject the null hypothesis, the sample group of agribusiness companies is representative on the significance level alpha of 0.01.

Table 1: Results of χ^2 Test by Categories of Agribusiness Production

Categories of Production		Result of Test	
Alcohol	25	**Calculated value**	**16.06906**
Meat	54	**Tabulated value**	**16.81189**
Vegetable	26		
Bread	61		
Non alcoholic beverages	17		
Milk	23		
Sweets	13		
Total	**219**		

Source: VUEPP, own calculations, XLSTAT

To follow the PR activities of individual agribusinesses and then to quantify their spending on PR activities is quite difficult, that is the reason we have chosen firstly to list top PR agencies in Slovakia divided by Incomes from PR activities in the year 2012 (Table 2).

Table 2: TOP 10 PR Agencies by incomes for PR activities in Slovakia (in 2012)

Order	TOP PR Agencies	Amount in EUR
1.	Seesame Communication Experts (Apr Sr)	1 643 000
2.	Neopublic Porter Novelli (Apr Sr, Ipra)	987 178
3.	Dynamic Relations 2000	973 000
4.	Ami Communications Slovakia (Apr Sr)	712 900
5.	Prime Time (Apr Sr)	567 000
6.	Comm	321 020
7.	Snowball	312 600
8.	Vyv Pr	296 755
9.	Media & Communication Consulting (Apr Sr)	225 987
10.	Arthur Media	201 345

Source: Strategies. HN online. Authors own research.

TOP 10 leading PR agencies in Slovakia stated that their most important clients from the agribusiness are Nestle Slovakia, Unilever Slovakia, Danone Slovakia, Coca-Cola Slovakia, Wrigley, Slovakia Chips, Dr. Oetker, Heineken, Kofola, Hubert J.E., Slovakia Chips, Hyza, McCain, Penam, Topvar, Becherovka, Pepsi-Cola SR, Hame Slovakia, Teekanne (Table 3).

Table 3: TOP Clients of PR Agencies in Slovakia (year 2012)

TOP Clients of PR Agencies in SR
Nestle Slovakia
Unilever Slovakia
Danone Slovakia
Coca-Cola Slovakia
Wrigley
Slovakia Chips
Dr. Oetker
Heineken
Kofola
Hubert J.E.
Slovakia Chips
Hyza
McCain
Penam
Topvar
Becherovka
Pepsi-Cola Sr
Hame Slovakia
Teekanne

Source: Own Research

Agribusinesses listed in Table 3, significantly contribute to incomes of top PR agencies, in average from 30 to 40 %, the rest represents income from the businesses from other areas.

Large companies realize the importance of PR tools and use it together with traditional forms of reaching the customer, which is a very positive phenomenon.

Events organizing is one of the most popular forms of reaching the customer. Therefore, we focused on the analysis of events in the use of domestic enterprises and enterprises with foreign participation. 75 % of the analyzed companies had a purely domestic participation, the remaining 25 % were companies with foreign participation.

Results of Chi-square test ($\chi 2$ test) confirmed statistically significant differences in the method of organizing events for the analyzed categories of companies - domestic versus foreign invested enterprises, the significance level alpha of 0.05 (Table 4). Based on the value of Cramer V correlation coefficients, can be said that it is a moderately strong association between qualitative variables analyzed.

Table 4: Results of Chi-square test ($\chi 2$ test)- Events organizing

Chi-square (Observed value)	11.067
Chi-square (Critical value)	7.815
DF	3
p-value	0.011
Alpha	0.05
Cramer's V	0.301

Source: own calculations, XLSTAT

More detailed information on the events organizing can be seen in Table 5, where are the specific percentages of the analysed categories of enterprises. Analysed food companies with foreign participation organized events that are intended for the general public and the proportion of these events was at 80.65 %. On the other hand, the share of organized events companies with domestic capital for the general public stood at 48.35 %. Domestic enterprises organize more events compared with companies with foreign participation for its own customers respectively for business partners. Higher percentage of domestic enterprises do not organize events at all in comparison with the enterprises with foreign participation (21.98%, respectively. 12.9%).

Table 5: Percentages of events organizing

Business Category	Yes, for the general public	Yes, for our customers	Yeas, for business partners	No, we do not organize events at all	Total
Enterprises with Foreign Participation	80.645	6.452	0.000	12.903	**100**
Domestic Enterprises	48.352	15.385	14.286	21.978	**100**
Total	**56.557**	**13.115**	**10.656**	**19.672**	**100**

Source: own calculations, XLSTAT

Table 6: Results of Chi-square test (χ2 test)- frequency of events organizing

Chi-square (Observed value)	28.948
Chi-square (Critical value)	11.070
DF	5
p-value	< 0.0001
Alpha	0.05
Cramer's V	0.487

Source: own calculations, XLSTAT

For more information regarding the frequency of organizing events (Table 6) provides a Table 7, where are the percentages of events organizing frequencies.

Table 7: Percentages of events organizing frequencies

Business Category	Once a year	Twice a year	More than twice a year	Less than twice a year	As needed but more than twice a year	We do not organize the events	Total
Enterprises with foreign Participation	9.677	12.903	25.806	22.581	16.129	12.903	**100**
Domestic Enterprises	45.055	16.484	5.495	4.396	6.593	21.978	**100**
Total	**36.066**	**15.574**	**10.656**	**9.016**	**9.016**	**19.672**	**100**

Source: own calculations, XLSTAT

The highest percentage of events organizing frequencies - more than twice a year – are organized by companies with the foreign participation (25.81 %), in domestic enterprises is this percentage relatively low, namely 5.49 %. Companies with domestic participation frequently organize events regularly once a year (45.06 %). Regularly annually organize events only 9.68 % of foreign companies. Overall, the analyzed companies organize regular events annually (36.07 %). These events are usually organized for Christmas celebrations, the anniversary of the founding of the company and other holidays.

When analyzing the type of organized events, there were not confirmed statistically significant differences between the analyzed categories of food businesses. These facts also documents the Table 8, where the p value is greater than the level of reliability alpha 0.05.

Table 8: Results of Chi-square test **(χ2 test)-Types of organized events**

Chi-square (Observed value)	3.794
Chi-square (Critical value)	11.070
DF	5
p-value	0.579
Alpha	0.05

Source: own calculations, XLSTAT

Specific information on the types of organized events provides Table 9. Social events and activities are organized the most by both categories of the analyzed companies. This kind of events totals 72 % share of all kinds of organized events. The second most numerous way of organized events were exhibitions, whose total share was 11 %.

Table 9: Percentages of types of organized events

Business category	Professional conferences	Exhibi-tions	Dis-cussions	Open Days	Social Events and Activities	Others	Total
Enterprises with Foreign Participation	3.571	3.571	0.000	10.714	78.571	3.571	**100**
Domestic Enterprises	6.944	13.889	1.389	6.944	69.444	1.389	**100**
Total	**6.000**	**11.000**	**1.000**	**8.000**	**72.000**	**2.000**	**100**

Source: own calculations, XLSTAT

In previous analyzes have been found statistically significant differences in the perception of the benefits from using events for the entire reference set of analyzed food companies. There was subsequently performed an analysis of perception of the benefits from events organizing for each category of business.

Analysis of the Preferred Media in Domestic Enterprises and Enterprises with Foreign Participation

When analyzing the type of preferred media were found statistically significant differences between the analyzed categories of enterprises. Table 10 shows the results of the χ^2 test, which rejects the null hypothesis of independence preferred media type, since the p value is less than alpha of 0.05. In this case, we can talk about moderate dependence.

Table 10: Results of Chi-square test (χ2 test)-Types of preferred media

Chi-square (Observed value)	19.621
Chi-square (Critical value)	3.841
DF	1
p-value	< 0.0001
Alpha	0.05
Cramer's V	0.422

Source: own calculations, XLSTAT

Enterprises with foreign participation prefer mostly nationwide media, while domestic enterprises prefer regional media. Overall, the share of using the nationwide media is higher than the share of regional (Table 11).

Table 11: Percentages of Types of Preferred Media

Business category	Regional	Nationwide	Total
Enterprises with Foreign Participation	9.677	90.323	**100**
Domestic Enterprises	57.778	42.222	**100**
Total	**45.455**	**54.545**	**100**

Source: own calculations, XLSTAT

Conclusion

Concerns about social and environmental issues provide opportunities for brands to connect with their consumers at a deeper level and, in doing so, gain competitive and sales advantage. Pioneering companies have proved that moving towards more sustainable marketing practices can be a shrewd business move. For many, operating in an ethically and environmentally responsible way is proving to be a cost-effective hit with customers. There is a need to communicate each step connected with this issues with customers. The way of doing this is using PR as the main tool of communication policy working for 3P – Planet, People and Profit. In Slovakia, there are TOP 10 leading PR stating that their most important clients from the agribusiness are Nestle Slovakia, Unilever Slovakia, Danone Slovakia, Coca-Cola Slovakia, Wrigley, Slovakia Chips, Dr. Oetker, Heineken, Kofola, Hubert J.E., Slovakia Chips, Hyza, McCain, Penam, Topvar, Becherovka, Pepsi-Cola SR, Hame Slovakia, Teekane.

For the companies is necessary to realize that the reputation can´t be built on what companies are going to do, the most important is what they are doing now and how is the communication with customers and public. By using PR tools is reaching attention of mentioned groups much easier. The business world of today is extremely competitive. Companies need to have an edge that makes them stand out from the crowd, something that makes them more appealing and interesting to both the public and the media. The public are the buyers of the product or services and the media are responsible for selling it. Public Relations (often referred to as PR) includes activities intended to promote understanding of the company or product, service . Through PR activities may be influenced the public opinion by delivering messages without incurring direct media costs.

The most popular PR activity is Events organizing, more than twice a year are organized by companies with the foreign participation. Enterprises with foreign participation prefer mostly nationwide media to promote, while domestic enterprises prefer regional media. PR also helps the company to achieve its full potential and provide feedback from the public. This usually takes the form of research regarding what areas the public prefers or does not prefer.

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1.5. FROM BIOECONOMICS TO SUSTAINABLE DEVELOPMENT

Summary
To find an effective mechanism to improve the development of rural areas of Ukraine and proposed funding measures of state support of the villages in a globalized economy that meets the requirements of time, will accelerate socio-economic growth and Ukraine in general. This process needs to describe the methodological foundations and principles of organizational and economic mechanism, the theoretical position about the nature of the mechanism of state support for rural development, their genesis and the priorities of rural development. The content of organizational and economic mechanism of state support for rural development is to be extended and systematized into methodological approaches and their application under market conditions.

Keywords: mechanism, support, development, rural areas, financing

Introduction

Sustainable development refers to a mode of human development in which resource use aims to meet human needs while ensuring the sustainability of natural systems and the environment, so that these needs can be met not only in the present, but also for generations to come. The term "sustainable development" was used by the Brundtland Commission, which coined what has become the most often-quoted definition of sustainable development: "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (United Nations, 1987; Smith and Rees, 1998).

Sustainable development ties together concern for the carrying capacity of natural systems with the social challenges faced by humanity. As early as the 1970s, „sustainability" was employed to describe an economy „in equilibrium with basic ecological support systems" (Stivers, 1976). Ecologists have pointed to The Limits to Growth, (Meadows et al., 1972) and presented the alternative of a „steady state economy" (Daly, 1973) in order to address environmental concerns.

The concept of sustainable development may generally be broken down into three constituent parts: environmental sustainability, economic sustainability and socio-political sustainability.

Concept of sustainable development

In 1987, the United Nations released the Brundtland Report, which included what is now one of the most widely recognised definitions: „Sustainable development is

development that meets the needs of the present without compromising the ability of future generations to meet their own needs."

According to the same report, the above definition contains two key concepts:

- the concept of "needs", in particular the essential needs of the world's poor, to which overriding priority should be given;
- the idea of limitations imposed by the state of technology and social organization on the environment's ability to meet present and future needs.

The domain of economics is fundamental to considerations of sustainable development, however there has been considerable criticism of the tendency to use the three-domain model of the triple bottom line: economics, environment and social. This approach is challenged to the extent that it treats the economy as the master domain, or as a domain that exists outside of the social; it treats the environment as a world of natural metrics; and it treats the social as a miscellaneous collection of extra things that do not fit into the economic or environmental domains. In the alternative Circles of Sustainability approach, the economic domain is defined as the practices and meanings associated with the production, use, and management of resources, where the concept of 'resources' is used in the broadest sense of that word.

The domain of "ecology" has been difficult to resolve because it too has a social dimension. Some research activities start from the definition of green development to argue that the environment is a combination of nature and culture. However, this has the effect of making the domain model unwieldy if culture is to be considered a domain in its own right. Others write of ecology as being more broadly at the intersection of the social and the environmental, hence, ecology. This movement allows culture to be used as a domain alongside economics and ecology (Scerri and James, 2010).

The sustainability of human settlements is implicit in the focus of study into the relationship between humans and their natural, social and built environments. Also termed human ecology, this broadens the focus of sustainable development to include the domain of human health. Fundamental human needs such as the availability and quality of air, water, food and shelter are also the ecological foundations for sustainable development. White et al. (2013) addressing public health risk through investments in ecosystem services can be a powerful and transformative force for sustainable development which, in this sense, extends to all species (IISD Annual Report, 2011-2012).

Focusing on other aspects, some researchers and institutions have pointed out that a fourth dimension should be added to the dimensions of sustainable development, since the triple-bottom-line dimensions of economic, environmental and social do not seem to be enough to reflect the complexity of contemporary society. In this context, the Agenda 21 for culture and the United Cities and Local Governments (UCLG) Executive Bureau lead the preparation of the policy statement "Culture: Fourth Pillar of Sustainable Development", passed on 17 November 2010, in the framework of the World Summit of Local and Regional Leaders – 3rd World Congress of UCLG, held in Mexico City. This document inaugurates a new perspective and points to the relation between culture and sustainable development through a dual approach: developing a solid cultural policy and advocating a cultural dimension in all public

policies. (Constanza et al., 1993) The Network of Excellence „Sustainable Development in a Diverse World", sponsored by the European Union, integrates multidisciplinary capacities and interprets cultural diversity as a key element of a new strategy for sustainable development. The Circles of Sustainability approach defines the cultural domain as practices, discourses, and material expressions, which, over time, express continuities and discontinuities of social meaning. However, culture falls within the social/socio-political dimension of sustainability, and therefore the proposal for adding a fourth „cultural" dimension has not been widely accepted.

The United Nations Global Compact Cities Programme has defined sustainable political development is a way that broadens the usual definition beyond states and governance. The political is defined as the domain of practices and meanings associated with basic issues of social power as they pertain to the organization, authorization, legitimating and regulation of a social life held in common. This definition is in accord with the view that political change is important for responding to economic, ecological and cultural challenges. It also means that the politics of economic change can be addressed. This is particularly true in relation to the controversial concept of 'sustainable enterprise' that frames global needs and risks as 'opportunities' for private enterprise to provide profitable entrepreneurial solutions. This concept is now being taught at many business schools including the Centre for Sustainable Global Enterprise at Cornell University and the Erb Institute for Global Sustainable Enterprise at the University of Michigan.

Sustainable development is an eclectic concept and a wide array of political views fall under its umbrella. The concept has included notions of weak sustainability, strong sustainability and deep ecology. Different conceptions also reveal a strong tension between ecocentrism and anthropocentrism. Many definitions and images (Visualizing Sustainability) of sustainable development coexist. Broadly defined, the sustainable development mantra enjoins current generations to take a systems approach to growth and development and to manage natural, produced, and social capital for the welfare of their own and future generations.

During the last ten years, different organizations have tried to measure and monitor the proximity to what they consider sustainability by implementing what has been called sustainability metrics and indices. This has engendered considerable political debate about what is being measured. Sustainable development is said to set limits on the developing world. While current first world countries polluted significantly during their development, the same countries encourage third world countries to reduce pollution, which sometimes impedes growth. Some consider that the implementation of sustainable development would mean a reversion to pre-modern lifestyles.

Others have criticized the overuse of the term:

„(The) word sustainable has been used in too many situations today, and ecological sustainability is one of those terms that confuse a lot of people. You hear about sustainable development, sustainable growth, sustainable economies, sustainable societies, sustainable agriculture. Everything is sustainable (Temple, 1992)."

The concept of sustainable development was originally synonymous with that of sustainability and is often still used in that way. Both terms derive from the older

forestry term ‘sustained yield’, which in turn is a translation of the German term ‘nachhaltiger Ertrag’ dating from 1713. (Grober, 2007; Finn, 2009)

According to different sources, the concept of sustainability in the sense of a balance between resource consumption and reproduction was however applied to forestry already in the 12th to 16th century (Ehnert, 2009).

‘Sustainability’ is a semantic modification, extension and transfer of the term ‘sustained yield’. This had been the doctrine and, indeed, the ‘holy grail’ of foresters all over the world for more or less two centuries. The essence of ‘sustained yield forestry’ was described for example by William A. Duerr, a leading American expert on forestry: “To fulfil our obligations to our descendents and to stabilize our communities, each generation should sustain its resources at a high level and hand them along undiminished. The sustained yield of timber is an aspect of man’s most fundamental need: to sustain life itself.” – it is a fine anticipation of the Brundtland-formula (Grober, 2007).

Not just the concept of sustainable development, but also its current interpretations have its roots in forest management. Strong sustainability stipulates living solely off the interest of natural capital, whereas adherents of weak sustainability are content to keep constant the sum of natural and human capital (Quigley, 2008).

History of the concept of sustainability

The history of the concept of sustainability is however much older. Already in 400 BCE, Aristotle referred to a similar Greek concept in talking about household economics. This Greek household concept differed from modern ones in that the household had to be self-sustaining at least to a certain extent and could not just be consumption oriented (Ehnert, 2009).

The first use of the term „sustainable” in the modern sense was by the Club of Rome in March 1972 in its epoch-making report on the ‘Limits to Growth”, written by a group of scientists led by Dennis and Donella Meadows of the Massachusetts Institute of Technology. Describing the desirable „state of global equilibrium”, the authors used the word „sustainable”: „We are searching for a model output that represents a world system that is: 1.) sustainable without sudden and uncontrolled collapse; and 2.) capable of satisfying the basic material requirements of all of its people” (Grober, 2007; Finn, 2009).

Environmental sustainability is the process of making sure current processes of interaction with the environment are pursued with the idea of keeping the environment as pristine as naturally possible based on ideal-seeking behaviour. Thus, environmental sustainability demands that society designs activities to meet human needs while indefinitely preserving the life support systems of the planet. This, for example, entails using water sustainably, only utilizing renewable energy, and sustainable material supplies (e.g. harvesting wood from forests at a rate that maintains the biomass and biodiversity).

An „unsustainable situation” occurs when natural capital (the sum total of nature's resources) is used up faster than it can be replenished. Sustainability requires that human activity only uses nature's resources at a rate at which they can be replenished

naturally. Inherently the concept of sustainable development is intertwined with the concept of carrying capacity. Theoretically, the long-term result of environmental degradation is the inability to sustain human life. Such degradation on a global scale could imply extinction for humanity.

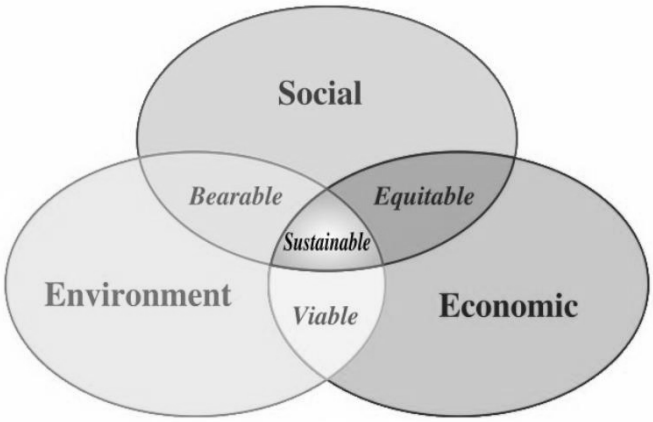
Table 1: Relations of sustainability and consumption

Consumption of renewable resources	State of environment	Sustainability
More than nature's ability to replenish	Environmental degradation	Not sustainable
Equal to nature's ability to replenish	Environmental equilibrium	Steady state economy
Less than nature's ability to replenish	Environmental renewal	Environmentally sustainable

Source: own construction

The Venn diagram of sustainable development has many versions, but was first used by economist Edward Barbier (1987).

Figure 1: Scheme of sustainable development



Source: based on Barbier (1987)

However, Pearce, Barbier and Markandya (1989) criticized the Venn approach due to the intractability of operationalizing separate indices of economic, environmental, and social sustainability and somehow combining them. They also noted that the Venn approach was inconsistent with the Brundtland Commission Report, which emphasized the inter-linkages between economic development, environmental degradation, and population pressure instead of three objectives. Economists have since focused on viewing the economy and the environment as a single interlinked system with a unified valuation methodology (Hamilton, 1999; Dasgupta, 2007). Intergenerational equity can be incorporated into this approach, as has become common in economic valuations of climate change economics (Heal 2009). Ruling out discrimination against future generations and allowing for the possibility of renewable alternatives to petro-

chemicals and other non-renewable resources, efficient policies are compatible with increasing human welfare, eventually reaching a golden-rule steady state (Ayong le Kama, 2001; Endress et al., 2005). Thus the three pillars of sustainable development are interlinkages, intergenerational equity, and dynamic efficiency (Stavins et al., 2003).

Arrow et al. (2004) and other economists (e.g. Asheim,1999 and Pezzey, 1989 and 1997) have advocated a form of the weak criterion for sustainable development – the requirement than the wealth of a society, including human capital, knowledge capital and natural capital (as well as produced capital) not decline over time. Others, including Barbier 2007, continue to contend that strong sustainability – non-depletion of essential forms of natural capital – may be appropriate.

Economic development has traditionally required a growth in the gross domestic product. This model of unlimited personal and GDP growth may be over. (Korowitz, 2012) Sustainable development may involve improvements in the quality of life for many but, particularly for the affluent, may necessitate a decrease in resource consumption. (Brown, 2011) Scheme of sustainable development: at the confluence of three constituent parts.

From sustainability to bioeconomics

"Sustainable development" constitutes a new, and a yet little analyzed semantic element in the discourse of economists and environmentalists. Beyond the broad consensus which has evolved around this notion, the various currents and schools of thought are competing to establish which theory will prove best adapted to explicate the concept and render its contents usable.

The objective of "sustainability" stresses, inter alia, the need for present and future economic development to be conducted with respect for the environmental and for its evolution. This challenge means that, one way or another, economic and ecological dynamics must simultaneously be taken into account. According to Robert Costanza et. al. (1993, p. 546.), the theoretical project currently at temping to bring together economic and ecological principals have their origin in works belonging to the field of "bioeconomics". (Constanza, 1993) However, this line of research is to be explored, it should be emphasized from the outset that the expression "bioeconomics" its polysemic. It is uses with various acceptations to refer to very different theories and models of economic and ecological analysis. One might, it is true, eliminate some of these theories and retains only those already established in the theoretical corpus of economic science, of those referring explicitly to the "sustainable development" problematic. Yet, in this writers view, such a "disciplinary" attitude would be tantamount to answering the epistemological questions raised by the science of "sustainability" before those questions are really posed. On the other hand, consideration of bioeconomics in all its acceptations and ramifications, would seem a useful way of reaching an understanding of the issues and challenges of the bodies of knowledge interwoven around the notion of sustainable development, as much for its definition as for its analytical content. Indeed, although they are very different, the various bioeconomics do share, as their name suggest, the common project of sacking

to link the teaching of the living sciences with those of economics. In doing this, these theories seek to transcend certain existing theoretical splits, and to establish a cross-disciplinary dynamic conducive to the elaboration of criteria for judgment and to the definition of prescriptions in the environmental domain. Thus, even if these bioeconomics analyses are not directly produced by the sustainability problematic (which in fact they predate), they may in the end find their place within it, by virtue of the epistemological project motivating them.

Sustainability and the challenge of climate change

Sustainability has long been part of various discussions regarding agriculture but has considerably come to the forefront in the recent years. At the Copenhagen Conference on Climate Change (December 2009), the use of genetically modified (GM) crops for biofuels was suggested as a sustainable option for developing countries, triggering intense discussion and debate. In March 2010, at the Bonn Climate Change Conference, GM crops were again part of the discussion, this time regarding sustainable land use. GM crops and sustainability remained a heated topic at the United Nations Framework Convention on Climate Change in Cancun, Mexico, in December 2010. Clearly, sustainability and its relation to the bioeconomy, biofuels, and biotechnology is increasingly important. The 15th International Consortium on Applied Bioeconomy Research (ICABR) held its annual conference near Rome, Italy (June 26-29, 2011) to examine this issue from four perspectives.

The first key aspect regarding sustainability in agriculture is the contribution of agricultural biotechnology to biodiversity, greenhouse gas (GHG) reduction, and adaption to climate change. Several recent studies have begun to quantify some of these benefits (Brookes & Barfoot, 2006; Carpenter, 2010; Smyth et al., 2011). James (2011) identified that in 2010 the production of transgenic/GM crops reached 148 million hectares. Cumulatively, since 1996, one billion hectares of transgenic/GM crops have been produced. James noted that it took a full 10 years to reach the 500-million-hectare level, but only five years to go from 500 million hectares to one billion hectares. A total of 29 countries produced transgenic crops in 2010. With the increasingly rapid adoption of GM crops, it is important to get a firm grasp on the contribution of GM crops to environmental and economic sustainability.

The second important aspect of sustainability is the relationship between sustainability and bioenergy. Climate change impacts can be mitigated from innovative developments in bioenergy and biofuels. However, for these innovations to be globally adopted, their sustainability in the developing world has to exceed that of current technologies. Policies and regulations are—and have been—implemented to encourage technological innovations in this area, yet little research exists that can substantiate the impacts, either positive or negative.

Sustainability and the society

The third aspect is the contribution of the bioeconomy to poverty reduction and sustainable development. As James (2011) highlighted, the adoption of GM crops is

geographically increasing and it is important to discern if the adoption of sustainable technologies are being impacted by policies and regulations in Organisation for Economic Co-operation and Development (OECD) countries. Factors of consideration here include access to new technologies, market constraints, and impacts from biosafety regulations. To ensure smallholder market participation in the benefits of GM crop adoption, it will be important to understand the institutional innovations and policy interventions that can facilitate this.

The final aspect of sustainability that merits attention is the contribution of the bioeconomy to sustainability in OECD nations. Sustainability in these nations is affected by both public and private R&D investments, innovation policy, and intellectual property rights. The trans-Atlantic divide regard GM crops and resulting products has the potential to have far-reaching global implications, and greater insights are required from both continents as to the role that the bioeconomy is having in relation to sustainability.

Bioeconomics and sustainable development is a title that covers the interactions of the natural environment with the economic process under the target of sustainable development. The concept of the Ecologically Sustainable Economic Development (ESED) emerged in the publications of the World Conservation Strategy as a policy framework to combat the environmental decay afflicting our planet, a decay mainly owed to the increasing pollution and the alarming surge in the extraction of natural resources. The ESED has grown in popularity since the publication of the Bruntlandreport (WECD, 1987). In it, the ESED is defined as 'the development that meets the need of present generations without compromising the ability of the future generations to meet their own needs" or as "a pattern of social and structural economic transformations which increase the benefits available in the present without jeopardizing the likely potentials for similar benefits in the future" (WECD, 1987). From these definitions, it is patently clear that the ESED sets a meaningful social target which, however, requires further elaboration in order to assume an operational dimension. A somewhat more precise definition, addressing policy issues, can be found also in the Brunt land report: "in essence sustainable development is a processor change in which the exploitation of resources, the direction of investments, the orientation of technological development and institutional change are all in harmony and enhance both current and future potentials to meet human needs and aspirations" (WECD, 1987). All three definitions share a common trait: the needs of present and future generations should be potentially fulfilled without trade-offs between fulfilment of present generations needs and fulfilment of future generations needs. The word "potentially" applies exclusively for the needs of future generations that cannot be brought under scrutiny at present since the preferences of future generations have-not arisen as yet, and, consequently, are unknown to us; therefore the only readily available strategy would be to waive, for the time being, the potential for fulfilment the needs of future generations, irrespective of the shape these needs may assume (Norgaard, 1994).

Two different scientific approaches dealing with the ESED were the result of two different considerations regarding the needs and preferences of future generations. These approaches are widely known as "strong" and "weak" sustainability. "Strong"

sustainability views the needs of future generations as independent of the needs/preferences of present generations and maintains that any needs arising at and belonging to a future period may have to be formulated in a manner entirely Tracing operational conditions for the ecological sustainable economic development independent of the way present needs/preferences are currently formulated. After all, the needs and preferences of future generations may take a different shape than that assumed by the needs and preferences of present generations or even be wholly irrelevant to them. In this context, a rational policy should aim at eliminating the boundaries that stifle the formulation and fulfilment of future generations needs and preferences. As a result, the "strong" sustainability approach asserts that the ESED, offering itself as a rational policy, must, eliminate those boundaries whose cause may lie in advanced environmental degradation and inexorable exploitation of natural resources. For, once these calamities have gathered momentum, they decrease the potential welfare that generations in times to come may have. With that consideration in mind, Christensen outlines sustainable development as the development ensuring the existence of the natural environment, which acts as a basis for human welfare (Christensen, 1989).

Sustainable development and renewable energy sources

Similarly, Goodland and Ledec states that "sustainable development implies using renewable resources in a manner which does not eliminate, or degrade them, or otherwise diminish their usefulness for future generations also implies using non-renewable mineral resources in a manner which does not unnecessarily preclude easy access to them by future generations" (Goodland and Ledec, 1987). Further, Allen argues that "sustainable utilization is a simple idea: we should utilize species and ecosystems at levels and in ways that allow them to go on renewing themselves" (Allen, 1980).

Veering towards a different direction, the approach of "weak" sustainability accepts that the needs and preferences of future generations will be similar and inane case contingent on the needs and preferences of present generations. Furthermore, the needs/preferences of future generations can be foreseen by extrapolating the evolution of current and past needs/preferences.

The essential characteristic of this approach is the assumption that future generations can substitute the fulfilment of needs and preferences pertinent to the natural environment with the fulfilment of needs and preferences pertinent to manmade elements along as one takes into account that such a substitution also holds true for both past and present generations. The assumption goes on to maintain that, because of the natural environment's degradation, the foregone utility can be substituted by the utility attained by using manmade assets and since this substitution did occur in the past it can continue in the future as well. In this context, the criterion of sustainable development is the per capita utility. As long as the per capita utility is not declining, welfare to be enjoyed by future generations, is ensured and therefore sustainability prevails.

This rationale is based on an extension of the existing mainstream welfare criteria to future generations. Indeed, past and present generations accept a lesser fulfilment of preferences regarding the natural environment on condition that other preferences regarding manmade elements are fulfilled to a higher level. It is thus implied that environmental degradation can be continuing if accompanied by other activities which increase welfare to an extent greater than the extent to which welfare, caused by the degraded environment, is lost. Such an evolution, argues the "weak" sustainability approach, can constitute a sustainable development path. As a result, future generations can do with less environment as long as manmade assets can guarantee a non-declining per capita utility. The implicit assumption underling this argument is that future generations have similar patterns of values with present generations and hence adopt a similar trade-off ratio between environmental utility and manmade utility. In this context, Pezzey firmly states that "our standard definition of sustainable development will be the criterion of a non-declining per capita utility, because of its self-evident appeal as a criterion of intergenerational equity' (Pezzey, 1989).

Pearce et al. defines that sustainable development is a situation in which "the development vector increases monotonically over time" (Pearce et al. 1989; Pearce and Atkinson, 1993; Barbier and Markandaya, 1990).It is, therefore, evident that there exist two fundamentally different directions in the scientific interpretation of the ESED. The direction of strong sustainability supports the maintenance of the existing natural ''capital'' as a condition for the formulation and fulfilment of future generations needs and preferences while the direction of weak sustainability endorses the mainstream criterion of the no declining utility which implicitly permits substitution of the natural environment with manmade capital and/or assets and hence opens the way to further environmental deterioration.

Between the two directions, interpreting the ESED one may detect several approaches valuable indeed which, however, are already deficient in operationability. Indicatively, Bergh and Nijkamp (1990) define the ESED as those dynamics of economic activities, social perceptions and population which provide acceptable levels of life for every human being by ensuring availability of natural resources and ecosystems. Daly speaks of uneconomic growth and proposes physical limits in economic process and in economic growth so that the latter may be a lasting one. This ''steady state'' approach proposes explicitly that economic process and production should not overcome the carrying capacity of ecosystems (Daly, 1999).

Georgescu-Roegen envisages grave and irreversible scarcities of natural resources and an exacerbated pollution problem if economic production continues at its current pace. In this context, he foresees irrevocable on sustainability by which future generations will be dealt a far heavier blow (Georgescu-Roegen, 1971, 1976). It is clear from the above, that there exists a lively scientific dialogue over the ESED and an inexhaustible effort to make the concept operational and decision making relevant. Sadly, considerable lack of operation ability still remains.

As a result, future generations can do with less environment as long as manmade assets can guarantee a non-declining per capita utility. The implicit assumption underling this argument is that future generations have similar patterns of values with present generations and hence adopt a similar trade-off ratio between environmental

utility and man-made utility. In this context, Pezzey firmly states that "our standard definition of sustainable development will be the criterion of a non-declining per capita utility, because of its self-evident appeal as a criterion of intergenerational equity" (Pezzey, 1989).

Bioeconomics and sustainable development is a title that covers the interactions of the natural environment with the economic process under the target of sustainable development. Sustainable development is development that meets the needs of the present without compromising the ability of future generations to meet their own needs.

Conclusion

The first key aspect regarding sustainability in agriculture is the contribution of agricultural biotechnology to biodiversity, greenhouse gas (GHG) reduction, and adaption to climate change.

The second important aspect of sustainability is the relationship between sustainability and bioenergy. Climate change impacts can be mitigated from innovative developments in bioenergy and biofuels. However, for these innovations to be globally adopted, their sustainability in the developing world has to exceed that of current technologies. Policies and regulations are – and have been – implemented to encourage technological innovations in this area, yet little research exists that can substantiate the impacts, either positive or negative.

The third aspect is the contribution of the bioeconomy to poverty reduction and sustainable development.

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Jan Zawadka

1.6. AGRITOURISM IN MULTIFUNCTIONAL DEVELOPMENT OF RURAL AREAS

Summary
After the change of the political system and the transformation of the economy, which depended on abandoning the planned economy, in Poland emerged features that shown agriculture and rural areas maladjustment to the new state model and a market economy that was being implemented. By the end of the 1980s, the main features of agriculture and rural areas were resulting from development model realised over the years, whose main objective was the agricultural production. The new reality disclosed low economic efficiency of many farms and the necessity to reorient the concept of developing regions with monofunctional agricultural character to the concept of differentiating their economies. A key problem connected with ensuring rural population improvement of the standard of living is developing non-agricultural functions in rural areas. The generally unprofitable agricultural production must be supplemented, or even replaced by other non-agricultural functions, e.g. tourism, handicrafts or agri-food processing. The article presents the issue of multifunctional development of rural areas and agriculture in Poland. One of the elements of this development is tourism in rural areas, and the related agritourism, which is treated as an important branch of the non-agricultural activities, not only on a local, but also on a national scale. The paper shows the most important economic and non-economic benefits associated with the development of agritourism, as well as the threats arising from it for the rural areas.

Keywords: agritourism, non-agricultural functions, rural areas, multifunctional development

Introduction

After the change of the political and economy system, in polish agriculture emerged features that showed its maladjustment to the new state model and market economy. Main features of farming and rural areas were the result of realised over the years development model, which fundamental goal was agricultural production. That is why the conception of regions with monofunctional character development states differentiating their economy, and a key issue concerned with providing local people better living standards is developing non-agricultural functions for rural areas. Unprofitable agricultural production must be supplemented and sometimes even substituted with other non-agricultural functions, e.g. tourism, craft, agri-food processing (Kłodziński and Rzeczkowska, 2000).

Development of rural areas is understood as a process of improving the economic situation and living conditions of people residing in these areas, which should be accompanied by an increase in the range and quality of the goods (including public goods) delivered from rural areas to whole society. Development integrity of these areas depends on harmonious combination of elements such as: economic growth (including creation of new workplaces and increase in real incomes of the population),

preserving the natural habitat, improving living conditions in villages, protecting and enhancing cultural heritage (Wilkin, 1999).

The essence and meaning of multifunctional development

Since the beginning of 1990s, multifunctional development of rural areas has become the subject of not only state politics, but also subject of research. Already in the nineties in Poland came out many publications touching upon issue of multifunctional development. This development depends mainly on differentiating rural economy, thus withdrawal from monofunctionality generally relying on manufacturing raw materials. Integrating into rural economic space increasingly higher number of new and non-agricultural functions (Kłodziński, 1997), contributes to diversification of rural economy and abandoning farming as a one and only dominating function in rural areas (Zawadka, 2010).

Model of multifunctional rural areas development is acknowledged as one of basic categories of policy towards farming and rural areas in Poland, and its main purpose is (Kłodziński, 1999):

- living and working conditions improvement of families living in villages,
- equalization of their living standards against the city dwellers standards,
- increasing of non-agricultural employment,
- greater possibilities in choosing work and its diversity.

All of this should contribute to the improvement of rural population incomes and increase the attractiveness of the countryside as a place for living and working, in consequence, leading to its socio-economic development.

Multifunctional development of rural areas may be considered on two levels - the socio-economic and spatial. The first aspect concerns the rational use of production factors available to the village, while the second refers to the proper distribution of man's socio-economic activities in economic space and results from the process of planning and area spatial management (Hopfer et al., 2000).

The idea of multifunctional development is the way to solve many problems of agriculture and rural areas, and the implementation of this model is based primarily on the creation of new, various sources of revenues for non-agricultural and agricultural population, who is not able to find a full employment in their own farms. New workplaces should be created, according to Kłodziński, namely in the rural technical and commerce service field, agri-food industry, near the investments related to infrastructure development, environmental protection, development of tourism, craft and industry. Special departments in agriculture may also become a source of new incomes. Growth of rural families' income can be stimulated by intensification of agricultural management, off-farm contract work and also non-agricultural use of farm resources. Multifunctionality therefore is reduced to a practical mode of action done through the multiple way utilization of owned potential (Kłodziński, 1995).

Rosner (1997) considers multifunction as a response to the necessity of increasing the number of workplaces in local systems, in which agriculture plays a dominant role, despite the fact that demand for work in this sector is decreasing. The meaning of the

concept, therefore, is reduced to an increase in diversity of employment fields, and a growth in variety of the rural population source of upkeep in local systems.

Above listed approaches to the problem of rural areas multifunctionality were primarily focused on the issue of the rural economy diversification. But this is not a sufficient interpretation range of the analysed category. As pointed out by Kłodziński, the concept of multifunctionality cannot be identified solely with the process of creating new workplaces. This is a much broader concept, related to local development, entrepreneurship, strategic planning, diversification of agriculture, infrastructure development, improvement of demographic resources, etc. (Kłodziński, 1996)

It should be emphasized that beyond functions of an economic nature, more and more recognised and appreciated are social functions performed by rural areas. The basic activities realised in rural areas, such as agriculture and forestry, fulfil important natural and cultural functions (Banski and Stola, 2002).

Understanding the multifunctionality of rural areas wider than as the socio-economic activities and taking into account their natural and cultural functions is consistent with the principle of sustainable development, understood as achieving simultaneous progress in three areas, i.e. economic, social and environmental. However, this is largely dependent on the course of economic functions development process.

A similar standpoint is represented by the Organization for Economic Co-operation and Development (OECD), which denominated two levels of multifunctionality interpretation (OECD, 2001). The first is the analysis of the multifunctionality as a property of economic activity, about which attest various, combined products or the effects of activity (e.g. positive or negative, intended or unintended). Some of them have a market value, others are excluded from the operation of the market mechanism. Multifunctionality is therefore a feature of many types of economic activity and it does not refer exclusively to agriculture. The second way of the multifunctionality interpretation regards assigning different roles to agriculture. From this point of view, farming as an economic activity has been entrusted to perform certain functions in society. As a result, beneath the concept of multifunctionality lies not only a feature of the production process, but also some values (functions) important for the whole society are contained. A juxtaposition of market and non-market functions of agriculture is presented in Table 1.

Importance of multifunctional development was also articulated in Agenda 2000, which is a set of reform proposals designed to modernise European Union policies and prepare it for expansion. It was remarked in this document that reforms concerning rural areas were expected to contribute to the creation of multifunctional and competitive agricultural sector, ensuring the future of weaker rural regions, and also to promote multi-directional agriculture in the context of rural development global strategy.

The necessity for multifunctional development of rural areas is emphasised in a number of polish planning documents concerning rural areas and agriculture. It constitutes the basis for the implementation of Poland's National Strategic Plan 2007-2013 (Program Rozwoju Obszarów Wiejskich 2007-2013, henceforth PROW) and

consequently is an instrument of support for rural areas development in the framework of PROW 2007-2013. PROW assumes economic empowerment of farms and competitiveness increase in the agri-food sector, with simultaneous provision of instruments in favour of economic activities diversification in order to obtain and create alternative sources of income for rural population.

Table 1: Classification of market and non-market functions of agriculture

Productional	Social	Cultural	Environmental
Commercial: - food products intended for the market, - farm products comprising industrial raw materials, including biomass. **Non-commercial:** - household self-supplying with food, - manufactured in the farm - capital goods for the farm own needs.	- influence on village's social vivacity and cohesion	- protection and enhancement of cultural traditions in the countryside, - enhancement of national culture, - strengthening cultural identity and diversity at the local, regional and national level - formation of cultural capital, - protection of countryside cultural landscape.	**Negative:** - soil and water pollution with chemicals, - soil erosion, - reduction of farmland biodiversity, - greenhouse gas emissions. **Positive:** - arable lands prevention from natural degradation, - protection of farmlands biodiversity, - protection or improvement of water supplies on farmlands, - prevention of soil erosion.

Source: Wilkin (2007)

Multifunctional development of a village is therefore an important factor, at the same time aspect of the sustainable development process, but only in a situation when rural economic function development is not associated with negative consequences for its natural sphere (Adamowicz and Zwolinska-Ligaj, 2009). On the other hand, it should be noted that the source of rural non-agricultural functions development can be preserved, high-quality natural and landscape values which contribute to the possibility of extending tourism function in these areas.

The benefits associated with the development of agritourism

As was previously mentioned, one of the elements of rural areas multifunctional development is agritourism, which as an economic, social, cultural and spatial phenomenon, includes factors arousing local development. Economic and social consequences of agritourism development, as an alternative form to mass tourism, are correspondingly smaller, but provide opportunities for its harmonious inclusion into socio-economic life of the community. The most frequently mentioned features and benefits associated with the development of agritourism are those with an economic character. As the most important among them the following can be identified:

Agritourism farm owners and other village inhabitants' additional income

Incomes derived from tourists presence are possible not only from renting rooms, but also from: selling them our own products, meals, handicraft, hiring sports equipment, teaching horse-riding, providing rehabilitation services and many more. Due to the presence of tourists in the borough also its dwellers have benefits financially. These benefits are results running a shop or bar, selling handicrafts, organizing sleigh and carriage rides, and renting horses for horse-riding and horseback riding lessons.

At this point it should be mentioned about the so-called multiplier effect (see Milne, 1990; McIntosh and Goeldner, 1990; Majewski, 2004), stimulating local economic situation. Arrival of tourists triggers increased demand for other products and services, which may not have anything in common with tourism. Therefore, in many countries, much store is set by the development of tourism as a field allowing for an economy revival in a relatively short period of time.

In the boroughs having relevant climatic and natural amenities additional revenues come from local taxes paid by its visitors.

Fostering economic initiatives and the creation of new workplaces

Arrivals of tourists to agritourism farms and profits of farm owners may be a source of inspiration for many rural residents to start receiving guests in their own farm or providing additional services for visitors, which will diversify their stay and rest. The essence of entrepreneurship in a market economy is searching for new fields of activity or creative imitation of the existing ones (Sikora, 2002). Depending on the local natural and cultural values, as well as the resources of their own farms, active citizens wishing to take advantage of the presence of tourists often decide on the provision of food, recreation, sports or cultural services, as well as manufacturing and selling traditional food and souvenirs (Tyran, 2005).

It is estimated that one farmstay makes about 10 new jobs (Debniewska and Tkaczuk, 1997) in a rural area, and creating one new workplace in tourism - including agritourism - requires only 40% of expenditures needed to create such a place in the manufacturing industry (Kmita, 1997).

The hosts' activity is very important here, because they are originators of recurring events for tourists and residents, they effectively acquire sponsors, are the founders of local tourist organizations and the seasonal tourist information centres establish associations, activate local government, etc. Manifestation of these people spirit of enterprise is also necessary for their own business to develop and get better, which requires continuous investment in the properties and enforces the extension of the offer and improvement of the services quality.

Reducing unemployment, employment growth

A common problem of the Polish countryside is a high unemployment rate and labour surplus in agriculture. The complex nature of rural tourism projects needs a wide range of associated services positively influencing the creation of new

workplaces in branches indirectly related to tourism services, which to a large extent may have an effect in the mitigation of the above mentioned problem. What is more, the chance of finding an employment in a place of residence is an inhibitor to migration of young people who cannot see their prospects in the countryside.

The development of agritourism is an occasion to reconstruct many vanishing professions, since tourists have a great interest in rural handicraft. This is a chance especially for elderly people who are familiar with the profession of a smith, an embroidery woman and wickerwork manufacturer, or folk art pottery, which creations have already been undervalued and are often forgotten by the local community, but still can find buyers among the visitors. Great potential in this area lies also in the traditional local food that is very popular and appreciated by tourists.

Activation and ennoblement of rural women

The activation of rural women is a particular benefit of agritourism development (Sawicka, 2005 and 2008). Since, the vast majority of preparing for an attractive offer (room, bed linen, trinkets in the room, laying the table, toilet, attractive cuisine, most of the accompanying services, etc.) is the domain of women. It is so important for rural areas, because when the general difficulties of finding a job occur, it is much harder to find a work for women than for men. Thanks to activity, which agritourism is, a number of rural women for the first time in their life have a chance to enter the job market and get their first income.

Leading an agritourism activity and providing a wide range of services within its framework gives the possibility to use the intellectual potential and skills of rural women. They willingly participate in various trainings, exchange their experiences, cooperate in the clubs of country housewives, compete in competitions (e.g., in cooking or for the best and most beautiful agritourism farmstead), sell own made handicrafts and own prepared meals. Moreover, the fact that many of them act agritourism associations governors or village representatives in their villages causes ennoblement of the women social position in the local community.

Local infrastructure improvements

The increase of aesthetics, quality, creation of new technical infrastructure and improvement of the existing one are the essential actions of local government and entities interested in developing tourism, undertaken in order to create a positive image of the town, indispensable in effective development of this and also other forms of tourism. The same applies to projects undertaken at the level of individual farms where large part of the capital and funds obtained from the EU is allocated for various investments, inter alia: renovation, modernization and expansion of buildings, transformation of farm buildings and improving the aesthetics of the farm surroundings.

Investments, undertaken by boroughs, focused on development and modernization of the local technical infrastructure, which contributes to improving the quality of services for tourists, concern: local roads, parking lots, sidewalks, street lighting; waterworks and sewerage system, local sewage treatment plants; landfills, separate

waste collection, etc. A notable number of farmstay tourists prefer spending their leisure time active. Hence the necessity of creation or modernization of a local recreational facilities, examples of which inter alia are: playgrounds for various team sports, ice rinks, developing slopes for skiing, bicycle paths, bridle paths, footpaths, water routes and harbours, beaches, marking of tourist trails, tourist information points.

Above listed investments in tourism infrastructure not only considerably determine the possibility of extending the tourist function in the area, but also conduce to the creation of new workplaces and influence life quality enhancement for all residents.

Transfer of capital from the cities to the countryside

Each tourist in the place of his temporary stay leaves some money. In the case of agritourism these people are mostly city dwellers who usually when coming to the farmhouse do not restrict themselves to use only its offer (Alejziak, 2001). Such holidaymakers often actively participate in many aspects of rural life and dispose their budget freely. The transfer of money from a city to a village regards vast majority of the local economy elements, ranging from gas stations to the confectionery with regional delicacies.

A great number of tourists are people interested in active recreation, so part of their expenditure is connected with experiencing different kinds of emotions and the acquisition of sports and leisure skills. Hence, sometimes a large sum of money expended by tourists goes to i.a. those who provide horses for horseback riding, organize carriage and sleigh rides, deal with bicycle, water sports equipment and quad rentals. Also climbing walls and extreme sports such as paragliding are becoming more and more popular. Entertainment like this is expensive, which intensifies the discussed phenomenon. Often omitted in many studies, however, worth noticing is the fact that the influx of tourists also reflects positively on the funds of rural parishes.

Agritourism is mainly seen through the prism of economic benefits achieved by hosts and the local community, and also the prosperity of the local economy. However, the development of this form of tourism is also associated with less important non-economic nature benefits. The most important are:

Ennoblement of rural residents and their lifestyle

Thanks to the arrival of citizens to agricultural farms deeper understanding of two different communities (urban and rural) is possible. Tourists, who pleasantly and efficiently spent their free time in rural environment, made closer relationships with their hosts and other members of rural society (which often become long-term acquaintances and friendships) change their, not always positive, vision of rural residents. Having a rest at such a farm provides an opportunity for: gaining or expanding knowledge about agricultural practices, getting to know and taking part in production processes, learning about problems of animal husbandry and other issues related to the foodstuffs manufacturing.

Staying at a farmland is also a great occasion to meet folk culture and learn about still cultivated rural customs and traditions which are often different from those of

urban residents, and to taste the local food and drinks. Such experiences are reflected in growth of understanding and respect for visited rural communities. They may become a basis for interpenetration and integration of different cultures.

Increasing level of qualifications

A farm owner should be characterised by courtesy, benevolence, patience and easiness in establishing new relationships. Such a person should maintain managerial skills and prescience. Character features are very important assets of the host. However, it needs to be emphasised that efficient development of agritourism ventures should be accompanied by not only investments made in farm, but also in human resources. On becoming more and more competitive agritourism market it is essential to systematically update knowledge and take part in trainings concerning tourism issues, which will allow making offer more attractive and improve the quality of the provided services (Jalinik, 2010). Tourists influence should also be stressed, because for the hosts they are a source of information and knowledge about different disciplines. Contact with people from cities very often has positive effect on rural youth aspirations and life plans – stimulated by visitors example and career accomplishments young people set more ambitious goals. Whereas, presence of foreign tourists reflects in motivation to learn foreign languages and acquired contacts may facilitate journeys abroad.

Activation of rural community, strengthening of social bonds

A considerable part of residents, living in regions where agritourism is being developed, is characterised by great activeness in self-organisation and ability to cooperate. An evidence of this fact is at least presence of numerous agritourism associations and local tourist organisations. Its members act in favour of region's promotion, agritourism development and other tourism forms. They demonstrate their activeness in acquiring and taking advantage of funds (also those coming from European Union) for variety of ventures which will make this development faster and easier. Hosts aware of the benefits associated with tourist stay, who aim at attracting greater number of tourist, strive for an increase in quality of services they provide and its diversification. That is why, many times they undertake cooperation with other owners of agritourism farms, disposers of gastronomic infrastructure and diverse tourist attractions, and also the rest of rural residents who may contribute to enrichment of the offer and making it more attractive. It should be underlined that both agritourism development and widely understood local development is possible thanks to realisation of cooperation principles, when responsibility for the place of residence is felt by all the members of community.

Protection of cultural values

Rural residents' cultural activity is extremely important for tourism development. Tourists' presence gives an argument for folk bands to work, local culture and religious traditions to be supported, organisation of feasts, church fairs, harvest festivals and other common amusements uniting local population and visitors. Tourist

interest in regional attractions also allows rural residents to look at their surroundings from other perspective and value it. Thanks to tourism influence increases tolerance for distinctness of behaviours and differences in customs.

Protection of valuable natural areas

Agritourism development, which one of the greatest trump is contact with non-polluted environment and its resources (Klisinski, 2005), sometimes causes anxiety of the future of natural values located in polish villages. However, agritourism realised in accordance with conception of sustainable development may occur to be a form of valuable terrains protection, which also does not exclude their simultaneous economical utilisation (Wiatrak, 2005).

Agritourism contributes to creation of so called "green workplaces", integrating development of tourism and principles of environmental protection, which is conducive to sustainable development of rural areas.

A way of natural value areas protection against degradation and pollution caused by tourism exploitation is to increase an ecological consciousness of local governments, communities and people who should be the most interested in preserving natural habitat values, that is tourists.

It is impossible to predict all the benefits which may arise from starting an agritourism business. Many of them have incommensurable character or do not reveal oneself in material form, but simply embodies in better living conditions.

Agritourism will bring that the local economy gets multifaceted, becoming less susceptible to market unsteadiness, which is important in typically agricultural areas. Thanks to tourism business farm families acquire new skills and learn entrepreneurship, which can pay off in other disciplines. Mere contact with visitors and exchange of views bring immeasurable, but significant benefits. For example, in case of foreign visitors tourism mobilises foreign languages learning (Majewski, 2004).

However, it should be noted that in a number of benefits associated with the development of agritourism may also occur risks and negative consequences. Agritourism, as well as other forms of rural tourism may become a threat to the environment, especially in case of over-concentration of tourist attendance.

Practicing various forms of active recreation, such as: downhill skiing, horseback riding, rock climbing, bike racing and hiking expeditions can cause degradation of the rural landscape, pollution and excessive noise. Just as an excessive number of tourists may harm the natural environment, so their stay in the rural areas can destabilise the local socio-cultural environment and disrupt the rhythm of rural life and work, and also raise conflicts between tourists and residents due to transferring of urban lifestyle and a different system of values to the village (Jędrzejczyk, 1995).

Agritourism can also cause irreversible changes in the rural area through its accompanying intense urbanization processes (Strzembicki, 1997). Uncontrolled infrastructure development often destroys a traditional architectural layout of the place. A village sometimes loses its identity its unique colour and special atmosphere. Tourist destinations offer more commercialised and often counterfeited version of its customs and folklore, tailored to the tourists' expectations and imagination (Przecławski, 1986 and 1996).

Regional culture becomes a culture for sale, losing its authenticity and value. Meaningful is also the fact that in many touristic places during the season the appreciation of price level occurs. This reflects adversely not only on tourists, but also on local people, especially ones who do not receive any benefits from the increase of tourism traffic. It happens as well that the land prices and prices of many services are rising (Różycki 2006).

However, it should be noted that the listed examples of threats to the natural and social environment of rural areas can be effectively prevented through skilful tourism management and obeying the principles of sustainable development.

Conclusion

Prerequisite for success in agritourism is inter alia the positive attitude of the main stakeholders towards tourism, i.e. the residents of the village. It is expressed primarily through hospitality. But only hospitality is not enough. Some appropriate skills of hosts are necessary and also adequately prepared local development plan is needed, which includes the development of tourism. Undertaking actions for the development of tourism requires carrying out a meticulous account of the benefits and risks.

Tourism, beyond the benefits of raising money and economic recovery, also requires long-term investment aggravating all the inhabitants of a certain village, so not only those who will directly benefit from the influx of tourists. Tourists will not come to the village which lacks basic infrastructure related to recreation and leisure. Room rental, guest services, organizing their leisure time often requires a significant financial investment, related not only to the renovation of the house, but also to equipping it so as to provide visitors the appropriate standard.

To increase revenues from tourism, municipalities and local communities should concern about the largest possible number of tourists visiting a particular place, simultaneously taking into account the tourist capacity. It is lucrative not only to extend the length of tourists stay, but also to extend the tourist season by introducing new functions independent of weather conditions.

Increased visitors expenditure can be achieved not only by raising prices, but also by the introducing variety of additional attractions, suitably managing the area. Often reservation arouses the fact of indifference or jealousy of the rural population which does not gain the financial benefits from tourists' presence. Meanwhile, all residents may get some profits from the development of tourism in the municipality.

Making the community and the authorities of territorial units aware of this fact and incorporating it during masterminding the municipality development strategy is an important factor in aiming at diversification of the municipality incomes and increasing revenues from tourism.

However, a particular attention should be paid to the fact that agritourism is only one of the elements of rural areas multifunctional development. Placing too much hope in agritourism is risky for the municipalities which are deprived of any tourist values.

Researches concerning rural tourism market, including existing and potential customers, are therefore necessary.

Future of rural tourism depends largely on good orientation in groups of services in which tourists are interested and also in segmentation of tourists.

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1.7. AGRICULTURAL FINANCIAL SYSTEM IN UKRAINE

Summary
The agricultural sector of Ukraine has significant financial needs. According to different experts' estimates there is agrifinance gap of USD 8.7 billion in the Ukraine. In this paper we will evaluate major financial intermediaries for agriculture in Ukraine. In particular, we will characterize the main financial institutions which supply the financial services to the agricultural sector; we will get an understanding of the underlying reasons of limited funding for agriculture. As well we will explore various performance criteria which determine the effectiveness of financial intermediation for agriculture such as efficient allocation of loan funds, interest rates on agricultural loans.

Keywords: agriculture, financial institutions, evaluation, financial intermediation

Introduction

Agriculture plays an important role in economy of Ukraine and has the potential to be a source of growth in a future. Ukraine is considered as one of the countries with the richest natural agricultural factor endowments with long-term investment opportunities (Global Ag Investments, LLC 2013). The share of agriculture in gross domestic product of Ukraine is about 20%. The sector represents more than 20% of the country's export. However, it accounted for only 5,9% loans in 2011.

According the assessments of experts' access to finance is a major constraint of the productivity and growth of agribusiness players (OECD, 2012a). Despite accounting for about 20% of the country's GDP, agriculture does not receive enough loans to finance working capital and investment. The banks in Ukraine are reluctant to lend to farms and hedge themselves against risk by raising either the interest rate on loans or collateral requirements. As well, insufficient understanding of agricultural production leads banks to increase their interest rates to cover for risks they cannot properly assess.

Financing the agriculture through the budget system in Ukraine has increased sharply over the last 10 years, but this did not lead to increasing the efficiency and the competitiveness of agriculture (Oliynyk, 2012a).

Different farm organizational structures and farm sizes might affect also different financial systems, which are applied in agriculture. Therefore, we analyze features of agriculture in Ukraine in terms of their farm organizational structures, their farm size structures and evolution in association with development of an efficient financial system for multifunctional roles of agriculture and for rural development.

Material and methods

The financial system is often defined in the literature in a narrow sense, i.e., as a set of financial institutions – markets and intermediaries – through which households, corporations and government obtain funding for their activities and invest their savings (Bodie and Merton 2000; Allen and Gale 2001; Hartmann et al. 2003). Some other (e.g., Schmidt and Hackethal 2006; Hryckiewicz, Schmidt and Tyrell 2001, 2003) argue that the conceptual starting points are financial decisions and activities of nonfinancial firms and households. From their point of view the concept of the financial system is a broader than previous definition. Within the financial system, they are considering financial relationships of households and firms that occur through the financial sector and outside the financial sector. Examples are real savings, self-financing and self-insurance, and informal and direct lending and borrowing relationships. Financial relations of the state with other economic agents concerning to the flow of financial instruments on non-repayable and non-equivalent fiscal relations have not been considered in the concept of the financial system of a given country or region.

The analysis of literature shows that the concept of the financial system is complex and multifaceted. Definition of the term "financial system" is often missing in fundamental works devoted to the study of the theory and practice of financial systems (Bain 1996; Buckle and Thompson 1998).

Based on the definition of "system" as a set of any items, pieces, parts, joined by a common feature, the purpose, we can determine that a common feature of the elements of the financial system is that they provide flow of financial instruments. Under the elements of the financial system should be understood entities of the financial system that have been identified according to harmonization institutional sectors: government, non-financial corporations, financial corporations, households, and non-profit organizations. If we would like to consider the concept of the financial system comprehensively, we should include to the financial system the financial relations of the state with other economic agents concerning to flow of financial instruments on a non-repayable and non-equivalent basis. Therefore, the financial system is the sum of economic entities, which comes together in financial relations according to the flow of financial instruments on the equivalent and non-equivalent basis.

Our aim is to analyze the agricultural financial system in Ukraine. We aim to analyze the ways in which financial relationships of farms with other economic agents through the financial sector as well as without financial sector on the equivalent and non-equivalent basis are designed and implemented. The paper contributes to the analyses on the ways in which farms meet their financial needs through the financial sector, directly with other economic agents and through the budgetary system.

Evaluation of the financial relationships agriculture with budget system is assessed on the basis of the OECD indicators which are available for Ukraine. One of the most known is the Producer Support Estimate (PSE).

The previous studies of investment behaviour for a sample of Ukrainian large farms 2001–2005 provided empirical evidence for the coexistence of financial constraints and soft budget constraints (Zinych and Odening 2009). Credit constraints are more

important than soft budget constraints. Large farms' investments significantly depend on financial variables in an imperfect capital market in Ukrainian agriculture. The presence of soft budget constraints was identified also for investment behaviour of a sub-sample of large non-private Ukrainian firms (Mykhayliv and Zauner 2013a, 2013b). Distortions to incentives in Ukrainian agriculture, including for capital market, have been widely analysed in the literature (von Cramon-Taubadel et al. 2001, 2007).

Results and discussion

Farm structures and the role of agriculture in the economy

Ukraine's farm sector is characterized by a three-way split between tiny household farms, medium-sized private farms and large corporate farms. State-owned agricultural enterprises are not significant players.

Table 1: Agricultural land use by categories of farms in Ukraine

The legal type of farms	2006				2012			
	Number of units	'000 ha	%	Average size (ha)	Number of units	'000 ha	%	Average size (ha)
Rural households*	15.1**	15602	37.4	1.0	14.3**	15815	38.1	1.1
Private farms***	42932	3972	9.5	93	40732	4389	10.6	108
Private agricultural entities	13030	16051	38.5	1232	13160	15313	36.9	1164
State-owned agricultural enterprises	371	1177	2.8	3173	294	963	2.3	3276
Enterprises of other types of business	1525	4874	11.7	3196	1680	5056	12.2	3010
Total	57858****	41676	100	–	55866****	41536	100	–

* Rural households, which own or use the land and their residence is registered in rural settlements.
** The number of rural population (in million).
*** Private farm is a form of private business of citizens with legal person's right, who has expressed the wish to produce commodity production, to process and sell it with purpose to gain a profit. Citizens carry out their activity on land plots, which were placed at their disposal for farming.
**** the amount is without "Rural households"
Source: SSSU (2007, 2012a, 2012b, 2013).

In the agricultural land use structures, there are mostly legal entities in Ukraine (Table 1). Their share in total agricultural land use was more 60%. However, rural households (family farms) have important role in agriculture in Ukraine. The share of this type of farms indicates their substantial importance in the Ukrainian agricultural land use structure, and increased from 37.4% in 2006 to 38.1% in 2012. They can be also important for cash-flows into rural households' farms by sell of surpluses of agricultural products such as potatoes, fruit, vegetables and milk at local free-markets.

Rural households play key role in agricultural production in Ukraine (see table 2). Although the share of rural households in agricultural output decreased by 12.8%, it remains significant and consists 49.3% in 2012. Private agricultural entities play major role in agricultural output as well. Increasing the percentages of private agricultural entities in agricultural production from 33.3% in 2006 to 49.7% in 2012 was caused the emergence and development of large agricultural enterprises. On average, they have relatively high capacity due to a vertically integrated structure and implementation of new technologies. As mentioned above, the state agricultural enterprises are minor players and they generated merely about 1.0 per cent of the country's gross agricultural output in 2012.

Table 2: Gross agricultural production, by main groups of producers

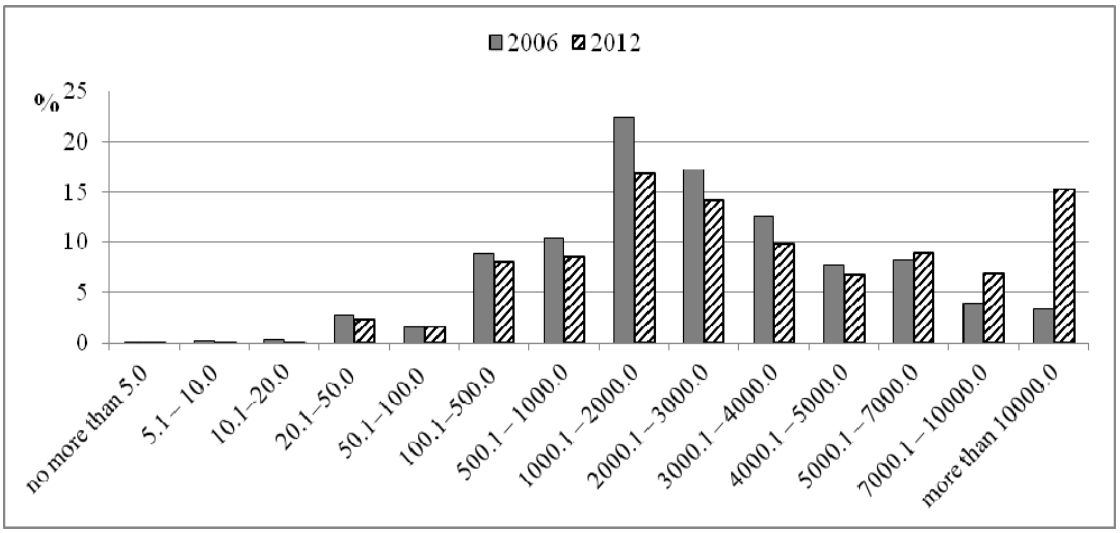
The legal type of farms	2006		2012	
	mln. UAH	percentage to total	mln. UAH	
Rural households	57886.4	61.0	110172.5	49.3
Private farms	4097.0	4.3	14111.1	6.3
Private agricultural entities	31594.1	33.3	110905.5	49.7
State agricultural enterprises	1317.1	1.4	2176.8	1.0
Total	94894.6	100.0	223254.8	100.0

Source: SSSU (2007, 2013).

As can be seen from Figure 1, the average size of agricultural enterprises has increased between 2006 and 2012. The percentage of agricultural enterprises greater than 10000 ha of agricultural land use has also increased from 3.3% in 2006 to 15.3% in 2012. There are the four main factors, which influence on rapid increase of big agricultural enterprises. Firstly, the private enterprises in the agricultural sector were formed, which allowed to merge these forms in the holdings. Secondly, at that time influential and in lobbying powerful capital owners emerged in Ukraine, who aimed to multiply their capital in the long-term perspective. A certain number of large capital owners were from the food industry. They were interested in the vertical integration of agricultural producers to minimize costs. Thirdly, the lack of appropriate institutional and legal conditions for the fully-fledged agricultural land market leads to the opportunity to develop lease market and to lease land for low costs and, consequently, making the agricultural land of unlimited production resources (Oliynyk 2011a). In

addition, among the reasons for their rapid increase are migration of labour from rural areas and greater availability of land with opportunities for further large agricultural enterprise concentration. Finally, in privatisation of some agricultural enterprises has been engaged also foreign capital through stock exchange markets (Balmann et al. 2013). Stock exchange markets are one of opportunities for access of capital, which is needed for investments and technological advancements of large commercial agricultural enterprises.

Figure 1: Distribution of agricultural enterprises in operation by the size of agricultural land use in Ukraine



Source: SSSU (2007, 2013).

As can be seen from Table 3, the percentage of employment in agriculture in the Ukrainian economy decreased slightly from 17.5% in 2006 to 17.2% in 2012. This declined has been caused by the increasing role of the large agricultural enterprises (agroholdings of the average size more than 50000 ha), which have implemented new advanced technologies on a large-scale farms. Consequently, these large-scale agricultural enterprises in Ukraine have shed the labour, which has also migrated out of the rural areas and to abroad. On the other hand, the share of value added of agriculture, forestry and hunting in the gross domestic product of the Ukrainian economy increased from 8.6% in 2006 to 9.2% in 2012.

Table 3: The role of agriculture, forestry and fishing in the economy of Ukraine

	2006	2007	2008	2009	2010	2011	2012
Value added of agriculture in gross domestic product (%)	8.6	7.5	7.9	8.3	8.7	9.9	9.2
Employment in agriculture in the economy (%)	17.5	16.6	15.7	15.5	15.3	16.7	17.2

Source: SSSU (2012b, 2013)

The role of the financial sector in the financing of agriculture in Ukraine

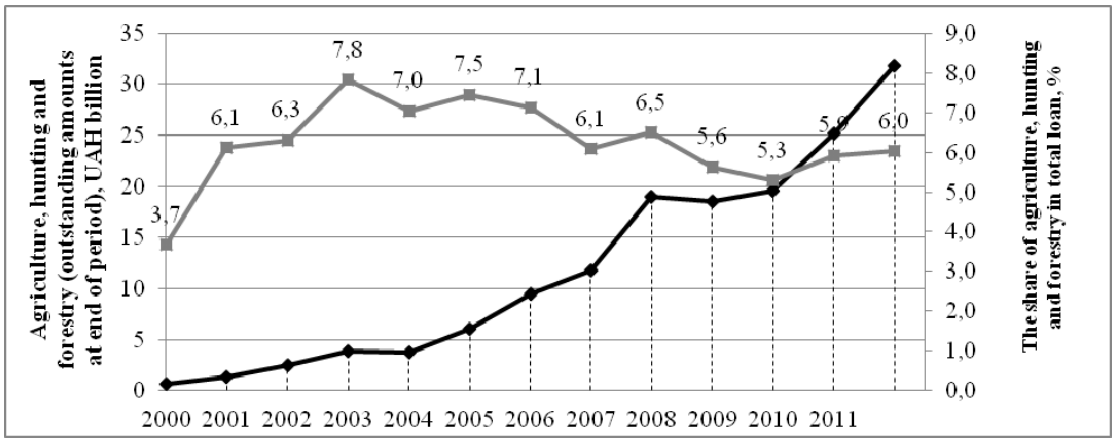
The financial system is understood how farms meet their financial needs through the financial sector, directly with other economic agents and through the budgetary system. Thus, we analyse the main suppliers of agricultural finance.

Except for rural households, Ukrainian farms satisfy their need for finance mainly through commercial banks. Other financial institutions such as credit unions, leasing companies, insurance companies and other financial markets play marginal role in funding of farms in Ukraine (Oliynyk and Oliinyk, 2013).

According to the data presented in Figure 2, during the years 2000 - 2012 there was a positive tendency in the value of loans in constant prices for lending to agriculture by commercial banks. The value of loans at constant prices increased by 46 times and it was 31.9 billion UAH in 2012. The main reasons for the increase in the value of loans have been the introduction of the interest rate subsidy programme since 2000, the emergence and development of large enterprises, which have experienced relatively high profitability.

On the other hand, the share of agriculture, hunting and forestry in total loan portfolio of banks has fluctuated during the years 2000-2012 between 3.7% in 2000 and 7.8% in 2003. The highest share of agriculture, hunting and forestry in the structure of the bank loans in 2003 can be explained by significant increasing in the government support to agriculture through the interest rate subsidy programme from 120 million UAH in 2002 to 326 million UAH in 2003. Since 2003, this share has tended to decline, particularly by the most recent economic and financial crisis.

Figure 2: The loan portfolio of commercial banks to agriculture, hunting and forestry in Ukraine, in constant prices of the year 2000*



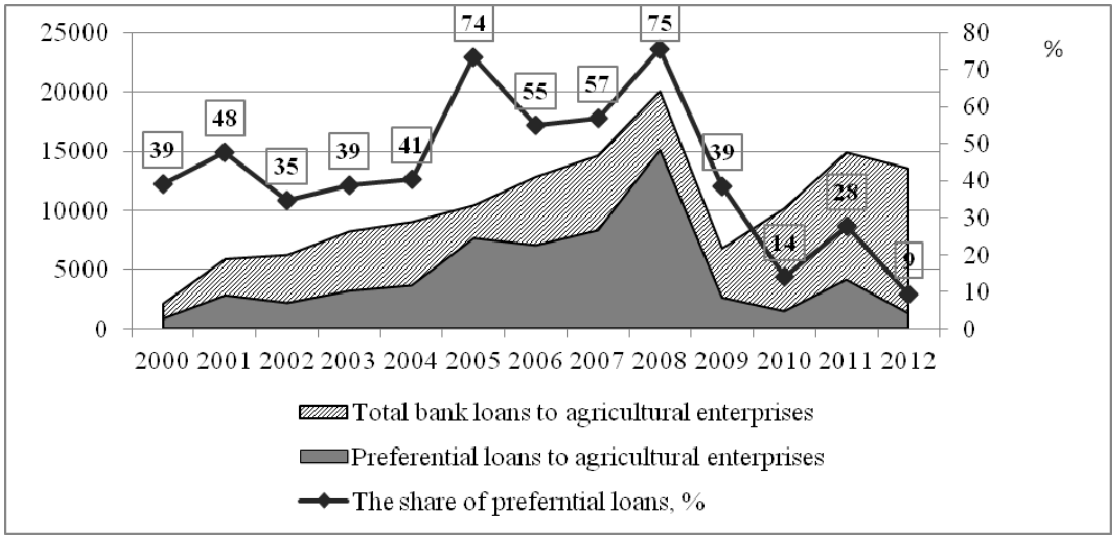
*Loans deflated using price indices for industrial production (2000 = base period)

Source: National Bank of Ukraine (2012, 2013)

The interest rate subsidy programme played an important role in financing agricultural enterprises, especially in 2005 and 2008 (see Figure 3). Thus, during 2005-2008 the share of preferential loans in total loans was over 50% and reached more than 70% in 2005 and 2008. The high share of preferential loans in the portfolio shows that the high interest rate is the main factor that restricts access the agricultural enterprises

to loans. The financial crisis affected significantly the preferential loans because the funding from the budget decreased sharply. As a result the share of preferential loans was only 9.0% in 2012.

Figure 3: The amount of bank loans granted to agricultural enterprises, including preferential loans, UAH million



Source: Ministry of Agriculture Policy and Food of Ukraine (2001-2012)

Despite significant impact of interest subsidy scheme on agriculture lending, it has been argued that these schemes actually create market distortions, since support is not allocated through a market-based mechanism but rather through direct state subsidies. Furthermore, these measures do not target small and medium enterprises (SMEs) and have very broad eligibility criteria for the right to use the program, which means that the actual beneficiaries are mainly large market participants (von Cramon-Taubadel et al., 2007). Similar findings by experts from USAID and OECD, indicating that the program covered a small number of farms, and the farms benefitting from the scheme are not necessarily credit constrained (OECD, 2012b). Generally note the following shortcomings of interest subsidy program (OECD, 2012b). First, eligibility criteria for the programme are not defined: all businesses can apply, irrespective of their size, turnover and the purpose of the loan. Second, subsidies have no size limit relative to the size of the loan. Therefore, market participants who received a large loan, receive large subsidies and thus it includes fewer companies. Thirdly, the application process is complex and lacks transparency. Fourth, banks have an incentive to raise interest rates for agriculture, when they know that the borrower will receive a subsidy from the support scheme.

The agriculture is generally not the first priority of many commercial banks in Ukraine. Some banks are working with agricultural enterprises, but they clearly differentiate between companies according to size. Larger vertically integrated agri-holdings are attractive clients for commercial banks as well as for international financial institutions such as the IFC, EBRD and others. Smaller farms and rural households are underrepresented in bank portfolios (EFSE, 2012).

Despite the large number of commercial banks in Ukraine (175 at the end of 2011), half of loans to agriculture are concentrated in the 10 commercial banks (Table 4). The largest share of the market belongs to two powerful banks in Ukraine - PrivatBank and UkrEximBank. Together, they hold more than 23 per cent of the total agricultural portfolio. Their clients are predominantly large enterprises. These two banks are offering wide range of products and services, but they do not have specialized products for agriculture.

Table 4: Top 10 banks serving the agriculture, hunting and forestry (as outstanding amounts at end of 2011), UAH billion

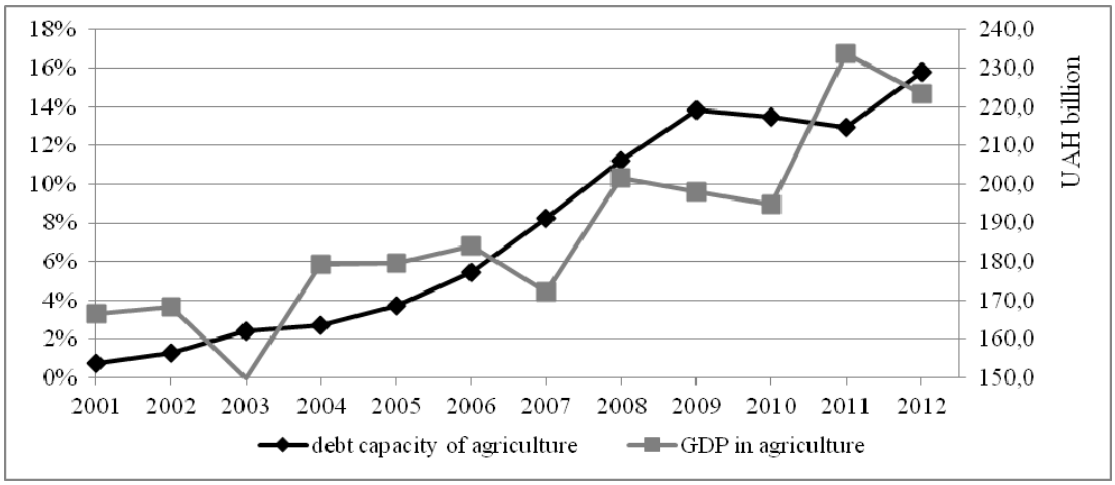
Bank	Total loan portfolio	Loans to agriculture, hunting and forestry	The share agriculture, hunting and forestry in bank sector, %
PrivatBank	113,5	3,4	10,0
UkrEximBank	42,9	4,4	12,9
Financial Initiative	9,7	2,8	8,2
Raiffeisen Bank Aval	30,3	2,4	7,0
Oschadbank	58,8	1	2,9
PromInvest Bank	29,2	1	2,9
Sberbank of Russia	15,4	0,6	1,8
First Ukrainian International Bank	2,1	0,4	1,2
Bank Forum	11,3	0,3	0,9
Credit Agricole Bank	3,1	0,2	0,6
Total 10 banks	316,3	16,5	48,4
Other banks	259,2	17,6	51,6
Total banks	575,5	34,1	100,0

Source: annual reports of the commercial banks, 2011; National Bank of Ukraine (2012)

Certain market share of agricultural lending composes the banks, which is the affiliates of international financial groups. These include Raiffeisen Bank Aval (Raiffeisen Banking Group, Austria), Bank Forum (Commerzbank, Germany), Credit Agricole Bank (Credit Agricole Group, France) and others. Experience the mother companies allows these banks to develop specialized loan products for agriculture.

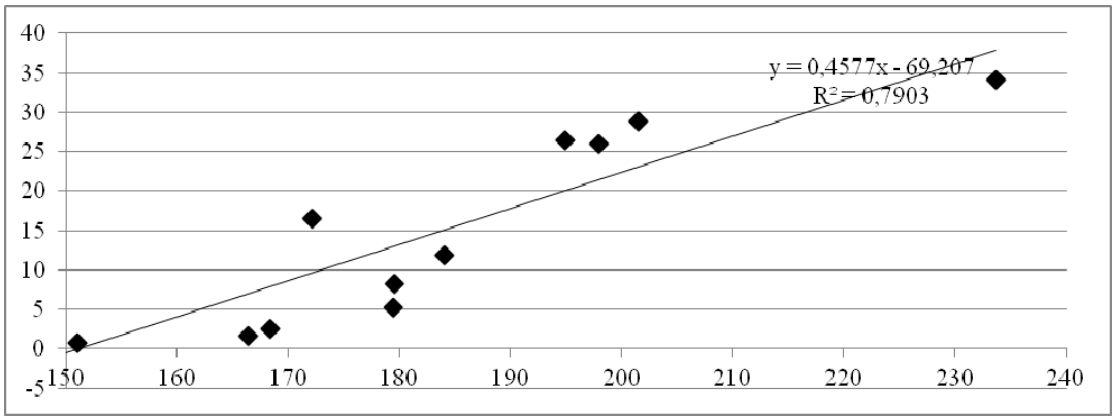
Compare the loans to agriculture with GDP in agriculture indicated (Figure 4) positive tendency, every year debt capacity of agriculture (calculated as the ratio the agricultural loans to GDP in agriculture) increases from 0,7% in 2001 to 15,8% in 2012. Regression analysis shows the significant relation between loans and GDP in agriculture (Figure 5). The determination coefficient is 0,79. However, on the other hand tendency of the reverse index to indicator debt (Figure 6) shows that the effectiveness of loans decreased significantly. This is evidence about the use of loan deterioration, but not about the efficiency of the agricultural financial system as a whole.

Figure 4: Debt capacity of agriculture and GDP in agriculture in Ukraine



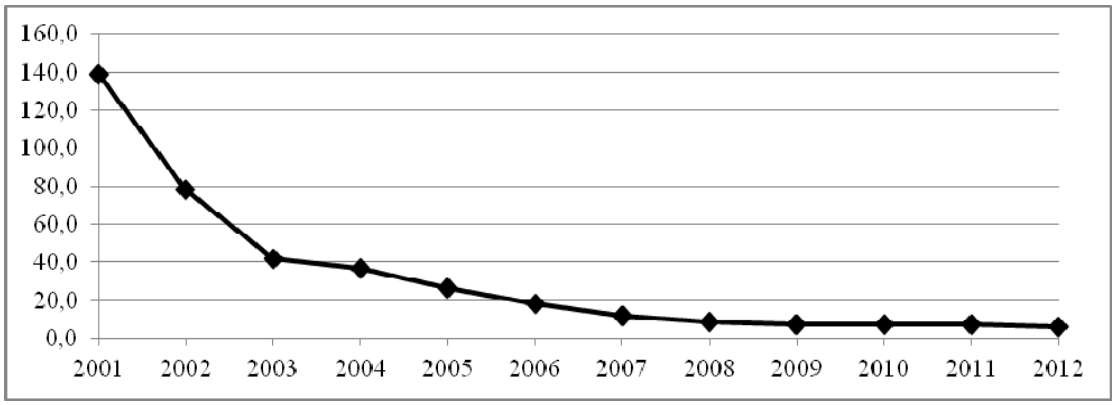
Source: SSSU (2012b, 2013), National Bank of Ukraine (2012, 2013)

Figure 5: Relation between loans and GDP in agriculture



Source: SSSU (2012b, 2013), National Bank of Ukraine (2012, 2013)

Figure 6: The effectiveness of loans (the ratio GDP in agriculture to agricultural loans)



Source: SSSU (2012b, 2013), National Bank of Ukraine (2012, 2013)

In a spite of the increasing value of loans to agriculture in both current and constant prices, the agro-finance supply of about UAH 36 billion failed to meet short-term demands by agricultural farms, which is estimated at UAH 96 billion (EFSE 2012). The main obstacles of agricultural lending development in Ukraine are on the supply-side, on the commercial banks, which are facing the lack of specialized risk assessment tools to be used in evaluating business strategies and loan applications of farms. Most of commercial banks due to the lack of understanding of the specificities of agricultural production and the inability to assess adequately the risks associated with farming activities and farmers, they resort to higher interest rates, which in turn lead to a reduction in the demand-side for loans by farms. On the demand-side, about 35% of all Ukrainian farms are trapped in a vicious circle of low solvency, low yields, low margins, poor management and bad economic performance with low creditworthiness (EFSE 2012).

Despite the huge natural agricultural factor endowments potentials of Ukrainian agriculture, commercial banks are currently with their loans supply focusing only on the largest agribusiness players. According to the assessments by the Organisation for Economic Cooperation and Development (OECD 2012a), the European Bank for Reconstruction and Development and the World Bank (EBRD-World Bank 2009), access to finance is a major obstacle and constraint of agricultural productivity and growth of agribusiness players in Ukraine. This is particularly relevant obstacle for small and medium enterprises (Bojnec, Kvasha and Oliynyk 2013).

The credit unions are small players in the credit market. They have small proportion in-service agribusiness. Credit unions suffered from financial crisis more than the banking sector as it did not receive any support from the National Bank of Ukraine or the Government. Credit unions had to rely on members to support their liquidity. The situation is complicated by the fact that in Ukraine there is no common institution for refinancing credit unions and commercial banks were reluctant to lend to them. As a result, the number of credit unions has declined from 829 in 2008 to 613 in 2011. The volume of loans to member credit unions has declined by almost 60% (from 5.6 UAH billion in 2008 to 2.2 UAH billion in 2011). The share of loans to individuals and private farms in the loan portfolio of credit unions was 6% in 2011, which amounted to 44.7 million UAH, which is only 0.3% of the bank loans to agriculture in 2011.

The development of credit unions is limited by a series of constraints. They are allowed to lend only to individuals and only in local currency. A further essential constraint is the absence of a functioning refinancing organization balancing the liquidity needs of credit unions. Also there is no effective mechanism to protect the rights of members of credit unions, including the deposit insurance system, poor control of credit unions and the lack of financial help by state, low level professional and technical equipment of the vast majority of credit unions that generates imperfect structure loan portfolio, policy development and management of assets and liabilities, the lack of implementation of new services and market instruments, the lack of a coherent long-term market strategy and more.

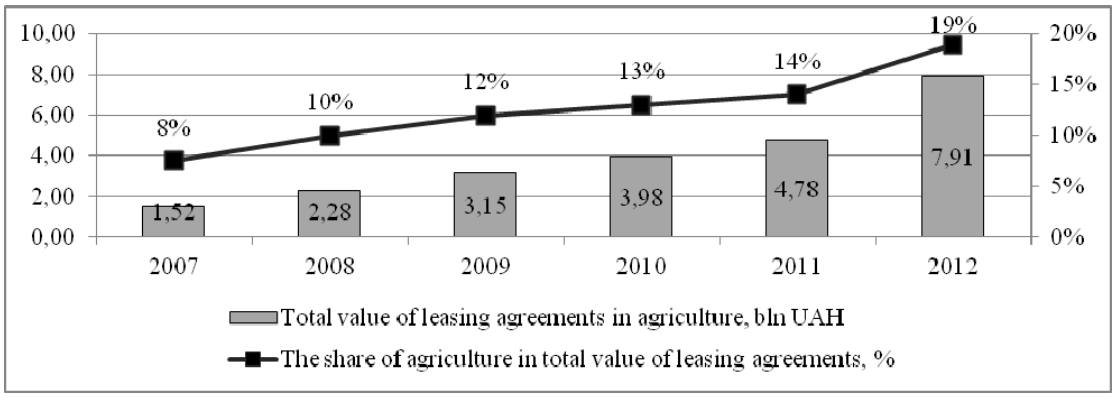
Leasing companies are the following supplier loans for agriculture. The leasing business in Ukraine consist a small portion of total investments in the economy. At the

end of 2012, 243 leasing companies and 115 financial companies had lease agreements in agriculture, with a total value of 7.9 UAH billion (see Figure 7).

The leasing agreements in agriculture is rapidly increasing from 2007 to 2012 in five times (see Figure 7) in despite of the financial crisis. The first reason for the growth in leasing is following. In recent years, commercial banks have understood the advantages of leasing over conventional lending and have started to actively engage in such activities, typically through daughter companies. The leasing companies can increase their portfolios rapidly whereas the banks are limited by strict reserve requirements. The next reasons for the growth in leasing are the improved tax environment and the overall economic recovery and, in particular, agriculture. The profitability level of agricultural enterprises has increased from 7.7% in 2008 to 16.2% in 2012.

The share of agriculture in lease transactions has been growing strongly over the last five years, from 8% in 2007 to 19% in 2012 (see Figure 7). Agriculture was the second most important sector after transport.

Figure 7: Volume of leasing operation in agriculture, 2007-2012



Source: State Commission for Regulation of Financial Services Markets of Ukraine

There are two state-owned leasing companies specialized in the agricultural sector – UkrAgroLeasing (was created in 1998) and SpetsAgroLeasing (was created in 2010). UkrAgroLeasing leases domestically produced machinery, as well as machinery made in Russia and Belarus.

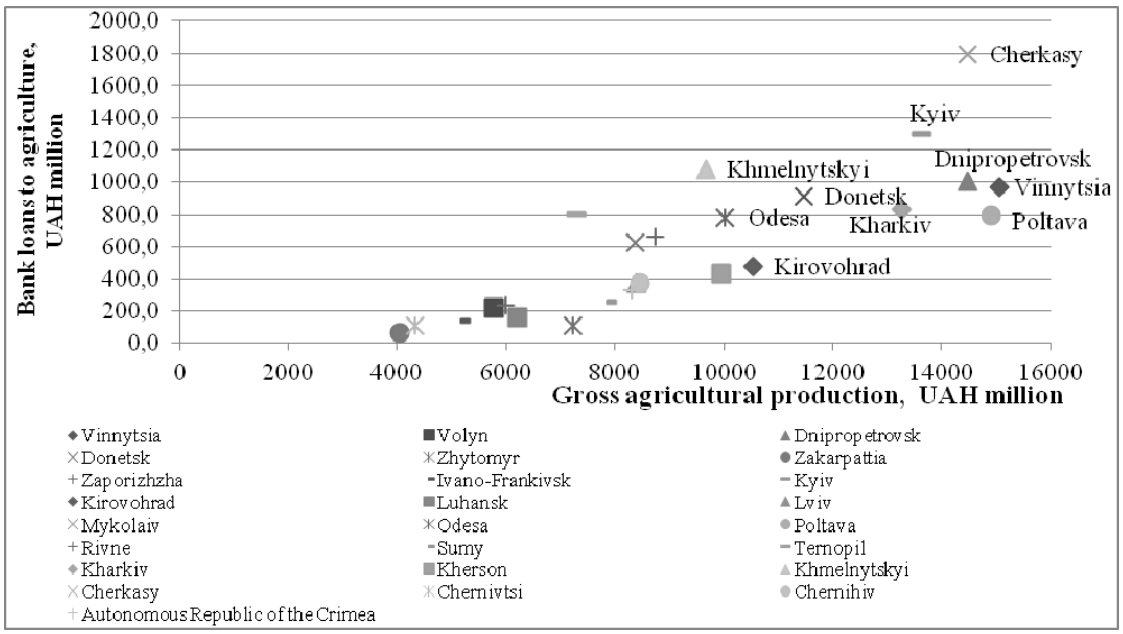
Through UkrAgroLeasing and SpetsAgroLeasing is provided the state support for the leasing of agricultural machinery. This support means lower payments for lessees and lower initial coverage requirements. For 2011, SpetsAgroLeasing and UkrAgro-Leasing received 25 UAH million and 200 UAH million, respectively (EFSE, 2012).

The financial intermediation in agriculture could be evaluated by criteria as efficient allocation of loan funds and interest rate on agricultural loans (Barry and other 2000).

Efficiency criteria in economics specify that an optimal allocation of capital is characterized by equal marginal productivity of capital for all users in all geographic areas. Under perfect financial intermediation, two agricultural businesses producing the same products in different regions but having similar operations and risk characteristics should have similar access to loan funds and similar interest rates (Barry et al. 2000).

About the low efficiency of the allocation of loan funds in Ukraine, shows breakdown of loans to agriculture by region compared with gross agricultural output (see Figure 8). Figure shows that the regions that produce largest gross agricultural output are not always the leaders in obtaining loans. So, in 2011 Vinnytsia region produced the largest volume of gross agricultural output, but obtained less loans by 10% compared to the Khmelnytskyi region, which produced 36% less gross agricultural output.

Figure 8: Bank loans to agriculture versus gross agricultural output in 2011, UAH million



Source: SSSU (2012b), Ministry of Agriculture Policy and Food of Ukraine (2011)

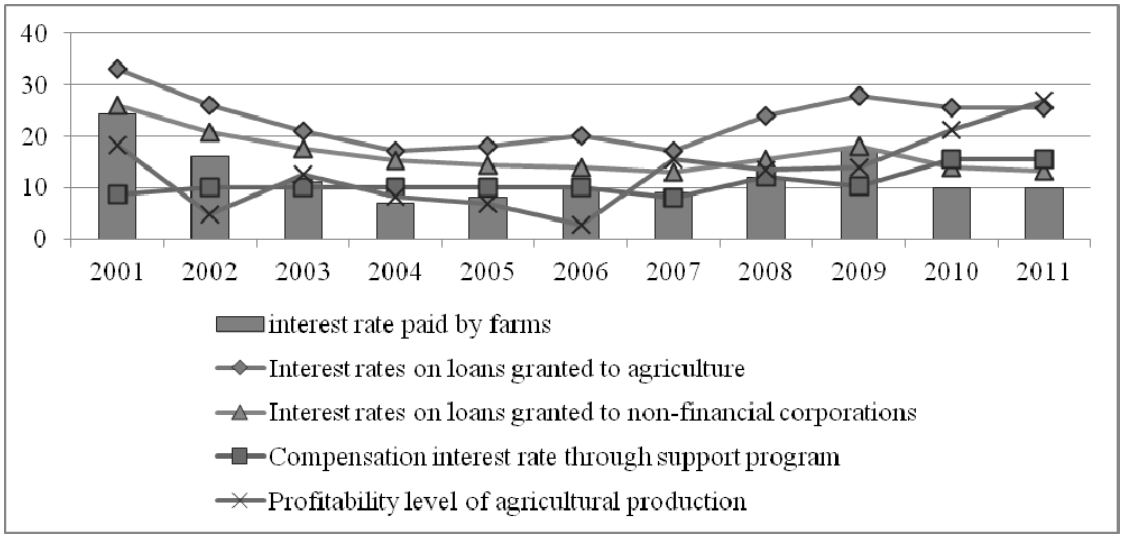
About disparity in the distribution loan resources says so fact. Vinnytsia and Poltava regions can be considered as an area with similar natural and economic characteristics. Firstly, they have almost the same area of agricultural lands - about 1900 hectares. Secondly, they have almost the same number of farms - about 2400. They produce almost the same amount of gross agricultural production, but the amount of obtained loans varies greatly from year to year. In 2010, Poltava region obtained 4 times more loans than Vinnytsia region. In 2011, conversely, Vinnytsia region involved on 22% more loans than Poltava region. As well, they had not similar interest rates. In 2010-2011, the interest rates charged on agricultural loans by commercial banks in Vinnytsia region was higher on 3-4% compare with Poltava region.

Odessa and Dnipropetrovsk regions are also with similar natural resources. These areas are the same size of agricultural land - about 2200 hectares, similar yearly average number of employees - about 37000. However, they have a different number of farms: in the Odessa region, there are 6731 enterprises, in the Dnepropetrovsk - 4014 (SSSU, 2012b), indicating a greater fragmentation of agricultural production in the Odessa area with a large number of small and medium enterprises. Nevertheless,

the level of financial penetration in these areas is not identical and varied significantly. The level of agricultural loans in Dnipropetrovsk region is much higher (more than 29% compared with Odessa region in 2011) and the same could be said for the gross agricultural output (more than 44% compared with Odessa region in 2011). This can be explained by the Dnepropetrovsk region has 60% more financial institutions than the Odessa region, while Odessa and Dnipropetrovsk regions had similar interest rates in 2011 (17%).

A comparison of interest rates charged on agricultural loans and on loans to nonfinancial corporations over time is shown in Figure 9.

Figure 9: Average interest rates for agriculture, compensated by the State and profitability level of agriculture, %



Source: Bulletin of the National Bank of Ukraine (2012), The Statistical Yearbook „Agriculture of Ukraine" for 2006-2011, Ministry of Agriculture Policy and Food of Ukraine (2001-2011)

Also included is compensation interest through support program and profitability level of agricultural production, serving as an indicator of efficiency of interest rate for agriculture. Several features are clearly evident. First, the interest rate on agricultural loans is higher over time than interest rate on loans to nonfinancial corporations. As mentioned above the banks cannot properly assess the agricultural risk because they understand insufficient the agricultural production and they increase their interest rates for farms. The second is the sharp increase in rate levels in 2008, which has been impacted by the recent financial crisis. The third is the high volatility of interest rate. The fourth is the interest rates on agricultural loans were much higher than the profitability level of agricultural production (exception only 2011). Even the compensation interest rate is not allowed to make profitable loans to agriculture in some years. The interest rate paid by farms was higher the profitability level of agricultural production mostly during 2001-2011 (see Figure 9).

Government support to agriculture in Ukraine

Next step in describing the agricultural financial system for it is analysis of the ways in which farms meet their financial needs through budget system.

Agriculture via its strategic role (national food security) and their characteristics (seasonality, long production period, depending on natural factors, etc.) in all countries is under the special supervision of the state, which develops special government support to agriculture.

The government support to agriculture in Ukraine is realized through budgetary spending as well as budgetary revenue foregone (special tax regimes).

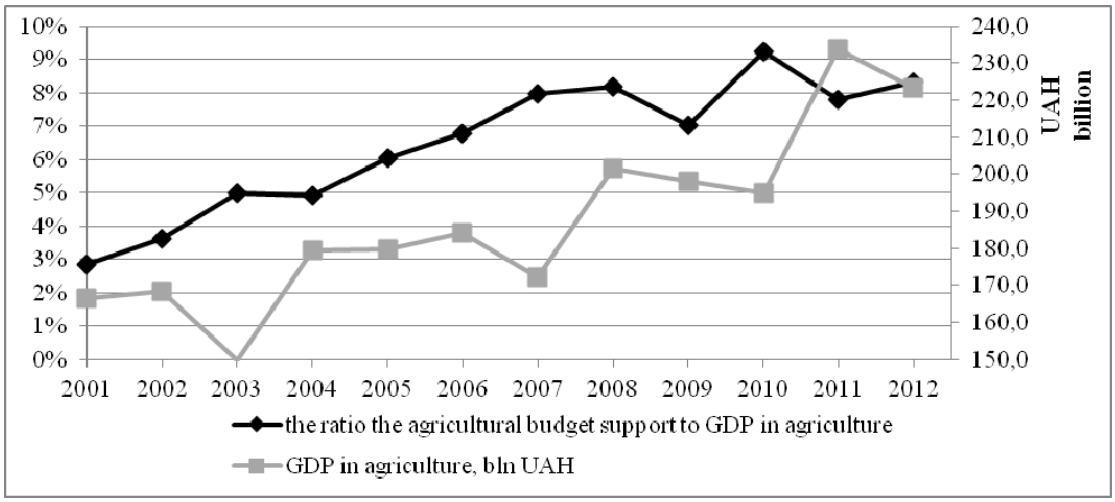
The budgetary revenue foregone on agriculture, coming from VAT exemptions, remains large compared to other sectors of the economy. The major types of VAT expenditures are granted to agriculture:

- VAT charged from sales of agricultural products remains on farm accounts to be used to purchase production inputs, and
- VAT charged from sales of meat and dairy products is not paid to the budget by processing plants, but returned to primary milk and meat agricultural producers.

The volume of government support to agriculture in Ukraine has increased by 3 times during 2001-2012. However, in 2009-2012 the volume declined, which was due to the influence of the global financial crisis that has negative affected the development of Ukraine (sharp inflation, rapid depreciation of the national currency, the decline in GDP, reduction of budget expenditures etc.).

Compare the government support to agriculture with GDP in agriculture indicated (Figure 10) positive tendency, except there is only 2009-2010, 2012, which was due to, as mentioned above, the influence of the global financial crisis. As can be seen from Figure 10, the share of government support in agricultural GDP increased from 2.8% in 2001 to 8.3% in 2012, but it is more less than in USA – 27%, EU – 45%, Japan – 63%.

Figure 10: Agricultural budget support and GDP in agriculture in Ukraine



Source: SSSU (2013), Reports of the Accounting Chamber of Ukraine

Previous study (Oliynyk 2012b) showed that for middle and low support countries with relatively low levels of government support and few protectionist measures, government involvement in agriculture has little effect on the agricultural labour productivity. For the high support countries such as Norway, Japan, Switzerland and Korea the government support significantly affects the agricultural labour productivity.

There were the budgetary spending dominated in the structure of government support during 2000-2008, but since 2009, the budgetary revenue foregone has begun to prevail that it was caused by the influence of the global financial crisis. As a result of special tax regimes could substantially increase financial support of agriculture, which is practically impossible to provide directly in budget (Kvasha and Oliynyk 2011; Oliynyk 2011b; Oliynyk 2012a).

Different indicators can be used to evaluate and compare the developments in government transfers and the distributional effects from agricultural policies (El Benni et al. 2012). The Organisation for Economic Co-operation and Development (OECD) uses indicators of agricultural support, which are comparable over time and between countries. Among the most popular is Producer Support Estimate (PSE), which measures the annual monetary value of gross transfers from consumers and taxpayers to agricultural producers, measured at the farm-gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on farm production or income. PSE values are calculated by adding to the market price support the value of transfers to producers from other policies (OECD 2011a).

The publication of internationally comparable PSE figures has increased transparency on the nature and incidence of agricultural policies in OECD countries. In addition to the OECD countries, the PSEs have been also calculated for some emerging economies such as Brazil, China, Russia, Ukraine and South Africa.

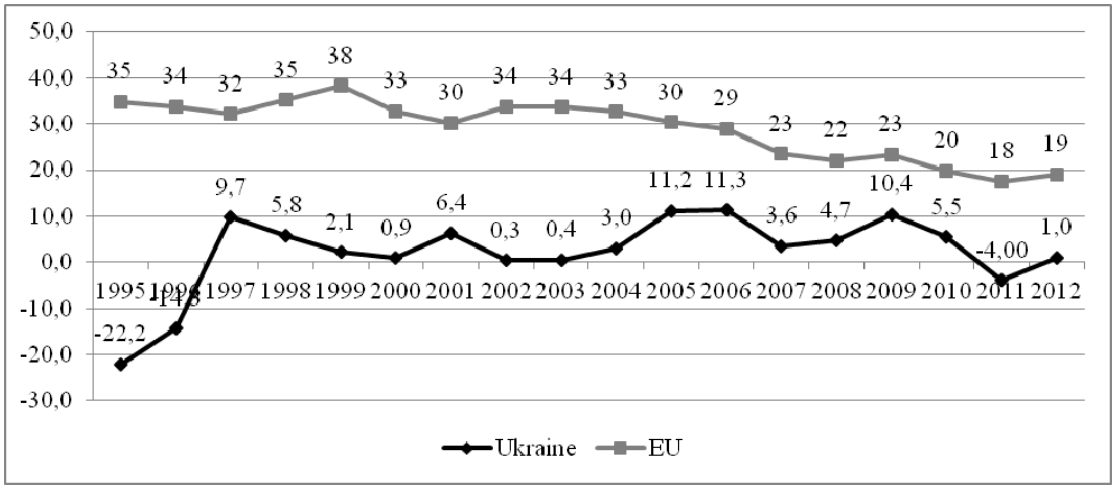
The PSE concept has also contributed to establishing a base for internationally binding commitments on domestic support measures through the Aggregate Measure of Support (AMS) in the Uruguay Round of trade negotiations of the World Trade Organization (WTO). The summary measure, the relative PSE or %PSE (expressed as a percentage of the gross support transfers to farmers in the value of the farmers' gross receipts), is frequently cited in the international debate on agricultural policies, and used as a yardstick of policy "misconduct", i.e., unfair competition with farmers in unsubsidizing countries (Blandford et al. 2008).

The percentage PSE (%PSE) is often used for international comparisons. A %PSE of 20% means that 20% of gross farm receipts come from transfers due to policy measures supporting producers. A %PSE of 0% indicates that the estimated aggregate value of transfers to producers from consumers and taxpayers is zero. A %PSE cannot be higher than 100%, at which level all farm receipts come from policy measures, with no returns from the market (OECD 2011a).

Figure 11 compares the %PSE between the EU and Ukraine over time. Three main features are clearly evident. First, the government transfers to farms in Ukraine have on average been relatively lower than the government transfers from consumers and taxpayers than for the EU's farms. Second, there has been convergence in the %PSE as the government support to agriculture in the EU has declined, particularly since the EU enlargement from 33% in 2004 to 19% in 2012. Finally, the higher volatility in the %

PSE in Ukraine over time implies unsystematic government supports to agriculture with a lack of stability of agricultural policy in Ukraine. A substantial volatility in government support to agriculture in Ukraine in comparison with the EU in the case of Ukraine confirmed that the existence of budgetary spending and its growth cannot guarantee stability in government assistance to agriculture, if there are some other ad hoc policy measures.

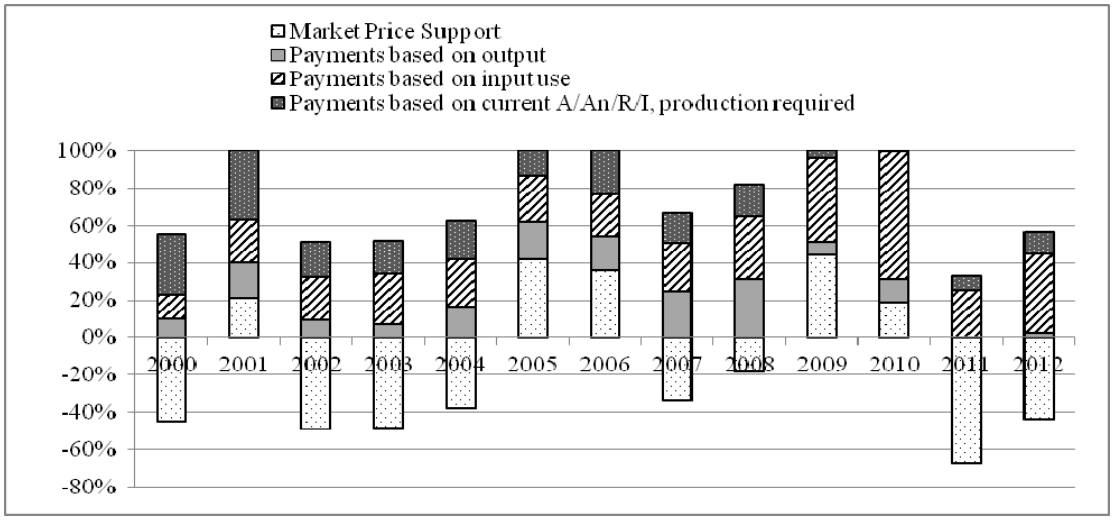
Figure 11: Percentage PSE in Ukraine and EU countries (%PSE)



Source: OECD, http://stats.oecd.org/Index.aspx?DataSetCode=MON20113_1

Figure 12 presents the composition of the PSE in Ukraine between 2000 and 2012.

Figure 12: The structure of the PSE in Ukraine during the years 2000-2012



Source: OECD, http://stats.oecd.org/Index.aspx?DataSetCode=MON20113_1

According to this data payments based on output (mainly for livestock products) and input subsidies were Ukraine's principal instruments of government support to agriculture, especially during the years 2007-2010, where they accounted for a slightly

more than 70% of the Ukrainian PSE. The bulk of this support is based on budgetary revenue foregone as opposed to actual budgetary spending. This is implemented through specific procedures to use the Value Added Tax (VAT) due from agricultural producers and processors as mentioned above.

Market price support has also significantly affected the total amount of support in the Ukrainian PSE. Moreover, only this component has experienced negative values owing from lower domestic prices than global or international market prices as the negative impact on the PSE. Except for the 2001, 2005-2006 and 2009-2010, the Ukrainian domestic agricultural prices were lower than global or international market prices of similar products. However, the level of PSE, which adjusts market price support in the total amount of subsidies to farmers, shows that government was able to reduce the negative impact of gap of domestic and world prices by providing budget financing: taxation of producers occurred only in 2011, when most products negative market price support is not offset by quite insignificant direct payments from the budget. For comparison, in most other OECD countries market price support has often been of a positive value and in the past, before the most recent CAP reforms, amounted between 44 and 60% of total PSE, but has declined during the most recent years substantially with a shift from market price support to direct budgetary support to agriculture and payments for rural development. The most recent developments in OECD countries have been adjustments of domestic agricultural prices closer to global or international market prices.

Due to the composition of PSE "Payments based on output" and "Payments based on input use" take significant share besides market price support (see Figure 12). Previously important output payments were substantially decreased due to budget constraints last years. Critical allocation were done in 2011; they were slightly increased in 2012, but amounted to 15% of their level in 2008. Another reason for the reduction in output payments is that in addition to actual budgetary outlays, some part of these payments is based on the budgetary revenue foregone. Thereby, meat and milk processors "re-direct" VAT due on processed products to their primary suppliers instead of transferring this tax to state budget. With Ukraine's WTO accession, concerns emerged about the impact of this subsidy on the country's AMS commitment. The previous mechanism was changed several times between 2010 and 2012, which meant that it functioned with interruptions and uncertainty. According to the latest agreed procedure to be in place until 1 January 2015, dairy and meet processors transfer their VAT in proportions fixed foe each year to the state budget and to a special account they open. The part transferred to the state budget will be directed to new animal payments for household producers, while the part transferred to the processors' special accounts will continue to be used for top-ups to producers delivering milk and meat (OECD, 2013).

The share of inputs payments was significant particularly last years. The largest component, accounting for 86% of all inputs support in 2010-12 and the largest single payments in the Ukrainian PSE, is based on so-called VAT accumulation mechanism. Agricultural producers can accumulate the VAT due on their primary and processed products on a special account. Accumulated funds should be directed to cover the VAT on purchased inputs, while the residual sum can be used for any other production

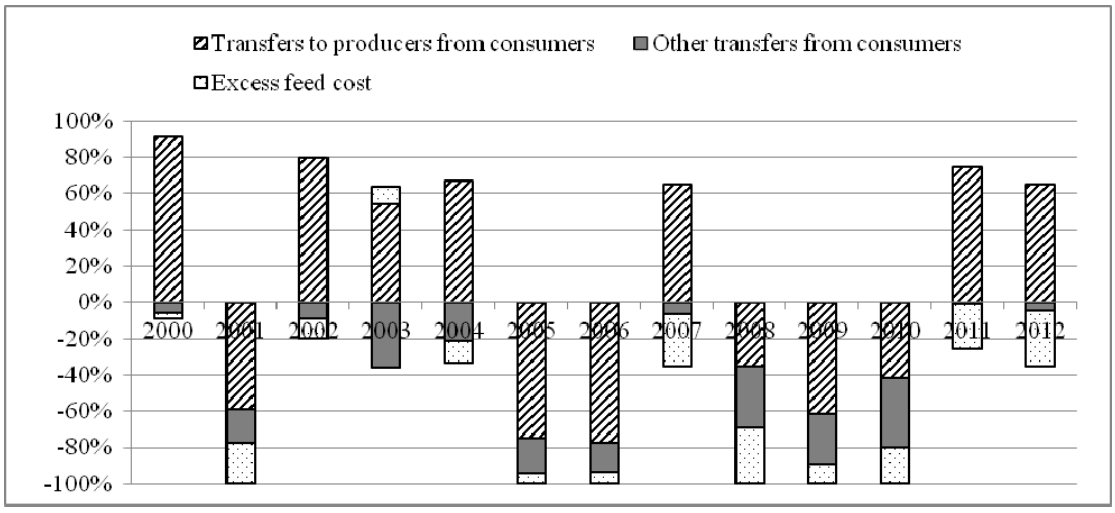
purposes. Following rises in agricultural prices VAT-based transfers have been steadily increasing in 2010-12: from UAH 9.2 billion in 2009 to UAH 15.4 billion in 2012.

Other the OECD indicators of agricultural support are indicators of support estimate to consumers, indicators of support estimate to general services for agriculture, and indicators of total support estimate to agriculture (OECD, 2011a, 2011b).

CSE is the annual monetary value of gross transfers from (to) consumers of agricultural commodities, measured at the farm gate level, arising from policy measures that support agriculture, regardless of their nature, objectives or impacts on consumption of farm products. The percentage CSE (%CSE) is a share of consumption expenditure on agricultural commodities (at farm gate prices), net of taxpayer transfers to consumers (OECD, 2011a).

Figure 13 presents the structure of the CSE in Ukraine for the 2000-2012. During the 2001, 2005-2006, and 2008-2010, the CSE was characterized by the provision of support to producers just through the transfers from consumers. On the other hand, the 2000, 2002-2004, 2007, 2011-2012, Ukrainian consumers received subsidies from agricultural policy transfers. Such a situation has contributed to more rapid farm restructuring as one of the reasons for the decline of Ukrainian farmers. Some farmers due to lower profitability in farming have exited from farming activities or have migrated from rural areas to urban areas or have migrated abroad.

Figure 13: The CSE structure in Ukraine during 2000-2012



Source: OECD, http://stats.oecd.org/Index.aspx?DataSetCode=MON20113_1

The GSSE transfers capture payments to eligible private or public services provided to agriculture generally. Unlike the PSE and CSE transfers, the GSSE transfers are not destined to individual producers or consumers, and do not directly affect farm receipts (revenue) or consumption expenditure, although they may affect production or consumption of agricultural commodities in the longer term (OECD, 2011a).

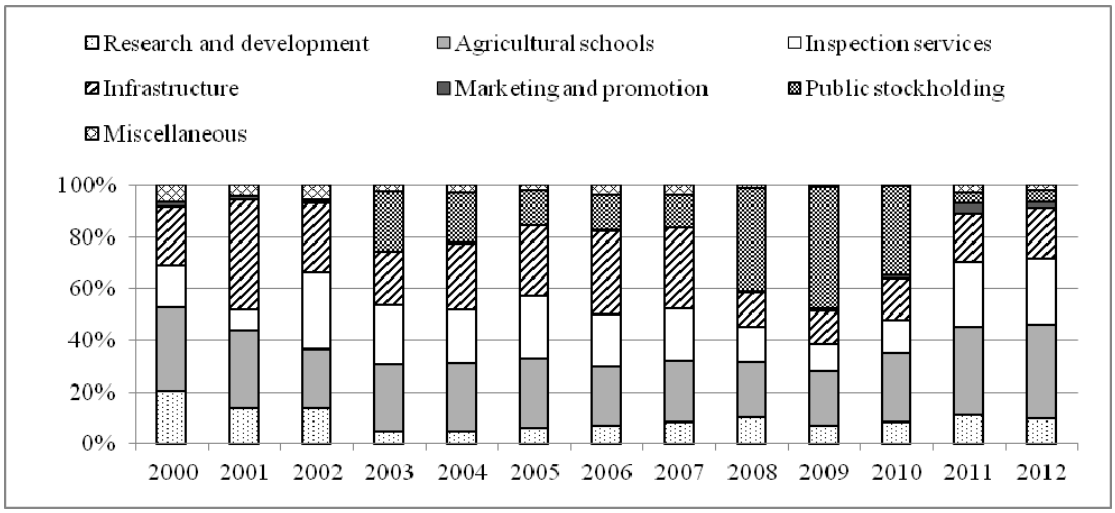
The composition of the GSSE transfers in Ukraine is presented in Figure 14.

As can be seen from Figure 14, the share of budgetary payments for financing research and development activities and thus improving agricultural production has

been reduced from 20% to 9% during the 2000-2012 period. The share of the GSSE budgetary payments for financing agricultural training and education in Ukraine has taken a significant greater part in Ukraine in comparison with the EU member states. For example, the share of the budgetary payments to agricultural schools in Ukraine was between 21 and 36% during the 2000-2012 period, while in the EU member states only around 0.4%.

The share of the budgetary payments for infrastructure and marketing in the EU member states was very high: between 33 and 70% for infrastructure and between 4 and 12% for marketing. While in Ukraine, these components were only between 16 and 40% and between 1 and 2%, respectively. Relatively low budgetary payments for financing of improvement of off-farm infrastructure and relatively low budgetary payments for financing of assistance to marketing and promotion of agro-food products lead to increased production and transportation costs and mitigate competitiveness of Ukrainian agro-food products on domestic and international markets. One of the reasons for less favourable values of market price support can be also insufficient funding and investments in infrastructure, marketing and promotion of Ukrainian agro-food products.

Figure 14: The GSSE structure in Ukraine during the 2000-2010



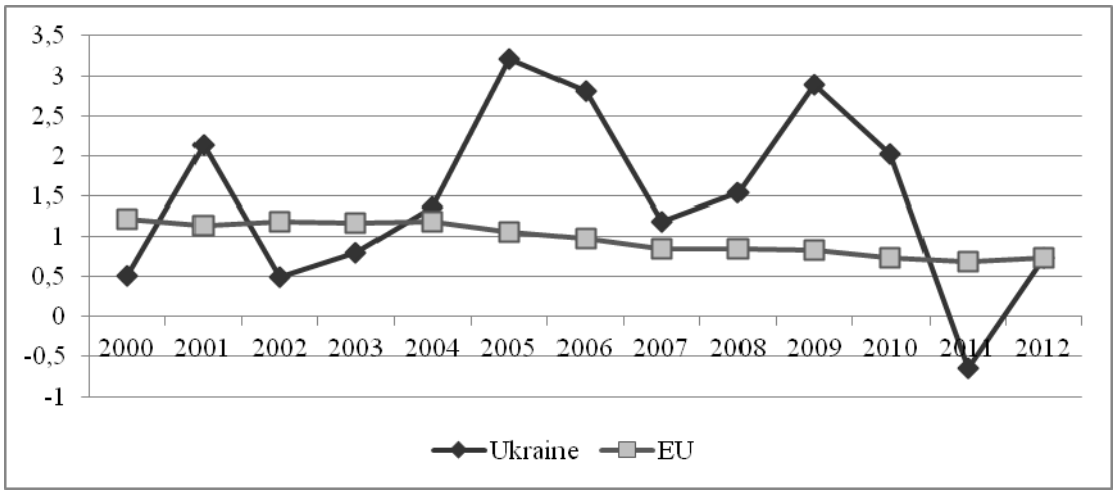
Source: OECD, http://stats.oecd.org/Index.aspx?DataSetCode=MON20113_1

TSE is the annual monetary value of all gross transfers from taxpayers and consumers arising from policies that support agriculture, net of the associated budgetary receipts, regardless of their objectives and impacts on farm production and income, or consumption of farm products (OECD, 2011a, 2011b). The percentage TSE (%TSE) is calculated as a share of agricultural GDP. During 2000-2012, Ukraine has experienced rather unsystematic agricultural policy measures, which have caused significant cyclical fluctuations in the %TSE indicator (Figure 15).

As shown in Figure 15, the %TSE for Ukraine tends to increase with substantial cyclical oscillations. On the other hand, the %TSE tends to decline a slightly with rather stable developments between the individual years. Therefore, different are patterns and the significant fluctuations in the TSE (%) development in Ukraine

compared to more stable, but declining tendency in the EU member states. Therefore, this support for agriculture of Ukraine differs significantly from the most recent developments in the EU member states. In Ukraine, the % TSE is characterized by a lack of stability and a steady upward trend.

Figure 15: The percentage TSE (%TSE) in Ukraine and in the EU member states



Source: OECD, http://stats.oecd.org/Index.aspx?DataSetCode=MON20113_1

The main strategic objective of Ukraine should be development and implementation of long-term strategy of agricultural and rural development that would allow carrying out a transparent agricultural policy focusing on a greater stability and sustainability in competitive agricultural and rural development.

Conclusion

Ukraine's farm sector is characterized by a three-way split between tiny household farms, medium-sized private farms and large corporate farms.

Rural households (family farms) have important role in agriculture in Ukraine. Their percentage indicates substantial importance in Ukrainian agricultural land use structures – 38.1% in 2012. Although the share of rural households in agricultural output decreased by 19.2%, it remains significant and consists 49.3% in 2012.

The second major player in agriculture are the corporate farms (private agricultural entities), their share in total agricultural land use was 36.9% in 2012 and their percentages in agricultural output increased by 49.7% in 2012. It was caused the emergence and development of large agricultural enterprises.

The average size of agricultural enterprises has increased significantly last 7 years. The percentage of agricultural enterprises greater than 10000 ha of agricultural land use has increased from 3.3% in 2006 to 15.3% in 2012.

The percentage of employment in agriculture in the Ukrainian economy decreased from 17.5% in 2006 to 17.2% in 2012, on the other hand, the share of value added of agriculture, forestry and hunting in the gross domestic product increased from 8.6% to 9.2% during the same time.

The assessment of agricultural financial system implies the analyses of the ways in which farms meet their financial needs through the financial sector, directly with other economic agents and through the budgetary system.

The commercial banks are the main financial intermediaries for agriculture in Ukraine. But the banks are reluctant to lend to farms because they cannot properly assess the risks through insufficient understanding of agricultural production. The banks are lending mostly larger vertically integrated large agricultural enterprises. Smaller farms and rural households are underrepresented in bank portfolios. The value of loans at constant prices increased by 46 times over the past 11 years and it was 31.9 billion UAH in 2012. The interest subsidy scheme, which has been implemented since 2000, played important role in agricultural lending. During 2005-2008, the share of preferential loans in total loans was over 50%. But the interest subsidy program has a number of weaknesses, which requires a review of the state support to agriculture.

Other financial institutions such as credit unions, leasing companies, insurance companies and other financial markets play marginal role in funding of farms in Ukraine.

The efficiency of financial intermediation in agriculture is low in Ukraine. Based on criteria "efficient allocation of loan funds" has been shown that regions of Ukraine with similar natural and economic characteristics have different access to loan funds and different interest rates. Interest rate on agricultural loans is high, and higher than the average in Ukraine, it has significant volatility. The level of agriculture profitability does not cover the level of interest rate.

The volume of government support to agriculture in Ukraine has increased significantly by 3 times during 2001-2012. However in 2009-2012 the volume declined, which was due to the influence of the global financial crisis that has negative affected the development of Ukraine (sharp inflation, rapid depreciation of the national currency, the decline in GDP, reduction of budget expenditures etc.).

Analysis of the producer support estimate in Ukraine showed that an unsuccessful price regulation caused the decrease to zero the producer support in 2000, 2002-2003, 2011.

The higher volatility in the % PSE in Ukraine over time implies unsystematic government supports to agriculture with a lack of stability of agricultural policy in Ukraine. A substantial volatility in government support to agriculture in Ukraine in comparison with the EU in the case of Ukraine confirmed that the existence of budgetary spending and its growth cannot guarantee stability in government assistance to agriculture, if there are some other ad hoc policy measures.

The main strategic objective of Ukraine should be development and implementation of long-term strategy of agricultural and rural development that would allow carrying out a transparent agricultural policy focusing on a greater stability and sustainability in competitive agricultural and rural development.

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CHAPTER 2

Economic evaluation and competitiveness of different sectors of agriculture

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Oksana Kukhar

2.1. STATE SUPPORT FOR THE DEVELOPMENT OF CATTLE BREEDING IN UKRAINE

Summary
The necessity for the state support of animal husbandry is important in market conditions. It is associated with unique characteristics, which are typical for this branch, its place and its importance for providing the food safety. The development of the branch is in difficult situation, which is resulted by the negative factors influence related to the instability of the external and internal environment. Consequently, there is a need to extend the researches related to an increase of state role and its importance in regulating of an economic process in attempt to prevent the possibility of a crisis and to assist a stable development of the livestock sector for a long period. The dynamics, the structure, and the amount of the beef production in Ukraine are considered in the article.

Keywords: beef production, cattle population, meat consumption, state support, cattle

Introduction

The problem of increasing the efficiency of agricultural state support is especially actual in the conditions of scarce resources. Since the world food prices have been increasing during the last years, the profitability of the agriculture has been also increasing. Consequently, the production and export of cereals, sunflowers, turnips, and other agriculture cultivations are made rapidly. However, the stock-breeding branch is in difficult financial position in Ukraine. Before the crisis of 2009, the amount extension of the branch state support did not result in the required productivity and did not significantly influence the financial position of agriculture producers. During 2009-2010, in the period of the financial crisis boom, the state support of the stock-breeding branch has been being decreased. The beef production has the worst position among the stock-breeding branches. Because of a lack of the state support the branch is actually unprofitable. Also, the tendencies of a cattle number decrease are observed. The significant part of national agriculture companies retracted to produce beef in favour of plant production. Therefore, the households are the main producers of beef in Ukraine. Due to the data of the State Statistics Service of Ukraine up for 1st January 2012, the 76 % of meat was produced in households. The significant structure transformations are first of all associated with an unemployment level increase in country, a poverty of country population, because the milk and the meat production is their only source of earnings. However, the beef production in households is characterized by the insignificant level of productivity figures and by the complication of international quality and safety standards execution (Dibrova, 2010).

Simultaneously, the price system that exists on the whole line of products value formation is the one more condition that noticeably illustrates the structural disproportions of the branch development. Although, the retail prices for beef in the internal market frequently excess the world prices, purchasing prices are significantly lower than prices for foreign substitutes. Therefore, with a low purchasing power of the majority of the population, a national consumer is made to pay more than an average in the world, and a producer does not receive significant financial resources used to provide the renovation process in the branch. The increase of import in Ukraine is stimulated by unfulfillment of the internal market, high prices for beef in the conditions of the external trade regime liberalization, occurred by the WTO entry.

The above-mentioned facts determine that the state regulation has a significant influence on a financial position of national beef producers. The theoretical consideration and the methodical basis of improving the efficiency of beef producers' state support is caused by a need of a prompt adaptation of the branch to new economic conditions and by a need of a balanced development conditions formation for a long period.

The problem of basing the agriculture state support level and efficiency, especially the stock-breeding state support level and efficiency is deeply considered in scientific researches. O. Borodina, A. Dibrova, I. Kobuta, V. Onegina, T. Ostashko, and G. Cherevko etc. made the significant contribution to the development of methodological and methodical questions. The world financial crisis negatively influenced the national economy and decreased the financial resources of Ukraine. Consequently, there is an intense need of scientific researches associated with the beef production internal support efficiency in Ukraine.

Main material presentation

Cattle are the important branch of productive stock-breeding that provides population with unreplacable food, textile industry with raw materials, plant production with organic fertilizations etc. Beef have the first place among meat products for high quality proteins and amino acids that beef comprises. The branch of stockbreeding based on cattle livestock. It is concentrated on 65% of conditional productive livestock. Its main products are meat and milk. (Ivanuh, 2003)

The most common breeds of cattle in Ukraine are the following: red prairie, black-spotted and Simmental. In some regions are common Lebedynska, brown Carpathian, red Woodland, Ukrainian Whitehead breed of cattle. (Clyment, 2006)

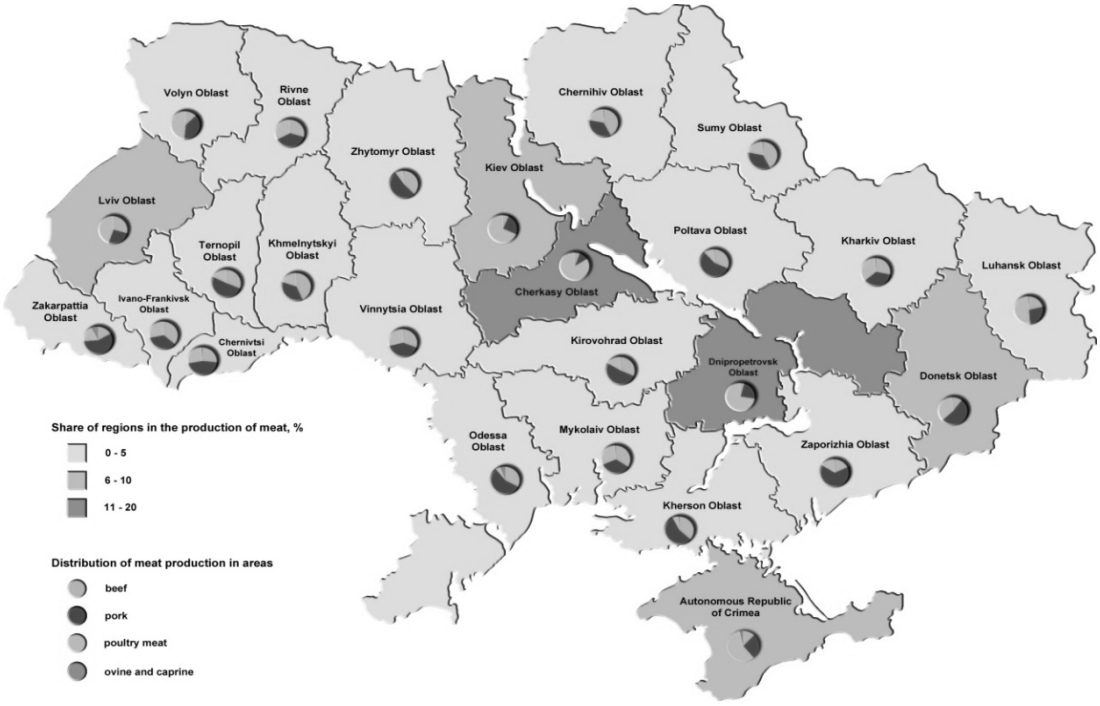
The geographic structure of meat production in Ukraine is shown on Figure 1. The largest share in the production of meat takes Cherkassy and Dnepropetrovsk regions, 15.3% and 10.5% respectively. The third place of meat production by volume in 2011 was the Kiev region with 9.9%.

Meat production is divided into its directions within country as follows. Leading positions in 2011 were taken by poultry meat. The highest concentration of produced product is in Cherkasy, Dnipropetrovsk, Kyiv and Lviv regions and Crimea. An important segment in the structure of meat production of territorial units is pork. Its

share varies from 11% in the Cherkassy region to 66% in Zaporizhia region. On average across Ukraine the produced pork accounts for 41% of the total volume.

Agricultural producers most actively engaged in stockbreeding in the Lviv, Ivano-Frankivsk, Vinnytsia and Khmelnytsky regions.

Figure 1: Geographic structure of meat production in Ukraine, 2011



Source: constructed by the author according to the data of the National Statistics Service of Ukraine

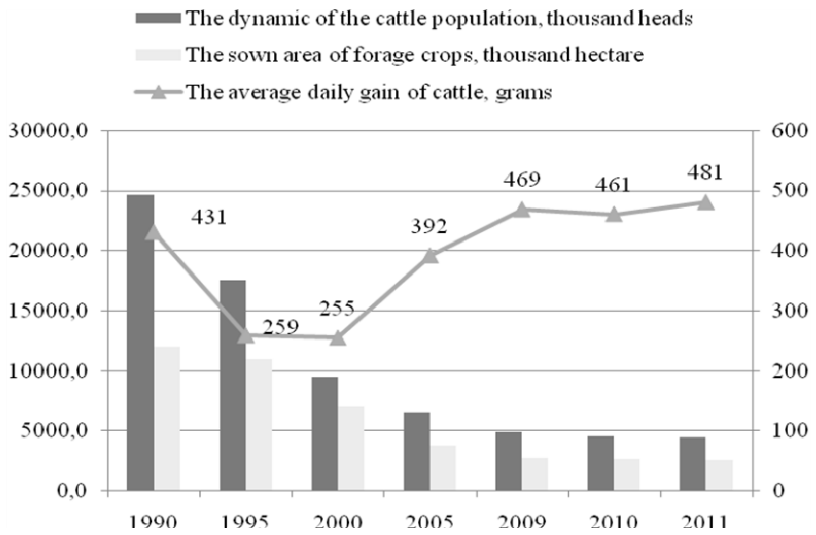
In Ukraine, depending on environmental conditions and the nature and structure of fodder production is used basically three main ways of maintenance of herd: tethered, not tethered with free maintenance on deep litter on pasturage, or not tethered boxed.

Unfortunately, during the last 20 years meat of cattle have been having significant quantitative and qualitative losses. During the period from 1990 to 2011 the number of cattle has been declining more than five times from 24623 thousand heads to 4426 thousand heads. (Figure 2). This was due to the influence of various unfavourable factors for the development of the industry.

One of the basic factors for the successful development of livestock is fodder production. Organization of fodder supply includes a system of production and use of feed, which is characterized by the appropriate structure of sown area of forage crops, technology of production, harvesting, storage and cooking of feed. (Pokropuvnii, 2001, p. 58). According to data of Figure 2, there was a reduction of sown area under forage crops by 80%: from 11,999 thousands hectares in 2009 to 2477 thousands hectares in 2011. This trend has had a negative impact on the creation of a strong fodder supply for cattle. Indeed the forage crops that is seeded occupy an important place in the diet of cattle. Thus, in the structure of the feed intake the silage accounts for 19-20%, 18% for hay and straw, and 30% on green feed seeded grasses, natural meadows and pastures. (Rybachenko, 2011)

The negative trends in stockbreeding the problems in Ukraine are also connected to the reduced productivity of livestock. A sharp decline in this index occurred between 1990 and 2000. In 2000, the average daily gain of cattle was reduced to 255 g per day, which is less by 40% compared to 1990. In order to improve breeding and productive characteristics of animals was enacted the Law of Ukraine „On the livestock breeding business" (as amended by Law of 21 December 1999. № 1328-XIV).

Figure 2: Dynamics of livestock, average daily gain of cattle and sown area of forage crops in Ukraine



Source: constructed by the author according to the data of the National Statistics Service of Ukraine

Due to a number of organizational and economic measures were managed to restore the capacity of farm animals and increase their productivity. Thus, the average daily growth in 2011 index reached 481 g / day, which is even higher than its value in 1990.

In Ukraine meat is produced by following three categories of farmers.

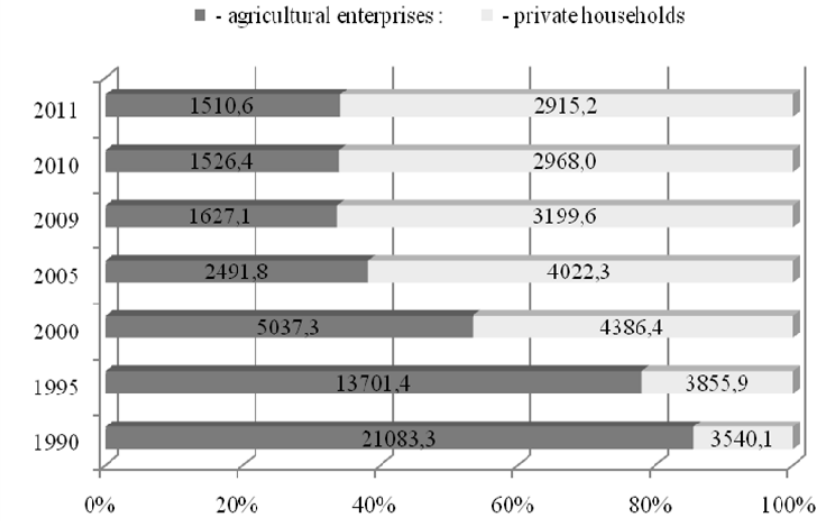
Agricultural enterprises, which are also called as big farms, this category includes public sector, joint stock companies and partnerships of all types, agricultural cooperatives, agricultural departments of industrial, transport and other enterprises, organizations and research institutes.

Private households, also known as personal farm (including plots) or small farmers: this category includes individual or family farms that have land, such forms of agricultural production, when an individual or family produce agricultural products to meet family needs for food or other purposes.

Farmers are also usually seen as small producers: the form of free enterprise that uses its own or rented land and other property. Private farmer engaged producing in his own company, sometimes in processing and marketing agricultural products, state registers it as a farmer. (Agriculture Ukraine…, 2003). Significant decline of cattle population was in agriculture companies. According to Figure 3, in 2011 the farms grew 1510.6 thousand heads of cattle against 21,083.3 thousand units in 1990. During the period under reduction was nearly 14 times.

In spite of this, the share of cattle in households has been increasing from 15% to 66% during the analyzed period. Up for 1 January 2012, households produced 76% of beef products. But as you know, the possibility of increasing of the volume of production of beef and milk in farms is extremely limited. Therefore, scientists and members of government consider that beef will be produced by the wholesale producers in the future.

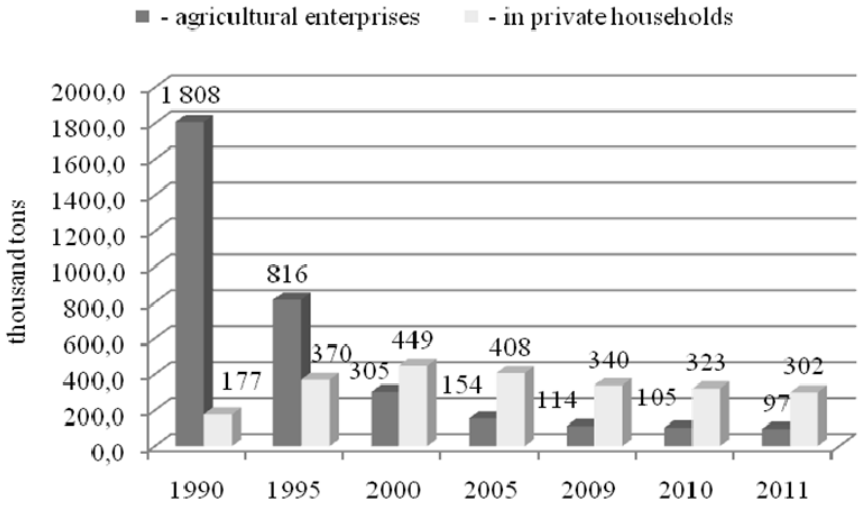
Figure 3: Number of cattle in agricultural enterprises and farms, thousand units



Source: constructed by the author according to the data of the National Statistics Service of Ukraine

Together with the reduction in the number of cattle in farms and the volume of output has also reduced. This figure dropped to 18 times, from 97 thousand tonnes in 2011 to 1,808 thousand tonnes in 1990. That is suggesting that farms began to massively abandon unprofitable type of business.

Figure 4: The production of beef of farms in Ukraine

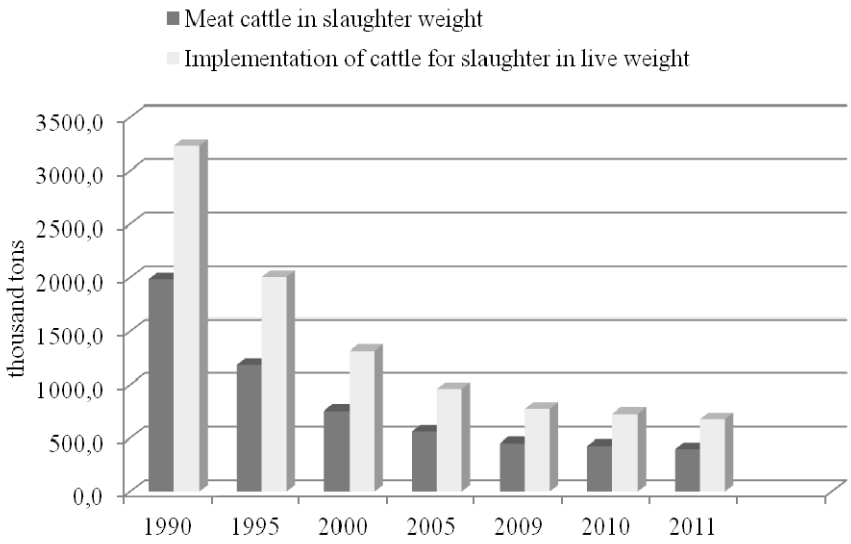


Source: constructed by the author according to the data of the National Statistics Service of Ukraine

In the last ten years, beef production has remained largely a by-product of dairy farming. At the same time, it should be noted that in recent years there have been several attempts to implement projects focused mainly on beef cattle. Among the large holdings continue to breeding of beef cattle following of them: «MHP», «Ukrland Farming», enterprise group «OSI Group». Active development of beef stockbreeding can be identified also at the holdings enterprises such as «Agreyn», «BB Holding», «AgroInvestGroup».

Correlation of sales value for slaughter cattle and of cattle meat production is characterized by disproportion. In 1990, 3,234.6 thousand tonnes of cattle were sold, and 1985.4 thousand tonnes of beef were produced, in 2005 – 961.2 thousand tonnes and 561.8 thousand tonnes, in 2011 – 679.1 thousand tonnes and 399.1 thousand tonnes respectively (Figure 5). The positive changes include reducing disparities.

Figure 5: The relation between realized for slaughter cattle and producing beef and veal production during 1990 to 2011 in Ukraine

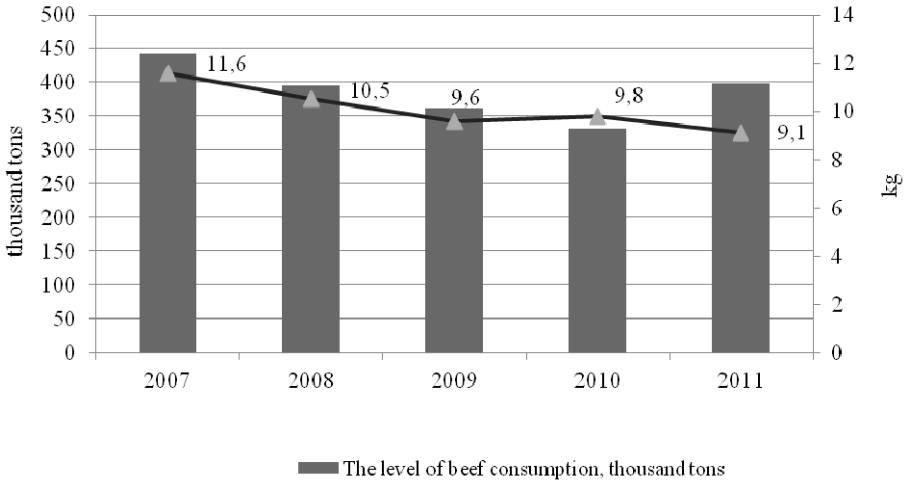


Source: constructed by the author according to the data of the National Statistics Service of Ukraine

The main consumers of the Ukrainian beef are meat factories, exporters, and final consumers. (Key…, p.7) Since cattle breeding is a more durable and a more breeding process in comparison with pig breeding and poultry, the prices for beef are higher than for other types of meat. Unfortunately, the tradition of beef consumption is less developed in comparison with high developed countries, e.g. the European Union and the USA, the population of which have a higher purchasing power. Usually, the Ukrainians choose cheaper meat products.

The Cabinet of Ministers of Ukraine due to resolution № 565 determined that the level of beef consumption might equal 14 kg per capita per year. Due to the data from the Figure 6, during 2007-2011 the Ukrainians have been actually consumed on an average 10.1 kg per capita. The highest figure was 11.6 kg in 2007.

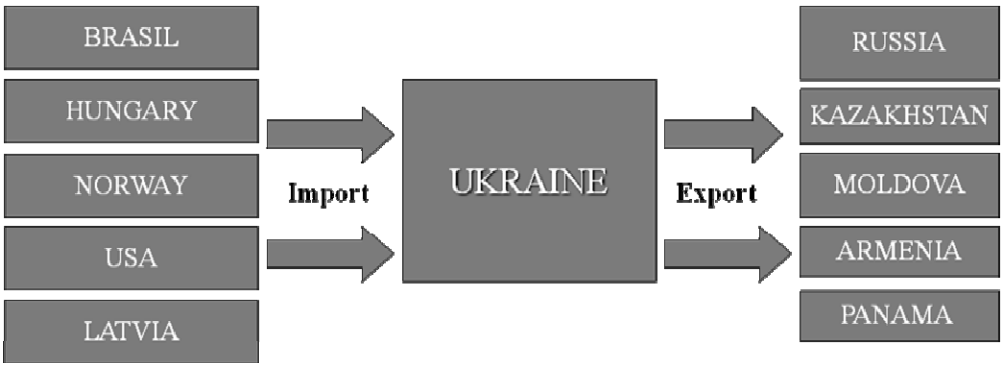
Figure 6: The level of beef consumption in Ukraine



Source: based on the data of the National Statistics Service of Ukraine

Figure 7 shows the main importing countries to Ukraine of cattle meat, and countries that consume beef Ukrainian production. The world prices for beef are significantly higher than prices in the internal market. Due to the FAO data, the world cattle meat markets have the problem of a high feed value, a decrease of cattle meat consumption, a decline of production efficiency. The FAO predicts that in result of this situation the stock-breeding production increases in developing countries.

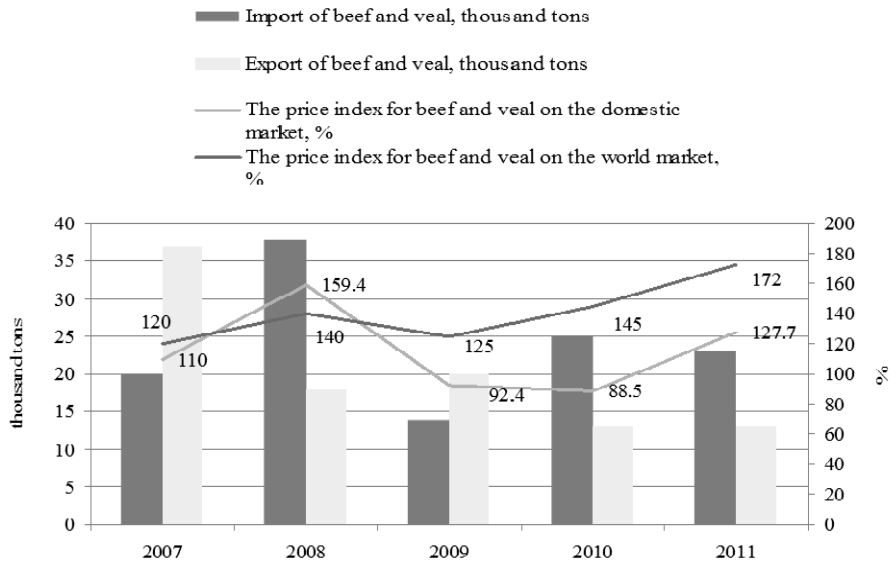
Figure 7: Geographic import-export of cattle meat to/from Ukraine



Source: constructed by the author

The export potential of Ukraine declined after the decrease production of beef and veal. 13 thousand tonnes of beef were exported in 2011 (Figure 8). It is 35% less in comparison with 2007. During the priod between 2007 and 2011 Ukraine imported 120 thousand tonnes of meat cattle, which is 20% higher than the export of this type of cattle meat abroad. The author determines that the national meat factories prefer cheaper imported meat products.

Figure 8: Exports, imports and the price of beef in the domestic and global markets

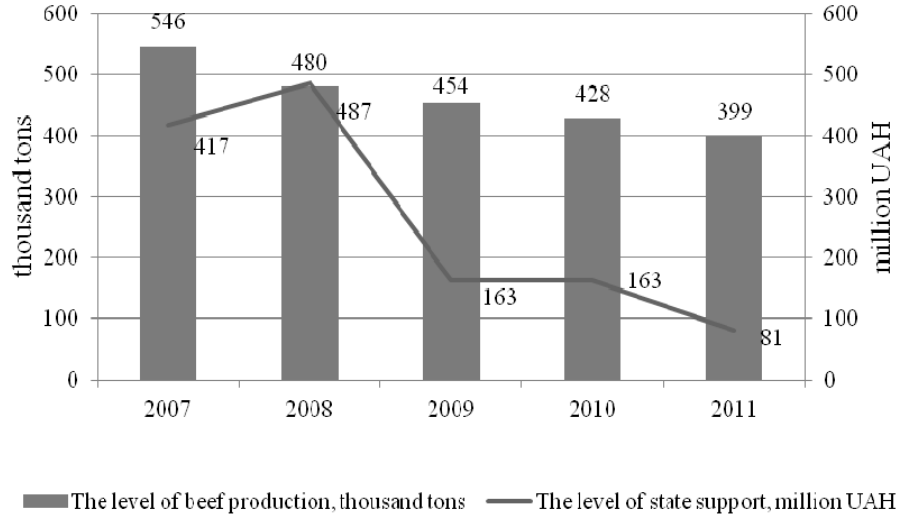


Source: built due to the data of the National Statistics Service of Ukraine and Food and Agricultural Organization of the United Nations (FAO)

Prices for beef on domestic market had the trend to decrease during the analyzed period (Figure 8). A gradual price increase in 2010 and 2011 was caused by a product supply decrease, a price increase for industrial products, consumed in agriculture, and a demand increase for agricultural raw on world markets (Chornorot, 2011).

At such circumstances, a production efficiency in stockbreeding industry largely depends on the governmental supporting activity (Figure 9).

Figure 9: Cattle meat production and the volume of state support for agricultural entities and households in Ukraine



Source: built due to the data of the National Statistics Service of Ukraine

The most important influencing factors of the meat industry development are the subsidies for sapling maintenance and saving, subsidies for product units, government subsidies for product quality, preferential taxation and loaning, minimal prices, duty tariffs for imported and exported products, target programs etc.

One of the most important elements of state regulation of the agricultural sector of economic is the tax system that affects to the amount, location and specialization of agricultural production, the choice of the legal form of business and the level of efficiency of use of available resources. (Mogilny, 2005)

Since 1999 Ukraine has enacted the Law „On Fixed Agricultural Tax" and entered into force amendments №639 of 31.10.1998 in the law „On Value Added Tax".

From the data of Figure 9, we can see that producers depend on the government financial subsidies. Gradual decrease in the meat cattle industry can be noticed after funding decrease.

Characterizing the structure of financial support of a stockbreeding development, it is important to notice the dominance of indirect support through special regimes and taxation mechanisms using direct budget financing (Andriyevskiy, 2008). A significant portion of subsidy resources are received by meet cattle producers due to VAT. During the analyzed period, the share of stockbreeding industry indirect funding due to VAT equals 55% (Table 1).

Indirect government support through VAT is important for agricultural producers. It provides substantial financial assistance to farmers to develop agricultural production, including livestock production. During 2006 to 2011 beef producers received 823 million UAH from VAT that is 53% of the total public funding.

The operating mechanism charging VAT creates a double effect: on the one hand, there is no outflow of proceeds from the sale of the funds allocated to current production needs, on the other - the funds returned as grants and received as refund. (Shyndyruk, 2006)

Becoming a full member of the World trading organization (WTO), Ukraine has begun to reduce indirect funding sources on behalf of direct programs, which do not provide a price support for producers. Between 2007 and 2011 the total volume of meat cattle industry government financial support has been decreasing from 416759.4 thousand UAH to 81107.5 thousand UAH for almost 80%. Among them VAT subsidies have decreased for 70%. The results of analysis show, that, measuring per 1 metric center, in the period from 2007 to 2011 the price for cattle meat has increased by 2.3 times and general costs has been increasing by 1.8 times, governmental support due to budget subsidies and VAT has decreased 8 and 4 times accordingly. During the analyzed period, the volumes of government financial support of the cattle production have been being far behind the growth of prices and general costs for cattle products.

One of the most influencing factors of stockbreeding support is the support of large-scale production by partial refunding of the cost of farms and complexes building (or reconstruction). In 2011, 500 million UAH were directed from the state budget for this purposes. The mechanism of compensational means receiving and using is confirmed by the Resolution of government № 900 on 4 October 2011. Due to this normative document the budget subsidies will be directed to cover 50% (without including VAT) of costs of farms and complexes built (reconstructed) in 2009-2011.

The achievement of objects capacity minimal level is the main requirement to the state support receiving (Maslak, 2012).

Difficulties in the stockbreeding branch have been confirmed by the beef production at a loss between 2007 and 2011. Due to subsidies, meat producers could compensate their expenses for average 10.5% during the analyzed period.

Table 1. The production effectiveness and the volumes of beef state support in Ukraine

Indexes	Years				
	2007	2008	2009	2010	2011
The amount sold cattle products, thousand tonnes	148,6	222,1	200,6	191,9	170,7
Total value of 1 quintal, UAH	883,5	1101,4	1236,9	1397,2	1590,5
The average retailing price of 1 quintal, UAH	516,4	835,5	830,6	896,1	1196,7
Income (loss) for 1 quintal, UAH	-367,2	-265,8	-406,2	-501,2	-394,1
The state support:					
- from budget support, million UAH	237,9	238,3	78,9	47,4	33,9
for 1 quintal, UAH	160,1	107,3	39,3	24,7	19,9
- from VAT, million UAH	178,9	248,2	83,8	115,7	47,2
for 1 quintal, UAH	120,4	111,8	41,8	60,3	27,7
The level of profitability (unprofitability) without support, %	-41,6	-24,1	-32,9	-35,9	-24,8
The level of profitability (unprofitability) with support, %	-23,6	-4,2	-26,3	-29,8	-21,7
The nominal protection coefficient for producer (NPCp)	1,21	1,33	0,98	0,91	0,89
The producer support equivalent (PSE),%	8,20	17,96	-2,88	-8,11	-7,82
The nominal assistance coefficient for producer (NACp)	1,2	1,27	1,00	1,00	1,00

Source: calculated due to the data of the National Statistics Service of Ukraine

According to an international practice, the efficiency of domestic support of agriculture products is measured by the comparison of domestic and world prices for produced goods. The approach, mentioned above, is based on the principle of differences elimination for prices on domestic and world markets due to abolition of governmental intervention (Dibrova, 2007).

Table 1 contains the measurement of the most common indexes, used in Organization for Economic Co-operation and Development (OECD) member countries. They are the followed: nominal protection coefficient for producer (NPCp), producer support equivalent (PSE) and nominal assistance coefficient for producer (NACp). NACp is used to determine the amount of profits of Ukrainian producers in world prices without a state support. The calculation of NACp confirms the previous consequences. During 2009-2011 the meaning has been being equal one. This means that the beef producers have been receiving profits fully from the market.

According to the data Table 1, by increasing the amount of state support managed somewhat to increase the effectiveness of production of cattle. However, beef

production in Ukraine is unprofitable. The analysis shows that there are significant regional differences in the amount of state support livestock production in agricultural enterprises.

After grouping farms by the largest state support per 1 hundredweight of beef obtained the following results are given in Table 2.

According to the data Table 2, the following conclusions can be drawn. Most meat cattle were sold by farms, which fell into the group „> 60". It is in this group with the lowest level of received government subsidies of all types per 1 hundredweight of beef observed the lowest cost and profit of production. Interestingly, the agricultural enterprises of Kharkov and Transcarpathian regions got into the group „151>„ because they received 163.6 UAH per 1 hundredweight and 212.1 UAH per 1 hundredweight of beef respectively, therefore had the greatest loss ratio -60.8%.

Table 2. Grouping of farms by size of state support per 1 hundredweight of beef, 2011

State support per 1 hundredweight, UAH	Number of regions in group	Number of farms in group	Subsidies, per 1 hundred weight, UAH	Including:		Sales volumes, thousand hundredweight	Cost of 1 hundredweight, UAH	The average selling price of 1 hundred-weight, UAH	Profit (loss) is based on 1 hundredweight, UAH	Loss ratio,%
				supports from VAT, UAH	budgetary subsidies, UAH					
> 60	17	31574	33,4	16,9	16,0	1220,0	1601,0	1199,3	-40,1	-24,4
61-150	6	8368	103,0	56,7	46,3	409,0	1608,8	1184,0	-39,5	-25,7
151>	2	2653	187,9	128,5	59,4	78,0	1683,8	1098,8	-60,8	-34,7
Total	25	42595	47,5	27,7	19,9	1707,0	1590,9	1196,7	-39,4	-24,8

Source: calculated due to the data of the National Statistics Service of Ukraine

It can be concluded that the largest share of subsidies goes to big products producers. Subsidies paid to the cost of production, which has two components - the price and volume of sales, the commodity producer hardly is able to influence to the first one, so the second component remains, and that is stimulated an increase in sales due to both its own production and purchase products from the public population

followed by submission to the processing companies to obtain grants. On the other hand, the amount of subsidies depends largely on the business of processing plants. It affects the tax liability and the tax credit on it. For example, the acquisition of main funds by processing plants, now virtually eliminates agricultural commodity producers subsidies. (Borodina, 2008)

The budget subsidy is provided for:

- Agricultural enterprises – for grown and sold, including through commodity exchanges and auctions for slaughter and processing for entities that have their own (rented) processing power or slaughtered and processed in their own (rented) processing workshops – of young cattle, pigs (for except for sows and boars) and domestic poultry (broiler chickens, ducks, geese, turkeys);
- individuals – for grown and sold, including through commodity exchanges and auctions for slaughter and processing for entities that have their own (rented) processing power, young cattle, pigs (except for sows and boars).

To provide fiscal subsidies for locally grown and sold cattle is determined by the following minimum of adopted live weight of young cattle: for farms - 390 kg and for individuals – 330 kg. Young cattle at the time of retirement at the processing plant must be identified and duly registered.(Resolution…, 2009)

There are different opinions of scholars and experts about amounts and procedures of addressing to direct budget support for the development of agricultural production, including livestock. The current mechanism is based on a quantitative approach to the problem. Often in scientific papers can be found criticism of this subsidy by virtue of its inefficiency and irrationality. However, in our opinion, given the present economic situation in which livestock is developing, it is necessary not only to maintain this mechanism, but also increase the amount of funding.

From 1 July 2012 was enacted the Law of Ukraine „On peculiarities of agricultural products insurance with state support", which provides granting to agricultural producers funds from the state budget in the form of subsidies for the payment of insurance premiums (premiums) accrued under the insurance contract. This law will promote the development of the insurance market in agricultural production and allow producers to reduce insurance costs for agricultural products. Also since 2000 was provided partial compensation of interest rates for loans of commercial banks and the implementation of the lease payments. The size of credit rates, that is compensated, the maximum size for the involved loans, and also procedure the compensation of lease payments are determined by the Resolution of Cabinet of Ministers of Ukraine „On approval of the procedure of using of funds allocated in the state budget for the financial support of entities agriculture through the mechanism of reduction of loans and compensation of lease payments from 11.08.2010.

Pricing Regulations as the direction of state support of producing of domestic agricultural products was made possible by the Law of Ukraine „On State Support of Agriculture" (2004). It gave an opportunity for the application of minimum purchase prices of livestock products. However, the possibility of forming of pricing policies for products of the agricultural sector of economic after WTO accession is limited commitments undertaken by Ukraine in joining the community, and the provisions of the multilateral agreements of WTO members. To complete the process of accession to

the WTO were made corresponding changes in national legislation on price regulation. The Law of Ukraine „On Amending the Law of Ukraine" On State Support of Agriculture of the country № 401-V of 30.11.2006 were repealed provisions on the application of minimum purchase prices to import. (Kobuta, 2010)

To create the organizational and economic conditions of integrated rural development and to improve the social level of the rural population – especially, increasing its employment and income – the definition of priority directions of development of the agricultural sector should be used; in modern terms to guarantee food security and to ensure the conditions for competitive development of agricultural sector. These comply with the WTO decision number 1158 of 19 September 2007 of Cabinet of Ministers of Ukraine approved the „Comprehensive Program of developing of Ukrainian village to 2015." For Livestock development were outlined the following objectives:

- Stop reducing cattle herds by improving mechanisms for budgetary subsidies;
- To provide a gradual increase in the number of high producing dairy cows in farms and bring it to 1.7-1.9 million head by its own reproduction and organization of purchasing of repair heifers outside Ukraine;
- ensure the growth of meat production through the development of beef stockbreeding, poultry and pigs in farms and large farms;
- Encourage the development of beef stockbreeding at favourable for its development regions of the country;
- Promote the development of competitive industries by supporting the formation of mechanized livestock farms and facilities, staffed by highly productive livestock and provided with adequate feeding grounds;
- To create a modern state system of selection of breeding livestock and poultry;
- To create conditions for better support of farmers, especially subsistence farms, by breeding young stock;
- Promote the concentration of livestock production in private farms by forming cooperatives to produce by them the high-quality raw materials and safety for human health animal products, expanding procurement of infrastructure, increase commercialization of livestock production by 1.5 times;
- Promote the development of feed industry on a cooperative basis and the creation of pasture;
- Expand the network of training operators livestock various fields, enhance skills and improve the mechanism of certification of specialists and workers in the sector. (Decision…, 2007)

As we can see in the figures above, since 2007-2008, managed to stop reducing livestock numbers therefore it can be considered as the first success in this project.

Given the crisis in domestic stockbreeding due to a decrease in volume of production of its products and the number of animals in farms of all types of ownership, the need for the developing of industry to meet the food needs of the country and its competitiveness in the domestic and foreign markets, research institutions of the National Academy of Agricultural countries have developed National Science project „Recovered stockbreeding". Duration of the project is provided to 2015, which is providing the ways and mechanisms to increase cattle

herds, its performance of livestock production with the corresponding organizational, economic, technological, technical and regulatory support. It is based on the basic principles of „State program of development of Ukrainian village to 2015."

Conclusions

Stock-breeding food producers provide a food safety of a state, provide other branches of an economy with raw materials, and are one of the population social level criteria. Unfortunately, during the last 20 years the meat stock-breeding of Ukraine has been in difficult situation. The cattle branch suffered serious quantitative and qualitative losses. Simultaneously, positions of Ukraine in the world market became weaker and the export potential decreased.

In such a situation in the field of stockbreeding, livestock production efficiency is largely dependent on government support mechanisms. It is clear that government support can provide the stockbreeding sector with anti-crisis-oriented direction, to achieve sustainable development in the conditions of market economy, improve its efficiency and competitiveness in the global market. State support should be put in the centre of the whole system of measures for breeding of cattle production from the critical condition as it will give quick returns, would solve the food problem, and most importantly – will be the locomotive that drives the other sectors of the economy.

The showed calculations of the production effectiveness figures and of the beef producers' internal support determine that there is a need to correct the state program and to search new decisions for the cattle development policy in Ukraine.

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Olga Markó

2.2. ANALYSIS OF THE HUNGARIAN MUSTARD SEED SECTOR

Summary
Nowadays the mustard seed production represents only 3000-4000 hectares in the total agricultural area in Hungary. The crop area of mustard seed has been decreased continuously in for the past 10 years, and this tendency are not going to change in the future. The Hungarian mustard seed production has both organizational and economic problems, which may worsen the problems and the hard situation of this sector. In my researches, I demonstrated and analyzed the market connections of the mustard seed producing sector, the differences in the bargaining power of the market players and I make suggestions to solve the organizational problems of the mustard seed production. I made economic calculations on the mustard seed production data, to determine the cost and income data of mustard seed production in Hungary, per hectare. The development and improvement of market connections is quite necessary in the mustard seed sector. On the base of the results of my calculations, I make proposals for the renewal of the mustard seed production and sales market, which may improve the domestic market situation and the willingness of the mustard seed producers.

Keywords: mustard seed, agricultural production, mustard seed market, input-yield relations

Introduction

Nowadays, the sustainability is among the most important questions all over the world. The threats of the environmental pollution have been taken into consideration not only by the producers and customers, but also by the EU policymakers. Both the Europe 2020 strategy and the new Common Agricultural policy highlighted the importance of the production of safe and good quality products in such way which minimize the harmful environmental effects and preserve or improve the present state of our environment. (Törő-Dunay, 2011)

The concept of sustainable plant production technologies emerged in the early 1990s in Hungary, simultaneously with the structural changes of the Hungarian agriculture. (Szakál and Illés, 1993) The new small-scale farm structure, the establishing of family farms has contributed to the introduction and the spread of the use of sustainable (traditional) technologies. (Illés and Podmaniczky, 1999) The sustainability became more important with the EU accession, and its importance is increasing at the present, and this process will be continued in the future.

Although mustard seed production has never been among the most significant plants of agricultural production, but it was considered as an important tool of sustainable production because of its role in rotation cycle and its positive effects on technology, plant protection and soil structure.

In the 1980s, Hungary produced the mustard seed in the largest area in Europe and globally it was the second largest exporter country in after Canada. The crop area of

mustard seed production in Hungary decreased continuously in the last years, which resulted a significant decline of the sowing area. In the 1990ies the cropping area of the mustard seed was nearly 35 000 hectares and Hungary's mustard seed export represented 10% share in the world market. Mustard seed, therefore, could be considered as one of the most important field crops in Hungary. In contrast with the former success, the average cropping area of 2010 and 2011 has decreased to only 4500 hectares, which justify the need for examination of the sector and the exploration of the reasons of this significant decrease.

The place of Hungary in the rank of the world's mustard seed production is shown in Table 1. The largest mustard seed producer of the world is India, but the statistical data of the country – as well as in Pakistan and Bangladesh – are related not only to mustard seed, but also rapeseed, therefore the database for these three countries cannot be evaluated officially.

According to the estimations of the Canadian Special Crops Association the production of India was 2,5 million tonnes while Pakistan and Bangladesh together produced 150 thousand tonnes in 2001. In the Asian countries, mustard seed is produced mainly for oil production. (Bi-Weekly Bulletin, 2001)

Apart from these countries, the world's mustard seed production is very concentrated. More than the half of the world production is represented by Canada and Nepal; the next most important producers are Ukraine and Mianmar. The production data between 2008 and 2012 are summarized in Table 1.

Table 1: The world's mustard seed production between 2008 and 2012 (1000 tonnes)

Country	2008	2009	2010	2011	2012
Canada	161	208	187	125	130
Nepal	134	135	149	139	139
Ukraine	39	118	64	50	56
Mianmar	66	70	58	61	63
Russia	29	24	36	31	24
Czech Republic	23	39	16	21	22
China	17	18	18	17	17
USA	19	22	19	8	14
Hungary	**8**	**10**	**7**	**7**	**7**
Romania	8	11	7	6	7
France	4	10	9	5	6
Germany	6	7	7	7	7
Etiophia	3	3	3	3	3
Bhutan	4	2	2	3	3
Slovakia	3	4	1	2	2
Other countries	3	4	4	4	4
Total	**527**	**685**	**587**	**489**	**504**

Source: own compilation from data of STAT Communication Ltd. Canada http://www.statpub.com/statpot.html

The yields of mustard seed in most of the producer countries is between 500-800 kg per hectare. In some countries, the average yield is nearly 2000 kg per hectare. According to the data of STAT Communication Ltd., the highest average yields (illustrated with grey shadow) were measured in France, Germany and the USA, which countries have relatively lower production area. In the past 5 years, the average mustard seed production is between 750-800 kg per hectare, thus, the Hungarian yield level may be considered as average. From the six leading producer countries Russia is the only which has lower yields (between 450 and 550 kg per hectare, while in the others the average is between 700 and 900 kg per hectare. The average yields of mustard seed in the most important producer countries are summarized in Table 2.

Table 2: The average yields of mustard seed in the main mustard producing countries between 2008 and 2012 (kg per hectare)

Country	2008	2009	2010	2011	2012
Canada	829	980	962	979	895
Nepal	745	747	750	744	745
Ukraine	708	681	605	614	625
Mianmar	721	700	580	691	687
Russia	566	466	478	535	463
Czech Republic	887	925	581	775	777
China	725	766	765	757	754
USA	582	1 074	929	800	805
Hungary	**940**	**763**	**808**	**813**	**807**
Romania	851	629	764	685	684
France	1 842	1 979	1 809	1 800	1 844
Germany	999	1 141	1 031	1 015	1 015
Etiophia	666	583	638	596	609
Bhutan	633	772	760	674	659
Slovakia	760	674	394	607	613

Source: own compilation from data of STAT Communication Ltd. Canada http://www.statpub.com/statpot.html

The Hungarian mustard seed market has both organizational and economic problems. In order to determine the organizational problems and to find solutions to improve the situation, the first step was to explore the market connections and the bargaining power of the market players. From economic aspects, it is quite necessary to examine the cost and income values of the sector and also the different technologies in use.

Material and methods

For determining the bargaining power of the players of the mustard seed market I made a survey and also performed depth interviews by the most important stakeholders of the mustard seed sector, focusing at the producers and the buyers in particular. I

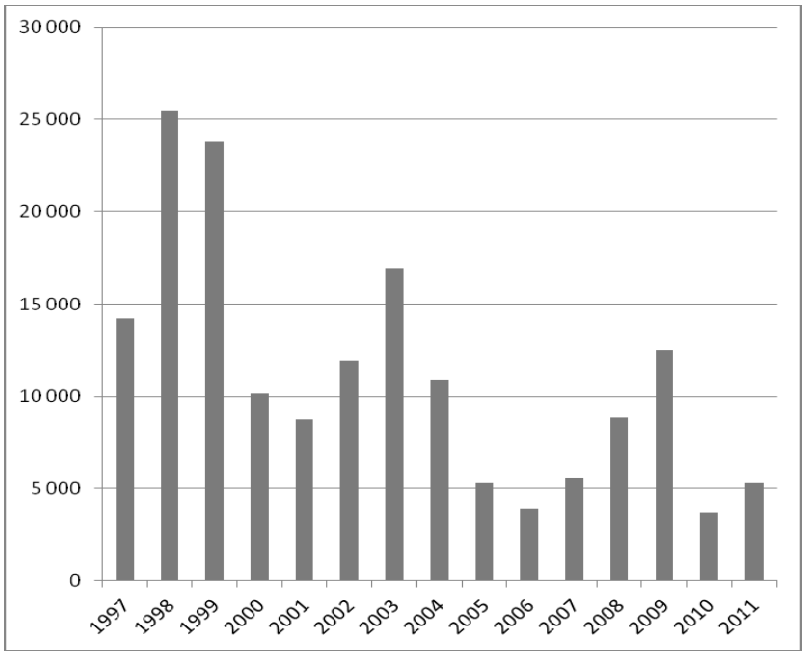
applied Porter's five forces model for the analysis. The cost and income conditions of the mustard seed sector were analysed on the database of 2009, which was made available by the Hungarian Research Institute of Agricultural Economics (AKI). For analysing the Hungarian mustard seed production data I used the data of the Hungarian Central Statistical Office (KSH) and – as primary data – I used the results of my survey that was carried out among Hungarian mustard seed producers.

Analysis of the mustard seed market in Hungary

Mustard seeds can come from three different plants: yellow mustard (Sinapis alba), brown mustard (Brassica juncea), and black mustard (Brassica nigra), which are used for different purposes. Yellow and brown mustard are used for producing mustard cream, mustard powder and whole mustard grains, while black mustard is used for the flavouring of other vegetable oils. (Bi-Weekly Bulletin, 2007)

In Hungary only yellow mustard is produced, the sown area was nearly 35 000 hectares in the 1990s (Eöry and Nagy, 1996) which has been decreased to 3000-5000 hectares by now.

Figure 1: The total harvested area of mustard seed in Hungary (hectares)



Source: based on KSH announcement

The reasons of the decrease of sowing area of mustard seed are very complex and are linked to each other.

I started my analysis with the assessment of market connections, namely, I determined the bargaining power of the stakeholders of the mustard seed sector, the producers, the traders and the processing industry. Through the market analysis of the mustard seed production, I introduce the evolution process of the market, the different

changes occurred in the past years, and I determine the market connections and the market position of the Hungarian mustard seed producers.

The main objective of the Hungarian mustard seed production primarily is the seed production to be used in as seed for sowing, and in a smaller extent, as a raw material of the processing industry. Mustard seed is produced for export; the producers are in direct connections with the exporter or integrator organizations. The processing of mustard seed is made by only domestic companies, producers' connections are made directly with wholesalers and integrators. The situation is the same in mustard cream and mustard powder production. The only processing company is the UNIVER Ltd., which has developed a direct production system and built connections with the most important suppliers.

The most important buyers in the Hungarian mustard seed and industrial mustard market are the following:

- Integrator - KITE Zrt.
- Wholesale trader companies:
  - Monortrade Agricultural, Producing, Trading and Service Ltd. Co.
  - Lajtamag Agricultural Ltd. Co.
  - Hungaro-farm Trading and Service Ltd. Co.
  - Alisca-Mag Ltd. Co.
  - Kaposmag Seed Producing and Sale Ltd. Co.
  - HHH Ltd. Co.
  - RIT-SAT Agricultural and Trading Ltd. Co.
  - GaRa Ltd. Co.

The processing of the mustard seed may be differentiated as primary and secondary processing; therefore, the companies of the processing industry should be also differentiated in this way. During the primary processing, the mustard seed is processed by wet grinding process into mustard cream, and by dry grinding into mustard powder. In the course of the secondary processing, the mustard cream and mustard powder is used as the raw material of the production of different products, such as mayonnaise, ketchup, dressings, sauces, instant soups, spice mixtures, meat products, chips etc.

The most important mustard cream producers in Hungary are:

- Globus Canning Ltd.
- UNIVER Cooperative Ltd.
- Koch's Torma Ltd. Co.

The most important mustard powder producer in Hungary is:

- Monortrade Agricultural, Producing, Trading and Service Ltd. Co.

The products of the members of the Globus Group (Globus Rt, Csaba Konzervgyár Rt.) are mustard cream, mayonnaise, salad dressings, sauces, seasonings, while the main products of the UNIVER Cooperative Ltd. are mustard cream, mayonnaise, sauces, ketchups and seasonings. The Koch's Torma Ltd. deals with mustard cream and salad dressings, the Aranyfácán Product Ltd. produces ketchup and sauces.

Only one company is operated in mustard powder production in Hungary, namely the Monortrade Ltd. produces mild mustard powder.

The market of spice mixtures and seasonings is consisted of many market players:

- Agropack Ltd. Co.
- M Profood Ltd. Co.
- Házi Piros Paprika Ltd. Co.
- Kalocsai Pirospaprika Ltd.
- Podravka Ltd. Co.
- Solvent Ltd.
- Vitapress Ltd. Co.
- Masterfoods Ltd. Co.
- Kotányi Hungária Ltd. Co.
- Papack Ltd. Co.

The most important players of the instant soup market are:

- Maggi
- Knorr
- Podravka International Ltd. Co.

Two companies (representing 80%) are the most important potato and corn chips producers:

- Chio-Wolf Magyarország Kft.
- Lay's Magyarország Kft.

The meat industry and canning industry also play an important role in the secondary processing of mustard cream and mustard powder.

The most significant companies in the Hungarian sausage and salami production are the following:

- Pick Szeged Ltd. (member of Bonafarm Group)
- Herz Szalámigyár Ltd. (member of Bonafarm Group)
- Délhús Ltd. (member of Bonafarm Group)
- Ringa Ltd.(member of Bonafarm Group)
- Debreceni Meat Ltd. (member of Debreceni Group Meat Producing Ltd.)
- Szole-Meat Ltd. (member of Debreceni Group Meat Producing Ltd)
- Csabahús Ltd. (member of Debreceni Group Meat Producing Ltd)
- Zalahús Ltd.
- Gyulahús Ltd. Co.
- Pápai Hús 1913 Ltd. Co.
- Zimbo Ltd. Co.

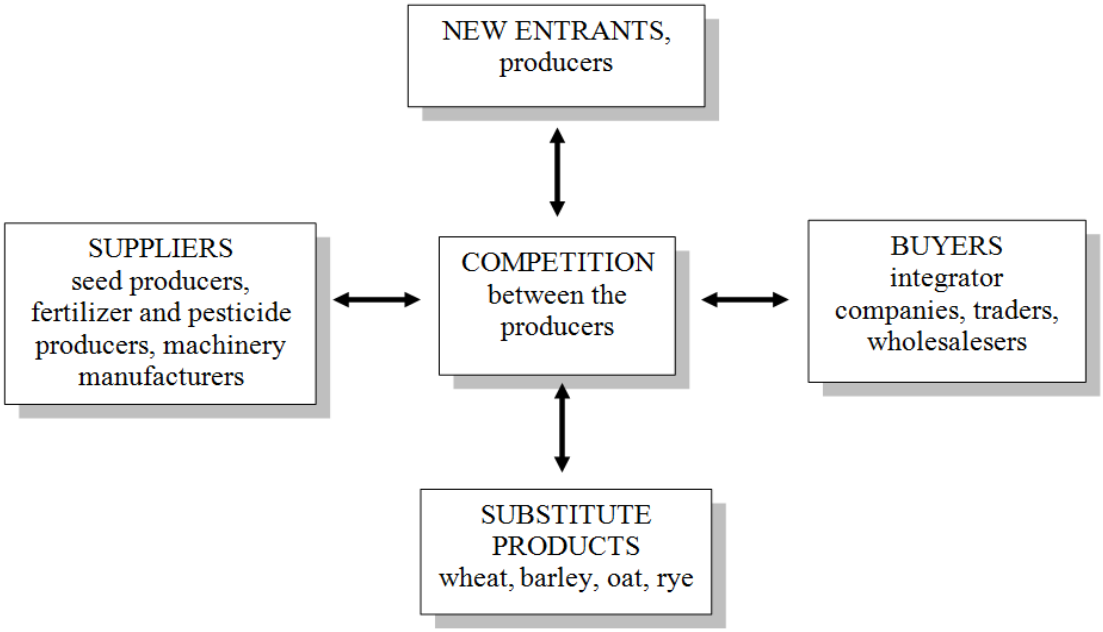
Within the meat industry, the Bonafarm Group has more than 30% market share, therefore this group plays the leading role in the market. The mustard powder is used as seasonings in the meat industry, mainly in sausage and salami production. The most important Hungarian sausage and salami producers are the Pick Szeged Ltd., Herz Szalámigyár Ltd., Ringa Ltd and Csabahús Ltd.

The main players of the canned and pickled vegetable production are the following companies:

- Globus Konzervipari Zrt.
- Csabai Konzervgyár Zrt.
- EKO Kft.
- Nagykőrösi Konzervgyár Zrt.
- REGE Szatmári Konzervgyár Kft.

After collecting the players of the Hungarian mustard seed market, I made an analysis of the market by the five forces model of Michale Porter. The Porter's five forces model of the mustard seed sector is illustrated by Figure 2.

Figure 2: Porter five forces model in the mustard seed sector



Source: own construction

Bargaining power

Analysing the mustard seed market the bargaining power can be summarized as follows:

Suppliers of the mustard seed production are seed producers, fertilizer and pesticide producers and machinery manufacturers. The suppliers market is concentrated and they have well differentiated products, which may increase their bargaining power. Producers have only limited information about their products, which can decrease the bargaining power of the producers. The competition between suppliers groups is represented by mostly the competition of the products; the competition of prices cannot be dominant as a result of the relatively poor financial situation of Hungarian agricultural enterprises.

On the other side of the Porter model, producers have connections with the representatives of buyers; in the mustard sector buyers are represented by the integrator companies, wholesalers and traders. The producers' bargaining power is very low in these relations; they are mostly in price-taking situation, which means they should accept the prices offered by the buyers. When the producer does not accept the price, the contract will not be signed. In some cases, the producers can bargain for a higher price, but this is not a common situation. Prices are strongly determined by the EU market.

The bargaining power between the primary and secondary processing is more complex. The competition in the sector was significantly changed by the transformation that characterizes the retailing sector. The change is manifested in concentration, centralization and internationalization of the stores, which had strong and very quick impacts on the bargaining power of small sized retailers. The intensity of the price competition between the retailer companies is increasing, which affects directly supplier prices. The tendering of the suppliers is a widely accepted method, which is based on the prices, ant the compliance with the quality and food safety requirements. The higher is the quality assurance of the suppliers the higher is their bargaining power.

The bargaining power between the producers and the primary processing companies is based on the fluctuation of the yields and the forced sales due to the financial problems, which is a common and widely known situation in the agricultural sector. Consequently, the bargaining power of the mustard seed producers is very low.

Substitute products

Substitute products of mustard seed production can be divided into two main groups. First is cereal production, which competes for the arable land, as most important natural resource of mustard seed production. Cereal production has more advantages in the present circumstances and price and income situation, further improving the cereals market will increase the competitiveness of the cereal sector. As the mustard seed may be produced even in areas with unfavourable soil conditions, therefore its main competitors are wheat, barley, oat and oilseed rape.

It is recommended to evaluate the complementary products as well, because the increased consumption of these products will cause the increase of those products which raw material is the mustard. Mustard seed is a raw material of different food products, for example mustard, mayonnaise, different sauces and salad dressings. These products are associated products of meat and salad consumption, therefore by increasing of the consumption of these products may bring the increase of the demand for mustard products.

The domestic meat consumption tendencies show an increase of the poultry and fish consumption, while the trends of the red meats are lower than the average trends. Mustard is consumed mainly with beef, pig and game meat, therefore the consumption of mustard products might show similar trends to red meats.

The other field of consumption related to mustard is the salad and pasta meals. The increasing trend of healthy diets will increase the consumption of salads therefore the need for salad dressings, sauces and mayonnaise might increase as well. The pasta with different sauces is not among the healthiest foods, but because of the quick cooking, it is very popular for the consumers. The promotion of healthy eating may increase the use of durum pasta foods, which also may improve the need for the consumption of the abovementioned products.

A smaller proportion of processed mustard is used for the production of seasonings and spice mixtures, which is also related to meat consumption, but it is connected directly to sausage and salami consumption. The consumption trend of sausage and salami products is decreasing, mostly as a result of their high fat, cholesterol and spice

content. Their substitute product might be the different ham products, where the mustard-based seasonings and products will not play an important role.

Whole mustard grains are used in the production of pickles and canned vegetable products, which substitute products may be the different frozen vegetables. Fresh vegetables also may be considered as substitute products, particularly in the summer season.

Different snacks and chips also contain mustard powder as additive materials. The consumption of chips may decrease as a result of the promotion of healthy eating, and they might be substituted by different healthier seeds.

Threat of new entrants

The threat of new entrants are relatively low in the mustard seed sector, the technology and the machinery are the same as in the cereal production, so there is no need for special knowledge or technologies. As mustard can be grown either in less quality soils, therefore good soils can be used for other field crops. The only significant threat of entrants is selling, which may cause many problems for the producers, as it is very hard to get good contracts in appropriate time, because of the unstable prices and the uncertain yields. In case of not fulfilled contracts, the producers must pay penalty. The barriers of the entrance into the mustard seed market are relatively low. However, when according to the market forecasts higher prices may be expected in the next year, more agricultural producers will grow mustard seed. In the other segments of the mustard market, it can be stated that the development process of the market is very slow, and its attractiveness is very low. In the beginning of the 2000s as a result of the EU accession process many European countries entered into this market, but after the economic crises several companies went to bankrupt or were transformed, mostly in the meat processing industry. There were significant changes in the canning industry because of the strict quality, hygienic and food safety requirements. As the industries connected to the mustard market generally may be characterized with low profit rate and slow growth, the threat of the new entrants will not be significant in the future as well.

Market competition

The different tools of market competition may be differentiated as tools of price competition (for example price reduction, different terms of payment or delivery) and tools of non-price competition such as product competition or sales promotions.

The competition between producers is very intensive and it is manifested in price competition. The price competition could be decreased by the concentration of the market, the cooperation of the supply chain and by establishing of long-term supplier contracts and sales contacts. According to the results of my survey the connections between the producers and traders has deteriorated because of the uncertain fulfilment of the contracts. Nowadays the producers hardly enter into contracts in advance, they try to sell their yield after harvesting at an ad hoc basis.

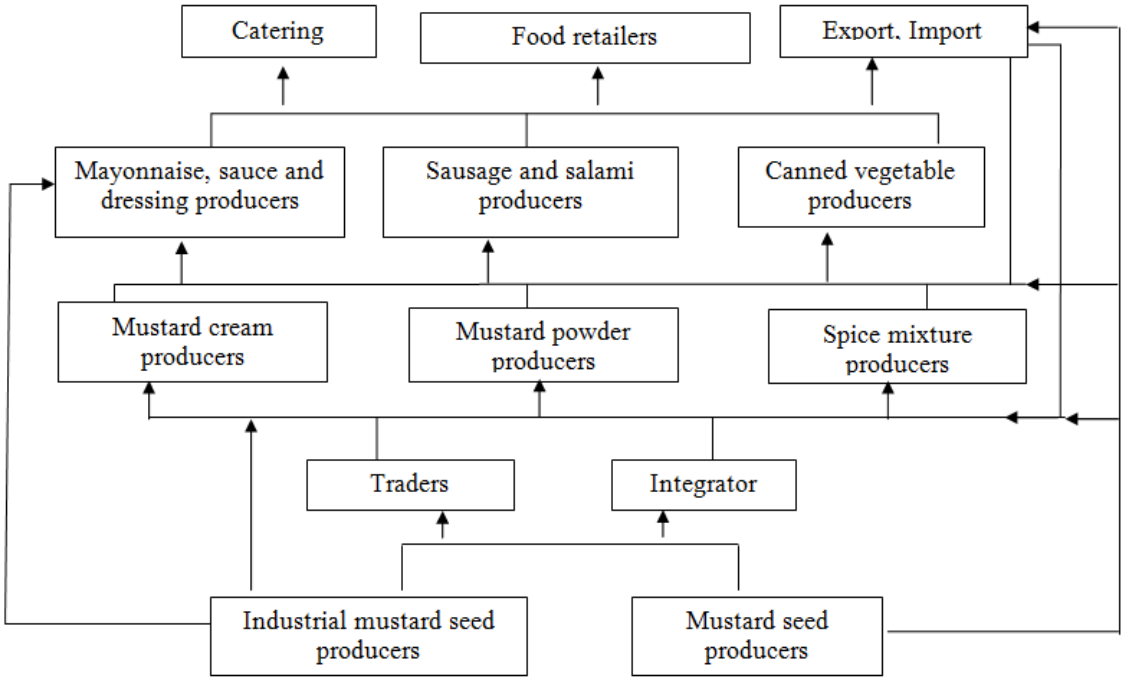
In the production of spice mixtures, seasonings, sausages, salamis, canned vegetables and pickles the price competition is determinant, the importance of product competition is very low. In the market of mustard creams, mayonnaise, sauces,

dressings instant soups and chips the brand and sales promotion have also appeared besides the price competition. In these markets, the strong price competition may be reduced by the coordination the supply chain and by establishing long-term supply and sales relations. By the reduction of the players of the market the market concentration might be increased which could improve the transparency and the coordination of the whole market of the mustard products. At the level of mustard seed production, the improving of information supply would be needed for which the support of the state and the professional organizations is also required.

Distribution channels

Figure 3 summarizes the distribution channels of the mustard seed sector and the complex scheme and the different directions between the different participants.

Figure 3: The distribution channels of mustard seed



Source: own construction

When examining the distribution system of the Hungarian mustard sector, it can be stated that the production is based mostly on mustard seed production, while the production for industrial use it is rather low, it is represented by only a few producers, who produce directly for the mustard processing industry. The mustard powder and mustard cream producers and the processing companies use mostly imported raw materials for mustard production. The greatest share of the produced mustard seed is for export, the producers have direct connections with the integrators and the traders.

The vertical integration is not typical in this sector, particularly in the connection of the producers and the companies working in primary processing. There are special cases for vertical integration, where the enterprise takes part simultaneously in the

primary and the secondary processing when producing mustard cream, mayonnaise and sauce products as well. The backward type integration is represented by those enterprises which produce mustard powder. This situation is similar to the pig sector, where the big slaughter houses and processing companies formerly had own pig farms and plant producing divisions as well (Lehota and Illés, 2001).

The most widely used enterprise forms in the mustard sector are limited companies, joint stock companies and partnership. The cooperative form occurs mostly among the producers.

There are not such organizations in Hungary that may give professional support for the players of the mustard sector. During the survey, none of the respondents mentioned the possibility of taking part in education, or professional trainings. The lack of these services may be one of the reasons of the general lack of information, and the relatively low professional knowledge of the producers. According to the traders, producers make many mistakes during their decisions connected to the production; they use not appropriate technology, which increase the risk of market failures. The Hungarian Seed Association coordinates the mustard seed production, but nowadays the Hungarian mustard seed production has lost its dominancy and the mustard seed for green manure production became more important instead.

Despite its relatively low share in the field crop production, the institutional background of the mustard sector should be built on the example of the cereal sector even by the cooperation of other, less significant crops. (Lehota, 2001)

The informational background of the mustard sector is very poor, the Hungarian Central Statistical Office (HCSO) has only very few data about the mustard sector. For my researches, the HCSO has made available the data for the area of mustard seed production and the yields since 1997 at county level, and there has been information about the foreign trade activities since 2003. The foreign trade data include the amount, the value of exports and imports, according to the countries of destination, but the export data of mustard seed production and industrial mustard seed are aggregated. In the foreign trade statistics, the mustard powder and the mustard cream are also presented together with other product groups. Neither the export-import balance of the products, nor market and yield forecasts are made for the products of the mustard sector.

In order to improve the competitiveness of the Hungarian mustard sector it is essential to establish a supporting institutional background for providing information for the producers and to conduct professional trainings and knowledge sharing possibilities for them. Without these steps and without coordination the Hungarian mustard sector cannot be successful.

During my researches, I also examined the establishment of the most important foreign institutional systems – particularly the operation of the coordination level and the institutions of the Canadian mustard sector – that may be used as “best practice” in the Hungarian circumstances.

Economic analysis of Hungarian mustard seed producing farms

After the exploration of the relationship between the players of the market, I made economic calculations on the mustard seed production data, to determine the cost and income data of mustard seed production in Hungary, per hectare.

At first, I made my calculations on the base of the data of 2009 from the five-year long database, because the number of the Hungarian mustard seed producers was the largest (54 farms) in this year in this five-year period. I calculated the arithmetic average of the cost and total revenue data of the 54 farms; by with I created the data of an "average" Hungarian mustard seed producer farm. The main data of this average farm are summarized in Table 3.

Table 3: Cost and total revenue data of an average mustard seed producer farm

Description	Values for the average farm (HUF/ha)
Total revenue	159 945
Average yield (t/ha)	**0,8**
Price (HUF/t)	**199 932**
Total direct variable costs	53 569
Machinery costs	31 017
Costs of equipment and devices	2 591
Costs of machinery services	11 932
Wages	8 790
Public contribution of wages	2 894
Land lease cost	17 790
General costs	6 935
Depreciation	16 436
Direct governmental support	49 906

Source: own calculations based on the primary data of the Hungarian FADN system (AKI, 2009)

The direct variable costs contain the costs of seed, fertilizers, pesticides as well as the direct marketing, insurance and other variable costs of the farms. Machinery costs include the costs of tractors, transportation vehicles and harvesting machines. Wages represent the salary of the permanent employees, family members working on the farm and the costs of casual labour (which was indicated by only three farms). The total direct support of the farms was 49 906 HUF per hectare in the examined year. The income categories of the average farm and the results of break-even analysis are given by Table 4.

Based on the results of my calculations it can be stated that in case selling of the products at the average price, variable costs can be covered by 0,242 tonnes of yield per hectare. This amount is below the average yield per hectare (which is 0,803 tonnes) and the 561 kilograms difference between the two yields should cover the sum of the indirect variables costs, the fixed costs and the minimum expected profit. The average costs calculated without wage costs is 168 879 HUF per hectare, which means the threshold price of profitability; the average cost calculated by total variable costs is

132 033 HUF per tonne, which determine the threshold price of production. More than 75% of the examined farms could reach the average price of 180 000 HUF/tonne, which exceeds the threshold price of profitability by 11 121 HUF, but in 13% of the farms even the threshold price of production could not be reached.

Table 4: Calculations of income categories and break-even analysis according to the average farm results

Total revenue; HUF/ha	159 945
Direct variable costs; HUF/ha	48 402
Gross margin; HUF/ha (for direct variable costs)	**111 544**
Average yield; t/ha	0,8
Cost of production; HUF/t (for direct variable costs)	**60 503**
Break-even point; t/ha(for direct variable costs**)**	**0,242**
Total costs without wages; HUF/ha	135 103
Average costs; HUF/t (without wages)	**168 879**
Total variable costs; HUF/ha	105 626
Average costs; HUF/t (for total variable costs)	**132 033**
Break-even point (yield); t/ha (for total variable costs)	**0,528**
Total costs; HUF/ha	146 787
Net income; HUF/ha	**13 159**
Break-even point; t/ha (Total revenues=Total costs)	**0,734**
Direct governmental subsidies; HUF/ha	49 906
Net income with subsidies; HUF/ha	**63 065**
Break-even point with subsidies; t/ha (Total revenues=Total costs)	**0,56**

Source: own calculations based on the data of Table 3

The break-even, calculated for the total revenues and costs, excluding subsidies is only 66 kg under the yield of the average producer farm. What is a high risk in case of minimal decreasing yield, the farm is producing immediately losses.

100 per cent of the farms receive direct payments, which average value is 49 906 HUF/hectare, by which value the net income and the yield level of the break-even point shows a significant increase. The difference between the yield amounts that covers total costs (break-even points with and without subsidies) is 174 kg, which means that the value of the support can compensate a 24% yield loss.

In accordance with the abovementioned, I made calculations for the remaining four years, which results are summarized in Table 5.

Table 5: Cost and total revenue data of the average mustard seed producer farms between 2007-2011 (HUF/ha)

Description	2007	2008	2009	2010	2011
Total revenue	67 983	174 777	159 945	94 869	162 166
Average yield (t/ha)	**0,63**	**1**	**0,8**	**0,65**	**0,98**
Price (HUF/t)	**107 910**	**174 777**	**199 932**	**145 953**	**165 475**
Total direct variable costs	29 486	46 428	48 402	33 551	43 982
Machinery costs	22 838	23 677	31 017	30 044	30 270
Costs of equipment and devices	1 997	2 400	2 591	406	2 323
Costs of machinery service	8 340	15 907	11 932	4 788	6 383
Wages	6 810	6 154	8 790	8 729	10 443
Public contribution of wages	2 899	2 250	2 894	2 616	3 124
Land lease cost	7 026	15 199	17 790	14 876	15 833
General costs	4 300	6 766	6 935	4 569	5 868
Direct governmental support	40 384	44 903	49 906	60 293	66 014

Source: own calculations based on the primary data of the Hungarian FADN system (AKI, 2007-2011)

In the examined 5-year period, a significant fluctuation of the yields, price and machinery costs may be observed. The fluctuation of the yields may be resulted partly by the adverse weather conditions, but it is also caused by using the not appropriate technology. The hectic changes of the prices are influenced by external factors such as the international market conditions, particularly the Canadian yields and market prices.

The average price of land rent has doubled between 2007 and 2008, and since then it has been relatively stable. According to the data, it can be stated that 65% of the mustard seed producing farms rent the total area that is used for mustard seed production.

The direct support has increased continuously, by 65% between the initial year of the examined period (2007) until 2011. This increase has induced a very positive change in the mustard production in Hungary, because – as it was mentioned in the previous calculations – it has a strong compensating effect against yield decrease.

The costs, the income categories and the results of break-even analysis, which were calculated from the basic data of the 5-year period, are summarized in Table 6.

The amount of the break-even point with subsidies was between 0,51 and 0,61 tonnes per hectare in the examined period, which quantity is very close to the average yields (between 0,63 and 1,00 tonne per hectare). The net income calculated without the support has produced losses for the average farm in 2007 and 2011, which implies that the increase of the subsidies can be a very positive external impact for the mustard seed sector and it represents a compensation function against the yield losses. The agricultural subsidies and payments generally play a significant role in the whole agricultural sector of Hungary and strongly determine the competitiveness of the different sized farms and different types of farming (see Illés et al., 2012; Dunay and Illés, 2013).

Table 6: Calculations of income categories and break-even analysis according to the average farm results between 2007-2011

Category	2007	2008	2009	2010	2011
Average yield (t/ha)	**0,63**	**1**	**0,8**	**0,65**	**0,98**
Break-even point ; t/ha (for direct variable costs)	0,27	0,26	0,24	0,23	0,26
Break-even point; t/ha (Total revenues=Total costs)	0,92	0,76	0,73	0,83	0,81
Break-even point with subsidies; t/ha (Total revenues=Total costs)	0,58	0,61	0,56	0,51	0,58
Price (HUF/t)	**107 910**	**174 777**	**199 932**	**145 953**	**165 475**
Average costs; HUF/t (without wages)	112 325	155 778	168 879	136 716	150 516
Average costs; HUF/t (for total variable costs)	114 873	96 816	132 033	123 283	98 495
Net income	**-31 586**	41 751	13 159	**-25 849**	28 186
Net income with subsidies (HUF/ha)	8 798	86 654	63 065	34 444	94 200

Source: own calculations based on the data of Table 5.

In order to explore the relations between the factors which may influence the average yields, I examined the farm level data of 2009 (i.e. that year, when the greatest number of farmers could be observed in the mustard sector in the examined period).

The farms were ranked according to their average yields into quartile groups, then I determined the average of all farms and the average yields of the lower and upper quartile groups (lower 25% and upper 25%). I also calculated the average value of other important data of the farms related to the mustard production, both for the lower and upper quartile groups and the average of the total farms. The results of my calculations are summarized by Table 7.

Table 7: The production data of the lower and upper quartile groups of the farms, ranked according to the average yields

2009	Average of lower 25%	Average	Average of upper 25%
Average yield (kg/ha)	**383**	**800**	**1340**
Income (HUF/ha)	11 176	58 131	116 989
Total revenue (HUF/ha)	68 170	154 303	246 741
AK (land value unit)	21	22	27
Seed costs (HUF/ha)	6 389	8 453	9 242
Fertilizer costs (HUF/ha)	10 087	20 700	32 243
Pesticide costs (HUF/ha)	12 258	16 646	22 287
Machinery costs (HUF/ha)	30 459	31 017	26 140
Total costs (HUF/ha)	113 850	149 780	182 852
Nitrogen (kg/ha)	25	57	80

Source: own calculations based on the primary data of the Hungarian FADN system

According to the data of Table 7, it may be observed that the farmers in the lower 25% group could reach only 383 kg yield per hectare, while the average yield of the

upper 25% was 1340 kg per hectares. Although no relation could be detected between the correlation coefficients, it may be clearly observed from the calculations that the farms in the upper quartile group had better quality of soils (with higher AK units) and they has higher seed, fertilizer and pesticide costs, and higher nitrogen doses then in the farms of the lower quartile groups. The higher land value units and the higher nitrogen doses may justify that despite the mustard is known as an undemanding plant species, it will benefit the better soils and the reasonable nutrient doses. Higher seed prices may be resulted by using sealed seeds, while the higher fertilizer and pesticide costs proves that that the higher costs are needed to reach the higher yields.

Conclusion

The analysis of the connections between the shareholders of mustard seed production showed that producers have not strong bargaining power opposed either to the suppliers or to the buyers, as a result of their poor financial conditions the Hungarian mustard seed producers should be considered as market players with price-taking attitudes.

The economical analyses show that the profit per hectare without any subsidies is very low, so in case of a minimal variation in yield the production of mustard seed is already unprofitable. The break-even point calculated with subsidies has changed slightly (between 0,5 and 0,6 tonnes per hectare), while its level without subsidies has increased significantly and could not reach – or just slightly has exceeded – the yearly average yield. It means that the supports play an extremely important role in the profitability of the mustard seed-producing sector.

After the overall examination of the factors influencing the yields, it can be stated that by using the appropriate quality and quantity of inputs (sealed seeds, fertilizers, pesticides etc.) not the production costs but also the yield level will be higher, which will result the increasing profitability and the competitiveness of the Hungarian mustard seed sector.

Most of the farmers have left the mustard seed market due to the unfavourable market circumstances and the low profit level, which is convinced by the continuously decreasing harvested area. The market circumstances could be optimized through establishing a farmer association, which would contribute to better market conditions and increasing sales opportunities. To reach higher profitability per hectare the farmers need to increase the yield per hectare what is achievable through improving the production technology and increasing the attention towards to mustard seed.

The proposed changes would result an increasing willingness to invest in mustard seed what would be manifested in the growth of the production area.

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Vitaliy Radko

2.3. MAIN TRENDS AND WAYS OF MILK MARKET DEVELOPMENT IN UKRAINE

Summary
In agricultural sphere of Ukraine, there are many problems in the organizational and economic conditions providing for its effective development. It concerns completely the milk production. Formerly the average level of milk consumption has been about 60% of the scientifically recommended amount. The decrease may be explained by limited buying ability of consumers, the decreased volume of milk production, low raw milk quality etc. The economic efficiency of milk production is very low, therefore agricultural producers are not interested in milk production and it is not attractive for investors. The efficiency is affected by the low level of organization and technological process. The old machinery used for the milking, feeding and stock keeping cannot provide the productivity level of modern requirements. Due to this, the competitiveness of Ukrainian dairy sector is decreasing. The need for modernization of the production process has become a very actual problem under the financial crisis. This situation requires innovative methods of development and efforts of the integration of producers, processing, service companies and other participants of dairy sector.

Keywords: market, milk, production, efficiency, price, profitability

Introduction

Development of national economy depends on the situation in agriculture. In this sphere, the production of animal husbandry products is of great importance. The shortage of financial resources, old machinery, out-of-date capacity, the immigraion of skilled labour and some other reasons have negative influence on the production efficiency. Another problem at the market of agricultural products is quality and safety. Old production technologies, high rates for bank loans make difficult the development and modernization of production processes. As a result, the profitability of many agricultural producers and their competitive ability have decreased. Such situation is similar for Ukrainian milk market.

Problems of efficient agriculture development, quality and safety of agricultural production, its competitive ability are researched in the works of many scientists including Berezivsky, Ilchuk, Kvasha, Sabluk, Shpychak and Svynous. These problems are still actual therefore it became one of the main reasons to choose the subject for the research.

Material and methods

The main aim of this research is to determine the main trends in milk production and to summarize the prospects of stable formation of milk demand in Ukraine.

To solve the task of the research such methods were used: economic and mathematic – to take account of the milk production economic efficiency indexes, an analysis and comparison – for economic estimation of main trends at the milk market, a graphic approach – for presentation some data that influence of supply formation.

Main information base of the article were the materials of Ministry of Agricultural Policy of Ukraine, State Service of Statistics, International Farm Comparison Network, the agricultural companies and the researches of different scientists.

Results and discussion

Important branch of agricultural production is the dairy cattle breeding, which provides consumers by a valuable and irreplaceable food product, which is necessary for maintenance of vital functions and which is characterized by a high food value and irreplaceable component matters. However, today this branch is in a very difficult situation. The gross production volume, the quantity of population of dairy herds, the productivity of cows and the quality of raw milk are at low level. In addition, the level of production substantially depends on the season that also influences the general situation. As a result, processing enterprises are not able to load own production capacities without interruption and to produce the prepared products at high quality and in a competitive way. The use of insufficient technical equipment by the agricultural producers and the out-of-date technologies of processing enterprises increase the costs substantially. In the conditions of the limited purchasing power, the increase of production prices will result a situation, when considerable part of consumers is helpless to satisfy the physiology requirements in dairies and the required level of consumption of milk will decrease. It is inevitable to provide the necessary terms of effective production of milk and to develop certain measures on the improvement of situation in this branch.

Parhomets (2005) suggests that the market of dairy products has specific features which most show up at complete correlation of demand and supply on concrete milk products. Thus, in a certain market situation these features become the dominant factors of mechanism pricing, which substantially influence on forming of demand, suggestion and cost of products. Such factors which determine the features of market of milk products are time, quality, assortment and place of delivery to the products to the consumer. Milk product market is a constituent of food, which unites the sphere of production of milk in the different forms of menage, the industries of purveyance of raw material, the processing and making of milk products and finally, the sphere of realization and consumption. Thus, the market of milk and milk products functions as a computer-integrated subsystem which has the following features: unity of purpose, close productive-technological copulas, organizationally-economic mutual relations, sent to the improvement of social terms of population (Parhomets, 2005, p. 50).

In the past years an unstable situation of milk market has developed. The number of livestock decreased that has resulted a decrease of milk production volume. Although cow productivity has increased but the indices of its increase were less than the indexes of number of cows decrease and it makes negative influence on production volume.

At the same time, decrease of production concentration according to a number of indices was observed. The major milk volume was produced at individual farms, which were unable to meet the requirements according to European quality standards due to the low level of mechanization and automation of technological processes.

Milk prices have reached the level of European countries but profitability of production remains unstable. In my opinion, it could be explained by the considerable increase of production costs. One of the most important reasons of low economic efficiency is low level of intensification and outcome per cow and one hectare of land.

Low quality of raw milk sold for processing does not allow many dairy plants to produce finished products that could be exported to world markets. It considerably decreases competitive ability of domestic milk branch that affects its economic efficiency.

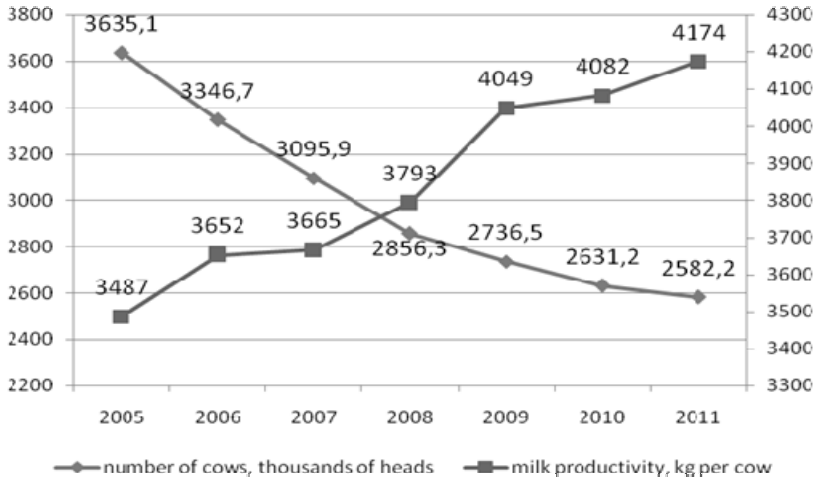
The following trends could be observed in milk and dairy market development:

- Low economic efficiency of milk production,
- Decrease of milk production volume,
- Small concentration of production,
- Large milk volume is produced by individual rural farms,
- Low raw milk quality,
- Low milk consumption level due to limited consumers' buying ability,
- Milk prices have reached the level of many EU countries,
- Low competitive ability of domestic milk branch.

Famous Ukrainian scientist, Berezivsky, states that modern scientific researches of production organization improvement are the necessary basement of economic efficiency increase (Berezivsky, 1998, p.8).

According to the data of the State Service of Statistics of Ukraine the number of cows decreased more than 1 million heads or 28,9% during 2005-2011 (Figure 1). Cow productivity increased from 3 487 kg in 2005 to 4 174 kg in 2011or on 19,7%. It is significant to note that cow productivity in private sector is 15-20% higher than at agricultural enterprises.

Figure 1.Number of cows and milk productivity in Ukraine



Source: Own research

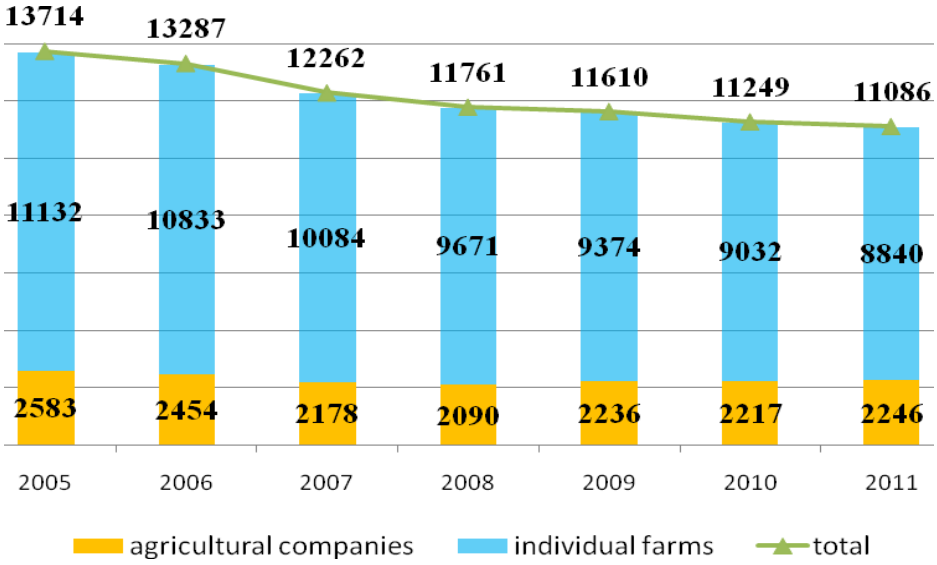
In my opinion, it could be explained by the fact that individual farms pay more attention to animal welfare and it affects the level of milk yield. Despite the milk yield increase, an average level of cow productivity in Ukraine is much less than in EU countries.

Some scientists affirm that the level of cow productivity is very low and it cannot guarantee economic efficiency of milk production (Musyka et al., 2010, p.17).

The above mentioned trends leaded to the reduction of total volume of production by almost 2,6 mln tonnes or 19,2% between 2005-2011 (Figure 2).

The rate of decrease in private sector is almost equal. The share of individual farms in the structure of total milk production was 80% while agricultural companies represented 20% in 2011.

Figure 2: Milk production, thousands tonnes



Source: Own research

The concentration in milk production is decreasing. In 2011, 22% of companies had 10 cows and 33% of them had between 10 and 100. It is very difficult to use modern technologies of milk production and milking in such situation. 28% of companies produced up to 2000 kg of milk per a cow and only 7% only produced above 6000 kg as many farmers in EU countries. It is very difficult to cover the production costs with a milk yield about 3000 kg. 44% of companies produced up to 300 kg of milk per day. Processing enterprises are not interested in such producers that affect their milk purchasing price.

Decrease of milk production concentration has negative influence on its economic efficiency and it may decrease interest and motivation of producers to keep cows and produce milk. One of the most important reasons is resources shortage for the development and modernization of dairy business.

Scientists state that production development is not a fast and simple process. According to the specific peculiarities of milk production organization, we can suppose that it will take a long period (Sabluk and Boyko, 2005, p.67).

One of the main problems for processing enterprises there is a low quality of raw milk. As Kravtsiv (2001) marked, one of the most frequent violations, which results in the reducing of quality of milk, is mixing of the cooled milk of evening yield and fresh morning yields. Even at the least of microorganisms in the cooled and fresh milk after their mixing there is a stormy height of microflora, and for short time milk loses the sanitary and hygenic internals as a result of high bacterial colonization, that is why and estimated as low-grade. At mixing of parties of milk, different on a size and cooling degree, quality of the mixed milk goes down the quicker, than anymore is party of the cooled milk. It is explained that intensive development of microflora of the cooled part of milk, the temperature of which rises at mixing, is, that and gives an impulse for the rapid increase of amount of microorganisms. Mixing of milk does not influence on a common colonization only then, when a difference in the temperature of parties of milk, which mixed up, did not exceed 2°C. It is necessary to be taken into account in practical activity of dairy farms, as a failure to observe of him takes work of all collective on it is not. Shelf-life of milk on farms to transporting to milk processing enterprises at a temperature 4°C not must exceed 24 hours, at a temperature 6°C it is 18 hours, but at a temperature 8°C it is only 12 hours (Kravtsiv et al., 2001).

Low quality of raw milk is also very important problem of milk market function. In 2011, 43,7% of agricultural companies that produced milk could provide a milk raw of high quality, 52,9% was first quality, 3,3% was second quality and 0,1% was unsorted milk.

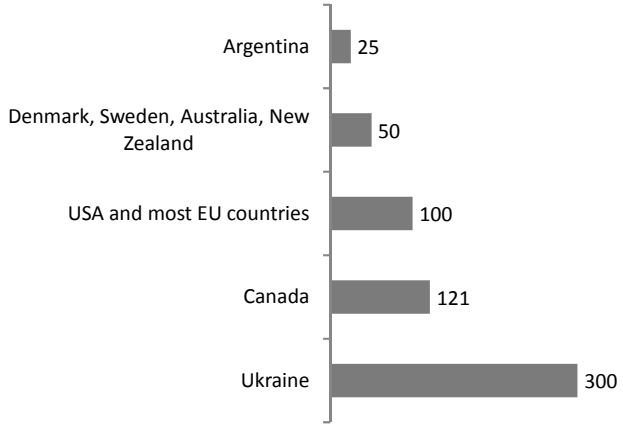
It should be noted that milk of sort „extra" realized in 2011 only by the agricultural enterprises of seven regions. More than average index in Ukraine (5,6%) realized four regions, namely: Sumy, Kherson, Kharkiv and Kyiv. Sumy region had the best index (16,2%).The agricultural enterprises of 21 regions realized milk of top grade. Anymore more thanaverage index on Ukraine (32,9%) realized six regions: Dnipropetrovsk, Mykolaiv, Vinnytsya, Kyiv, Poltava and Kharkiv. Milk of the first quality was realized less than in the middle of Ukraine (57,7%) by agricultural enterprises of 17 regions. At the same time from the agricultural enterprises of Kirovohrad, Chernivtsi, Rivne, Odesa, Volhynia and Khmelnytsk regions acted on processing almost of 100% (from 99,8 to 92,5%) milk of chop.The large enough percent of milk of the second sort was realized by the enterprises of Zhytomyr (20 thousand tonne, or 37,8%), Kherson (9,2 thousand tonne, or 22,7%) and Ivano-Frankivsk (2,3 thousand tonne, or 16,2%) regions. Low-grade milk (7,7 thousand tonne) acted on processing enterprises from agricultural enterprises 20 regions, most - from Kyiv (1,4 thousand tonne, or 0,7%), Vinnytsya (1,2 thousand tonne, or 0,7%), Ternopil (1 thousand tonne, or 1,6%).

At the same time there is a big difference between requirements of high quality milk in Ukrainian and European standards. They are approximately the same according to somatic cells (maximum level about 400000 cells per ml) and completely different according to bacterial cells.

A large number of somatic cells reduce economic efficiency a stated by researchers (Milk and milk processing industry: Ukraine, 2007, p.126-127). So producer's efforts have to be focused at their decrease and thus milk quality increase. It allows to increase price level for raw milk.

According to Ukrainian standards, milk with the quality of cells up to 300000 cells per ml is of high quality, 500000 – the first quality and 3 mln – the second quality. In world's leading milk producer countries the requirements are much higher. In most EU countries and the USA the level of the researched index is up to 100000, in Australia, New Zealand, Denmark and Sweden – up to 50000 and Argentina – up to 25000 cells per ml (Figure 3). So farmers in such countries would not be able to sell the milk for processing companies with Ukrainian quality level (see Figure 3.).

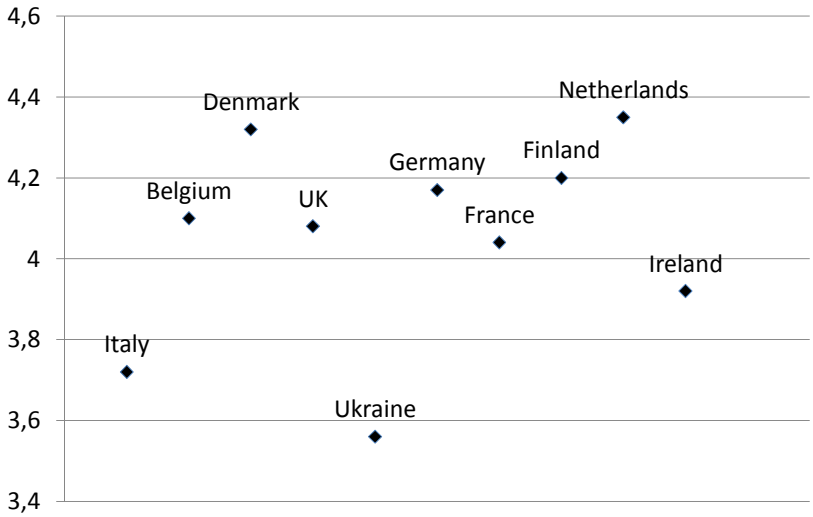
Figure 3: Quality standards, thousands bacterial cells per ml



Source: Own construction

Next problem is average milk fat rate. In 2011 In Ukraine it was 3,56% that is much less than in most EU countries where the researched index reached 4,3% (Figure 4). Similar situation is with protein in milk. Its rate in Ukraine is much less than in EU countries.

Figure 4: Average milk fat rate, %



Source: Own research

However upgrading not necessarily means the increasing of economic efficiency. With the increasing of additional costs on a production, in particular improvement of quality, the economic effect will grows. Economic efficiency grows only to the certain moment, when maximal recoupment of costs is provided. Since economic efficiency from additional costs begins to diminish, the personal interest goes down in further development of production. Thus, the necessity of determination of optimal additional charges appears on development of production, including improvement of quality of raw material.

Our suppositions are confirmed by developments of academician, Shpychak, which marks that „upgrading of products of concrete commodity producer is justified only in the case when receipts from realization of high-quality products will be higher comparatively with charges on her production" (Shpychak et al., 2000, p. 74). Investments in the improvement of quality are expedient only to that moment, when the rates of increase of realization price exceed the rates of increase of production cost.

Zubets and other scientists assert that composition and properties of milk depend on many factors among which forage and terms of maintenance have a major value. High yields and the best quality are predefined by a feed balancing, rational use of set of present in an economy forage and their preparation. Combination is in the ration of dairy cows of albumens, grew fat, carbohydrates, mineral matters, vitamins and other component parts it must be optimal and provide normal metabolism in an organism. On composition and properties of milk such factors influence yet and, as a breed and age of animal, her the physiology state, stage of lactation, disease on mastitis and other illnesses and others like that (Zubets et al., 2004, p. 530).

On information of Larry Chase, professor of animal breeding of Cornell University (USA), which was promulgated at International conference the „Milk rivers", that took place in Travneve village Dnipropetrovsk region (Ukraine) on the base of agro company „Agro-Soyuz", the determinative of quality of milk is a genotype of animals, her breed, intensity of plant-breeding process in a number of generations. Genetics predetermines 50% of variability amount of protein and fat, namely these indexes and influence on a purchase price on milk (Kudravtseva, 2007, p. 131).

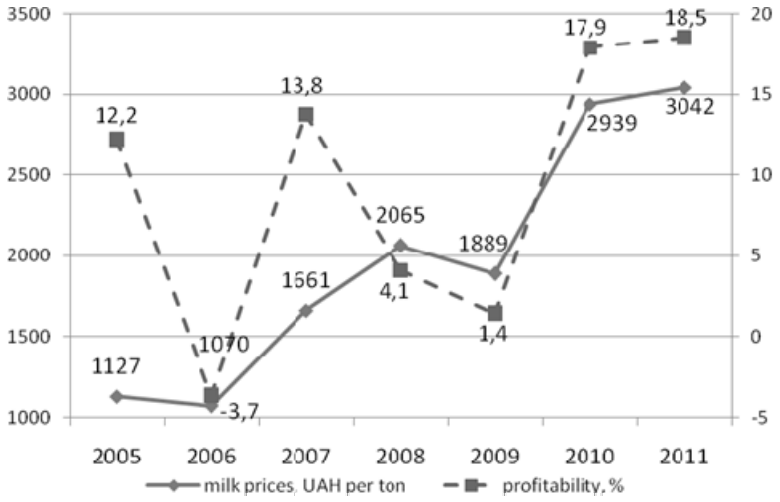
As the Russian scientists Ryadchykov, Podvorok and Potyehin assert, in an order to achieve cow, it is necessary correctly to organize feeding of animal. For the calculation of necessity of cows in nutritives apply a factorial method and such basic indexes: nutrient energy of food value of forage, requirement of cows in exchange energy, on a life-support, milk producing and pregnancy (Ryadchykov et al., 2007, p. 31-33).

During 2005-2011 average purchasing milk prices increased by 2,7 times and reached 3042 UAH per tonne in 2010 (Figure 5). In 2011, this trend continued and the prices have reached 4000 UAH per tonne in some regions. So the prices reached EU level and we cannot say that low level of milk production efficiency could be explained by low prices.

Although prices are increasing incessantly, milk profitability is changing from year to year. It means that there are factors that influence the profitability. The main ones are: fuel costs, livestock feeding, machinery for milking and fodder production and storage, etc.

As a result, in 2011, 62,3% of milk producers were profitable and 37,7% could not cover the production costs. The average level of production costs that allowed getting a profit was about 2265 UAH per tonne.

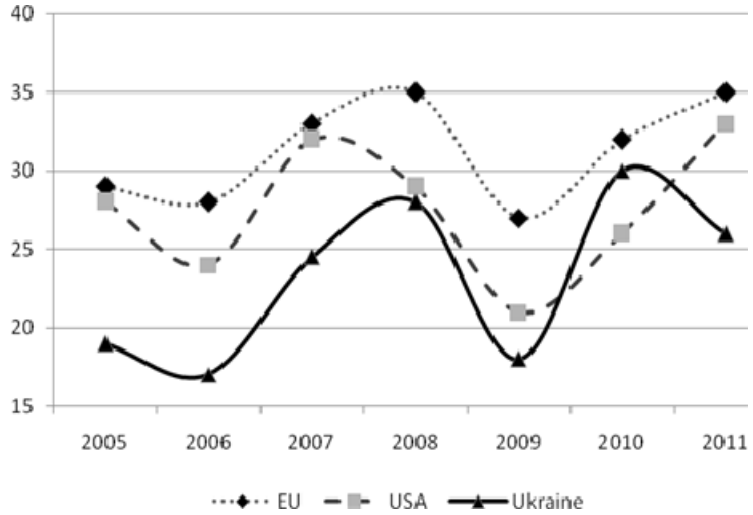
Figure 5: Milk prices, UAH per tonne



Source: Own research

As a result, milk prices almost attained the level of the leading countries of world market of milk. If during 2005-2007 a price on milk in Ukraine was below, than in the countries of European Union and USA, then in 2008-2010 they were almost the same as the level of the USA, and in 2010 even exceeded it (Figure 6). According to my opinion, to promote purchase prices on milk will not be the effective measure of providing of profitability of agricultural commodity producers. As it will become important pre-condition of increase of cost of the prepared products and negatively will influence on a competitiveness in the world market.

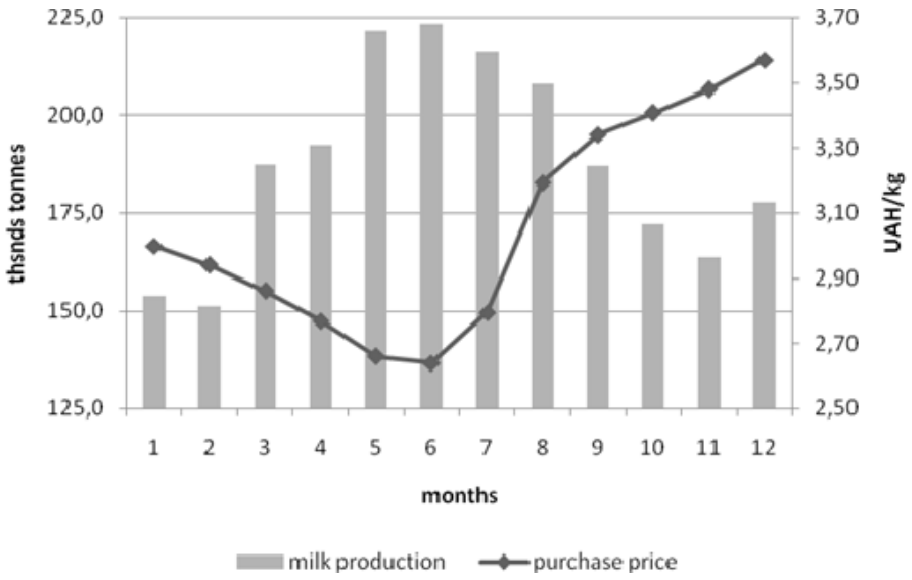
Figure 6: The purchase price for raw milk, Euro / kg*



**According to (1)* *Source*: Own research

On efficiency of production of milk substantially infuses into seasonality of agricultural production, and also seasonality of supply of raw milk-material to processing and purveying organizations. In a summer-pasture period, the level of production of milk considerably increases by comparison to a winter period (Figure 7). As a result of considerable volume of suggestion, and also of short duration shelf-life of dairy products realization prices will go down. In winter, there is a reverse situation: the level of production diminishes, and the consumption of products increases almost on 20%, that is why prices grow to 40%. Therefore, such phenomenon as seasonality substantially influences on the processes of pricing on milk, economic efficiency of branch and market of dairy products development.

Figure 7: Monthly dynamics of milk production and purchase milk prices



Source: Own research

Important reason of such sharp vibrations can be miscalculations in the system of organization of production. Through the shortage of facilities and possibilities for effective development, most of agricultural enterprises plans mass calving of cows on a spring-summer period, when upkeep of cattle and his feeding costs diminish due to the use of summer grounds and green mass. It allows producers partly to settle a situation with the necessity of resources, but negatively influences on the level of price on dairy raw material. Profitability of the dairy cattle breeding diminishes hereupon. Thus, by the decision of problems by such method commodity producers sharpen a yet more problem in branch.

An important factor, which influences on the volume of demand on milk is purchasing power of population. The income level of considerable part of population of Ukraine is at low level that results in insolvency to purchase necessary foods.

The conducted analysis showed that the level of production in Ukraine during 2005-2011 had exceeded the level of consumption of milk (Table 1). The level of self-sufficiency hesitated within the limits of 117-129%. Thus, to the 30% volume of milk

exported to other countries, that, certainly, is a positive tendency which promotes economic efficiency of production of milk substantially. A consumption at the level of 52-60% from a scientifically reasonable level testifies to the necessity of the increase of internal market of milk. It will allow heaving up the culture of consumption of dairies, and also will help in the decision of question of food safety of country. In 2011 every citizen consumed 147,5 kg on the average less thana scientifically reasonable level. For providing of internal demand at existent norms, it is necessary to produce additionally about 7 million tonnes of milk at the unchanging volumes of export and import of dairy products.

Table 1: Production and consumption of dairy products in Ukraine

Index	Year						
	2005	**2006**	**2007**	**2008**	**2009**	**2010**	**2011**
Production of dairy products per capita, kg	291,1	284,0	263,6	254,3	252,1	245,2	242,5
Consumption of dairy products per capita, kg	225,6	234,7	224,6	213,8	212,4	206,4	204,9
The level of self-sufficiency by domestic production, %	129,0	121,0	117,4	118,9	118,7	118,8	118,4
The level of self-sufficiency scientifically reasonable level of of dairy products consumption, %*	57,8	60,2	57,6	54,8	54,5	52,9	52,5

**According to the data of Kiev Research Institute of Food Hygiene of Dairy Products a scientifically reasonable level of dairy products consumption is 390 kg per capita.*
Source: Own research

Most regions of our state produce milk more than their habitants consume. After attitude of consumption of milk toward his production of regions of Ukraine it is possible to divide into 3 groups:

1. Regions which do not provide the internal demand are Autonomous Republic of Crimea, Dnipropetrovsk, Donetsk, Kyiv and Kharkiv.
2. Regions which provide own demand with a possible insignificant export - Zakarpattia, Zaporizhzhya, Luhansk, Odesa.
3. Regions which provide internal demand and export the considerable volume of milk - Vinnytsya, Volhynia, Zhytomyr, Ivano-Frankivsk, Kirovohrad, Lviv, Mykolaiv, Poltava, Rivne, Sumy, Ternopil, Kherson, Khmelnytsk, Tcherkasy, Chernivtsi and Chernihiv

Economic efficiency of milk product subcomplex depends on the results of economic activity of commodity producers, processing enterprises and sphere of realization of the prepared products. Unfortunately, now there was a situation, when commodity producers (almost 40%) do not even cover an expense on the production of products, and processing and trade enterprises get considerable incomes. Such situation is not normal, as interest is lost to the production of raw material. The level of production of milk diminishes, the work-load of processing powers, which brings an increase over of realization price to the increase of prime price of processing of milk, diminishes as a result. It in turn yet more substantial diminishes demand on milk in the conditions of the limited purchasing power. Reduction of

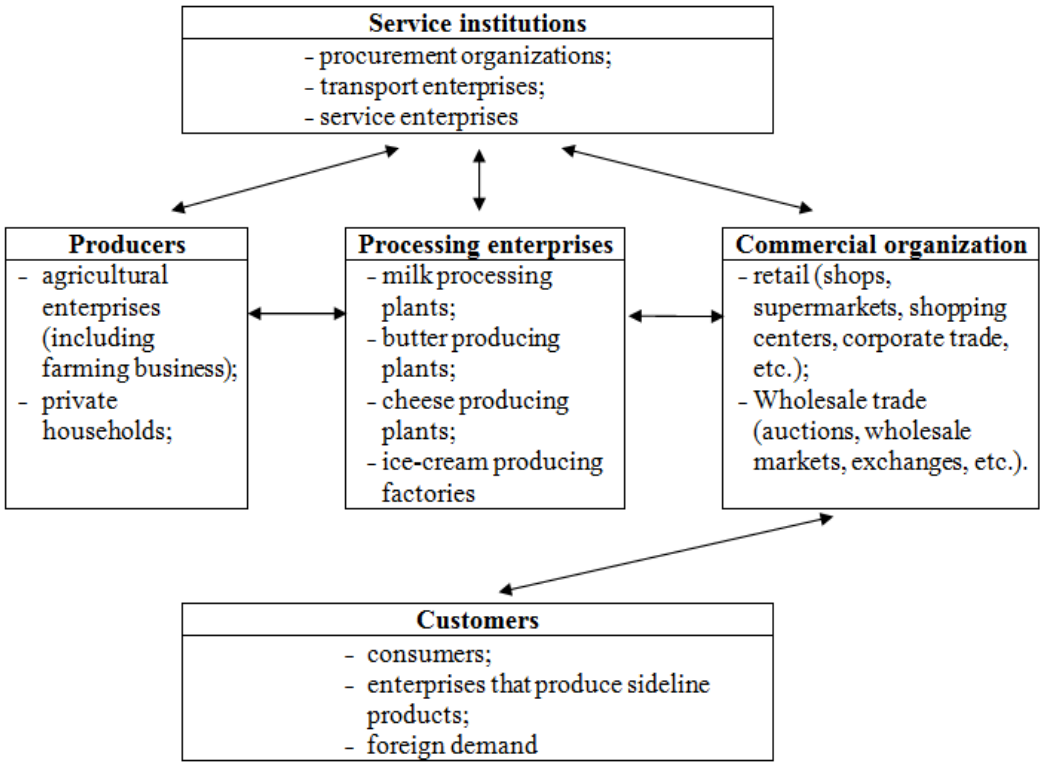
volumes of realization of milk on processing results in diminishing of volumes of cash receipts to the commodity producers and income in this branch.

The important condition of increase of economic efficiency is the development of economic mutual relations of production with processing. Practice testifies that powerful processing enterprises render a various help to the producers: supply of the improved and new equipment for the roughing-out of milk, providing, financing of the field works necessary expensiv materials (filter and washing facilities) etc. Such help foresees returning of payment through supplying with dairy raw material. Thus, developing a fruitful collaboration with producers, processing enterprises form the source of raw materials for loading of own production capacities.

Creation of integration agroindustrial associations will allow substantially promoting efficiency of production of milk. As in such associations combination of interests of all participants of market of milk registers: the assured sale is put right, the level of loading of production capacities rises, transport-purveying charges diminish, the greater assortment of the prepared dairy products is produced.

As a result, consumers get competitive products the cost of this may be answered by their purchasing power. The level of consumption and realization of the prepared products rise and provide economic efficiency of all enterprises of dairy branch. Integration intercommunications can arise up between different enterprises on all stages of passing of mine-out raw material on processing and to end-user in end-point (Figure 8).

Figure 8: The scheme of economic relationship between key participants of milk market



Source: Own construction

I agree with the statement of Levchenko that the problem of increasing the economic efficiency can be decided only in the case of creation of powerful stock-raising complexes and intensive production of milk on industrial basis. It confirms a world tendency is the annual diminishing of amount of small farms (Levchenko, 2006, p. 4). Processing enterprises are simply forced to buy in milk in a private sector through diminishing of his production volumes in agricultural enterprises.

By the evolutional way of development of the dairy cattle breeding and increase of him economic efficiency there is adjusting of mutually beneficial connections between agricultural enterprises and private farms by peasant farms which produce milk. It is thus necessary to foresee enlargement of private production and its reorganization in the domestic farms of farmer type.

Organizational unit of combining efforts of private commodity producers can be creation of milk cooperative stores on the base of agricultural enterprises. Activity of such economic structures will enable to promote efficiency of forming of suggestion at the market of milk and to promote economic efficiency of the dairy cattle breeding the same. Such idea is supported by Andryushenko (2006), which specifies that one of important directions of development of agricultural production there is activation of co-operative motion in rural area.

In a Table 2, comparative description over the activity of farms is brought at the individual and co-operative production of milk.

Table 2: The comparative characteristics of businesses under individual and cooperative milk production

Type of services	Individual farming	Family farm business that operates under cooperation
Resource attracting	Under market conditions	Formation of bigger volume
Sales of production	Unstable with lower prises	Organized, guaranteed, by contractual obligations and relatively higher prices
Use of financial resources	Remains on the farm entirely	According to engage in the production and sales
Management	Provided by owner	Use of hired labour
Risk share	Owner has unlimited liability	The responsibility is shared among the participants

Source: Own research

Due to co-operation and increase of level of the concentration of individual farms have possibilities for the receipt of additional economic values. To one of the most essential it is possible to take bringing in of productive resources on more subzero prices due to the greater volume of purchase, production distribution after comparatively by higher prices through forming of wholesale parties, distribution of risk et cetera.

Azizov suggests that co-operation which executes two functions, economic and social, is the important mean of realization of economic interests and social defense of her participants. An economic function consists in that on the basis of combining effort of collective or individual commodity producers the real terms are created for the

considerable increase of efficiency of the use of productive resources, all production the results of which belong to only his participants, and they can by them boss only. Co-operation, providing legal and economic independence of every commodity producer, enables to promote the concentration of production to the optimal sizes on separate him the technological stages. The social function of co-operation is sent to defense the interests of peasants. In the conditions of market economy, competitive activity of commodity producers for production distribution acquires sharp character. Therefore, co-operation becomes the effective enough mean of defense of shallow peasant commodity producers from large monopolistic associations, which aim to extend and control through monopolization of markets of sale of sphere of influence on a production. An extraordinarily important value is acquired by co-operation in creation of social infrastructure on a village, alteration of social terms of life of peasants. In co-operation, the commodity producers find the social protecting from influence of the tax system, realization of public and commercial credit policy (Azizov et al., 2001, p. 227)

The important purpose of cooperative store can be providing of additional profits for his participants due to the increase of purchase price as a result of roughing-out of dairy raw material (cooling). Basic activity will be sent to the association of the personal peasant farms of population, purchase in them milk and him roughing-out. Auxiliary activity will be formed due to providing of artificial insemination and veterinary service, consultative services, organization of transporting etc.

Basic economic performance indicators of service cooperative in the dairy cattle breeding are represented in a Table 3.

Table 3: Main indexes of economic activity in the service dairy farming cooperative

Index	Variant		
	1	2	3
The number of dairy cows in the cooperative, heads	100	200	300
The volume of milk bought from producers, kg/day	1200	2400	3600
Annual gross income results, thousand UAH	1533,0	3066,0	4599,0
Annual economic results, thousand UAH	525,6	1051,2	1576,8

Source: Own research

Calculations were conducted under different scenarios which differed in the quantity of milking cows in a cooperative store from 100 to 300 and accordingly by the volume of the provided milk - from 1200 to 3600 kg in a day. A calculation purchase price on dairy raw material in the personal peasant farms folds - 2,3 hrn./ kg, realization prise for processing enterprises - 3,5 hrn./kg

In end-point from functioning of cooperative a calculation economic result will fold from 262,8 a thousand hrn. to the almost 1,6 million hrn. depending on the volume of the provided milk.

Hubskyy asserts that farmer co-operation (from lat. *cooperatio* is a collaboration) with the purpose of agricultural production of most development distribution purchased

in the end of 19th to beginning of the 20th century as an alternative to the private monopolized system of processing industry. This was a practical step to her demonopolization. In most countries co-operation has a multilevel branch structure within the framework of which an agricultural produce passes a way from a farm to the wholesale and retail network of trade, where the prepared foodstuffs will be realized. On the basis of such structure, there is principle of horizontal and vertical concentration of co-operative business (Hubskyy, 1998, p. 12-13).

I support opinion of Parhomets, which states, that in milk business of EU countries a tendency to the increase of concentration of production in processing enterprises shows up. For example, to such stores-giants, as „MD Foods" in Denmark, „Sodiaal" in France, „Milk Marque" in Great Britain, „Arla" in Sweden repressing part of market of milk and dairies belongs in their countries. The large concentration of milk business enables to the cooperative stores to use the most modern technologies of processing, pursue a flexible commodity policy, get access to the international markets, combine milk business with a material and technical supply and other important services, to weaken negative influence of seasonal vibrations in the production of milk (Parhomets, 2003, p. 64).

Sabluk and some other scientists assert that at an international level there are two base determinations of co-operative societies. The first determination is offered by International Co-operative Alliance, the second is by International Organization of Labour. Both will not obligate the co-operators of different countries to apply exactly these determinations: they only carry out the role of recommendations and reference-points in preparation of projects of co-operative laws.

According to the first determination, a cooperative store is an independent association of persons with the purpose of satisfaction of the social and economic necessities and aspirations through an enterprise which is common property and controlled democratically. As a rule, such determination is complemented by the list of international principles of co-operation. However, many countries are inclined to use determination of International Organization of Labour and accede approximately to such definition: a cooperative store is an association of persons, which voluntarily teamed up with the purpose of satisfaction of general necessities by formation of the democratically controlled enterprise and did equivalent payments in the capital of the society and consented to divide a risk and benefit from activity in which they participate (Parhomets, 2005, p. 14).

So efficient milk production development could be reached by optimal use of resources (material resources, labour and finance) and modern methods of production organization (management, control, animal breeding, feeding, veterinary and hygiene). It enables to increase milk yield and improve the quality of milk raw. It will help to decrease the unit production cost and increase purchasing price. It will result in the increase of milk production efficiency and the provision of a competitive ability of Ukrainian dairy products at a world market.

Conclusion

Ukrainian milk production has very comfortable future prospects. There are some negative trends in milk branch but according to my opinion, they will change due to world market situation. Current market situation enables to increase milk price that in its turn influence on producer's motivation. One of the important problems of domestic milk production is milk raw quality. The limited amount of agricultural companies have possibilities to provide all necessary resources to get a milk of extra class despite the fact that Ukrainian standards requirements are lower than Europeans ones.

The shortage of financial resources is a very important problem of efficient development of milk production. It affects the milk production especially in peak seasons. The bank loans are very expensive in Ukraine therefore it is very difficult to get them for the majority of enterprises.

Stable milk supply formation depends on many factors. Some of them could be solved by agricultural producers and some may require for a government regulation. So milk production needs the integration of all participants of milk products subcomplex to achieve its competitiveness in world market.

Milk product subcomplex of Ukraine has sufficient potential for development. Favourable climatic conditions, comparably more subzero cost of forage and labour enable to assert that our state has serious possibilities and ponderable potential in an order to take the main place among countries-leaders from the production of dairies. For this purpose, it is necessary acceptance of innovative decisions in relation to introduction of modern technologies of production and his enlargement. But the dairy cattle breeding is in such position, when agricultural enterprises cannot independently work out existent problems to want of financial resources for the extended recreation. Therefore, for increasing the efficiency of production of milk and providing of population products for consumption at the level of scientifically reasonable norms an intervention is necessary from governmental institutions. The self forming of effective, effective mechanism of state support of dairy industry will allow to create necessary terms for providing of competitiveness of the Ukrainian dairy products on world markets.

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2.4. INFORMATION PROVISION OF UKRAINIAN VEGETABLE AND GROCERY SUBCOMPLEX

Summary
This paper examines the main issues about the information of product adaptation in the vegetable-grocery subcomplex of Ukrainian companies to foreign markets, their current status and prospects. It also analyzes the possible ways of receiving marketing information, defined by their positive and negative aspects for optimal use.

Keywords: problems, vegetable-grocery sub complex, foreign markets

Introduction

In Ukraine the exports of fruits and vegetables is about 2% of the total production and is very promising sales channel for large farms and farmers' associations. Currently, the share of sales channels is less than 3%, but exports of vegetables have the potential for domestic horticultural products contested at a price that is one of the main arguments when choosing a supplier. In the overproduction that is observed in certain types of products, the risks has been significantly increased of lower prices to cost-recovery levels. Reduce these risks we can by using export. Today the major markets for export of vegetables are Russia, Belarus, Lithuania, Latvia, and Kazakhstan. Promising markets were recognized in Western Europe. Export prices, less marketing costs, slightly higher than retail for the same products in Ukraine, but allow you to get enough return.

Volumes of export of fresh vegetables in 2011-2012 marketing years grew all the vegetables except onions and garlic. The main reasons for the low level of exports from Ukraine are the following: the concentration of the production in households (about 90%), which makes it impossible to create great sales, attractive for foreign wholesalers, low marketability: we have not developed advanced technology at this stage so as a result, limited power of sorting and packing, imperfect legislation to regulate export of vegetables, no system certification enterprises, international standards of quality and food safety standards. And Europeans are too demanding to having the necessary documents. In addition, customers from the European countries want to buy organic products that require stringent quality control, monitoring and certification of, not just the product itself. Organization of organic production in Ukraine is at an early stage. Currently on the market are only a few companies involved in the certification of domestic agricultural producers, but they are private, working on foreign capital and to order some foreign companies.

Its exports of fresh fruits dominate tomatoes - 60.8%, pickled cucumbers - 11.7, fresh beans - 11.4, other legumes - 6.7%.

Prices on the international market and the possibility of flow of foreign exchange earnings are attractive to manufacturers, 2008 was a serious challenge for growers. Reduction of import duty, under the WTO, in a significant increase in domestic production greatly complicates their jobs due to increased imports of vegetables in Ukraine.

The globalization of economic relations causes massive importation of vegetables in Ukraine from any part of the world, where there is a clear specialization fields on the principle of grow houses that profitable, and everything else is depending on buy and resell. Approximately $ 40 billion, or 18% of world trade volume accounted for fruits and vegetables in the United States. In Europe, the main markets for imports are Germany, the main suppliers - Turkey, Spain and Italy. Some vegetables of EU imports come from South Africa, Morocco, Chile, Argentina, New Zealand, Turkey and Israel.

The success of the vegetable world is determined not only growing technology and organization and vegetable market. Our farmers are no worse than their international counterparts learned how to grow vegetables. Nevertheless, in a competitive environment will benefit only by a very narrow specialization, which allows maximum intensify production. Each vegetable crop has to be unique to her growing technology and specific set of techniques. It is also capable Ukrainian producers, but prevents only one change - the inability to engage in cooperation and implementation.

Another important advantage of the production of foreign competitors is the organized market on which they supply their products through their super intermediary structures that dominate the activities of other exporters, the economically weaker countries. Accordingly, they have a much higher price than domestic producers. Such an organization is more effective because they have long-term positive experience and use the latest scientific and technological progress.

Natural conditions of cultivation and biological characteristics of vegetable crops require an efficient location of production. Eggplant, tomatoes, onions, peppers – the best produced in the south, cabbage, carrots, beets – on marshy scrub and steppe. This yields in different parts of Ukraine is quite different, for example, the yield of onions in the Kherson region reaches 94 t / ha, while the average for Ukraine is 22 t / ha.

In value terms in 2011-2012 marketing years imports of vegetables, compared to 2010-2011, increased by 3.3 times. Growing competition with our trading partners somehow narrowed our export opportunities.

Accession to the WTO immediately affected district and vegetable market in Ukraine. In the 2011-2012 marketing years imports of carrots and other root crops increased 33.5 times, onions and garlic - in 22.3, tomatoes - in 13.3, cabbage - in 8.5, cucumbers - 6 times. A small increase in imports and celebrated in other vegetables.

With its accession to the WTO and the avoidance of customs barriers, imports of vegetables grow. Emission rates importable duty on carrots, onions, cabbage and other vegetables that they traditionally grown in Ukraine and are a source of income for households, could adversely affect the living standards of the rural population. Admission to the WTO for domestic producers of agricultural is pretty hard, and the possibility of tariff and non-tariff protection agro-production domestic market from imported products is limited. So of course you need for every industry to develop a

specific action plan to ensure competitiveness in the future of the WTO and free trade zone with the EU. But the Ukrainian vegetable growers have all chances to become the main "garden" of Europe. Our climatic conditions of the Crimea marshy scrub are much better if Spain, which provides 30% of vegetable production.

Ukraine is among the top ten world leaders in gross production of vegetable and melon production, and in per capita ranks it is ninth in the world. However, among 20 advanced countries Ukraine occupies 18th place in terms of productivity. Genetic potential of local breeds and hybrids used only 30 percent.

Considering the state of the market vegetable-grocery subcomplex Ukraine is impossible not to notice a number of fundamental structural problems that are sure to keep in mind when providing information adaptation vegetable-grocery subcomplex products to foreign markets:

1. Regarding the profitability in the chain of "production – processing – sale" it should be noted that production managers could achieve losses because of the speculative pricing of wholesale and retail trade. Quality products that reach the significantly increased consumer do not meet the certification requirements. Ukraine has just begun to grow vegetables in wholesale system through organized food market, where the seller guarantees the sale of products on economically favourable terms. The state has a system of natural selling vegetables. The chain of "producer – trader – retailer – consumer" is overloaded by many businesses, which greatly increases the prices of vegetables. Revenue agents exceed the income of producers almost 1.5-2 times.
2. The increase of production of its products is inhibited by the following reasons:
   - lack of direct financial assistance for horticulture;
   - inadequate investment in the construction of vegetable stores and other infrastructure;
   - low agricultural technologies in the cultivation of vegetable crops due to lack of resources and technical support, including the use of technologies that are adapted for specific varieties and hybrids, precision seed, seedling cluster, making micro-doses of growth regulators and pesticides;
   - unsatisfactory storage, only 20 percent of the vegetable stores up to date.
3. The lack of domestic machinery for vegetable and processing industry is due to the high price of foreign counterparts, thus agricultural producers had used in growing vegetables new designs seeders, sprayers, cultivators, machines for transplanting, watering, plant care and harvesting. In manufacturing industry there is no domestic equipment with energy-saving technologies, including a line of washing, sorting, preservation, packaging and more.
4. High prices for natural gas and electricity, as well as high interest rates on bank loans, making it impossible to build new greenhouse facilities and rehabilitation of existing.
5. Storing vegetables is one of the biggest problems for the farmers grow vegetables as much as can to save up to December. Many vendors sell out their harvested products in autumn period, when many vegetables and they are cheap. Small wholesalers can store large quantities of fruits up to January-February. About 20% of cultivated vegetables "Borsch set" (carrots, cabbage, beets, and onions) do not

reach the consumer due to the lack of specialized repositories. Another problem is the requirements for quality and safety. Global trends in food safety require increased attention to the technological cycle, not just the quality of the final product.

6. Certification of products: the products of environmentally friendly producers' may have an easier access to the European market. Products they produce has advantages during implementation through international supermarket and a significant surplus of vegetables like onions, carrots and cabbage, no certification is exported to CIS countries only.

To sum up this review, it should be noted that the situation on the food market significantly deteriorated due to the global financial crisis, which in turn prompted the governments of the economically advanced countries to take additional protective measures to protect their local markets and export promotion.

Since 2008, when Ukraine joined the WTO, we are unable to urgently apply safeguard measures, so our market was in direct proportion to the situation of the international market, which mainly depends on the protectionist policies of developed countries. Open Ukraine borders to export agricultural products contributed to the importation of imported products, which began to displace domestic production of the domestic market.

Reorientation on the importation of finished goods flooded the domestic market of imported goods, but real improvement in nutrition Ukraine did not happen, however, it has deteriorated. One way to solve this difficult problem - bring food legislation in line with WTO and EU law, which will allow not only enhance the control of substandard imported products, but also come with their own foreign markets. During the fall of activity in the consumer market due to low solvency public issue is of particular relevance. When examined information of marketing activities in vegetable should definitely pay attention to the following characteristics of the market:

- Market vegetable production is characterized by a high degree of competition,
- Uneven demand
- Significant difference of cultures. Vegetables as a consumer products at prices slightly stretchy, and yet, for some reason, their use has not significantly reduced due to the vital nature of this product.
- The large number of small producers. Low income forces the population to use their horticultural land, and not engage in his usual trading activities, which puts companies vegetables producers at a disadvantage.

Organization of entering foreign markets is a major problem for businesses as well as marketing services are not effective and are not able to provide enterprises the necessary information that will give you a reduced risk in entering of enterprises on foreign markets. In this regard, finding ways of adaptation of information products vegetable-grocery subcomplex to the international markets is extremely urgent problem and need urgent solution.

Material and methods

Relevance of the question studied in this paper due to the fact that at this time in Ukraine, along with the economic crisis and its consequences, there is a general decline of marketing activities in enterprises. Decreasing marketing services will cut budgets for marketing activities, etc., this is the situation in the business vegetable-grocery subcomplex.

For the imagination of the existing situation to the problem of information support adaptation production vegetable-grocery subcomplex to foreign markets, we analyzed the most relevant publications of leading researchers in this field.

The researching problem in deceiving ways to obtain marketing information to adapt products to new foreign markets at different times engaged the leading domestic and foreign scientists - specialists in marketing. Such as, Krylov and Sokolova considered the adaptation process as opposed to the standardization process, and believed that the adaptation of products to foreign markets is forced and necessary.

In turn, Kolyuzhnova and Jacobson in their researching proposed to solve this problem by affecting the demand or the creation or increase it by moving goods to overseas markets (Krylov and Sokolova, 1999).

So scientists as Pertsovskiy, Spiridonov and Barsukova consider adaptation process in four main aspects: change language, name, colour, change promotional links, media plans, and adaptation to local languages, to promote (Kolyuzhnova and Jacobson, 2006).

The leading American marketer Franklin (1982) believe that the adaptation process can take place as adapting to a new product in the market, and in the opposite direction and the adaptation of the target audience to a new product through advertising. Sservices do resist to the last direction for simplification the process of introduction products on foreign markets (Pertsovskiy et al., 2001).

Economist Hravford believes that the primary goal of obtaining marketing information is unsuccessful possibility of determining yield to the overseas market and timely response. (Franklin, 1982)

Leading scientist Philip R. Cateora (1993) insists that the most important factor for the company at the introduction of the product to the overseas market is the speed of information and diffusion rate - the penetration of new information to the market.

Analyzing the latest publications and research on information support of adaptation process of products in vegetables grocery subcomplex, we can conclude that the majority of authors whose work was studied and analyzed in their studies do not take into account is the process of information provision process of adapting products to foreign markets, they did not examine issues sources, and the ways of receiving information on which will be built-to-market strategy and planned next steps. There are virtually no studies on the topic are focused precisely on vegetables grocery subcomplex that is an important point, because it has its own specific characteristics and requires a separate approach.

Given the above, we note that the study of the adaptation process of information products in vegetables grocery subcomplex to foreign markets is acutely important and absolutely necessary.

The subject of this study is to analyze the existing grade status and prospects of the enterprises of Ukraine vegetable-grocery subcomplex for foreign markets. Namely, the object of study is search and analysis ways to use information about the process of adapting products to the specific requirements of foreign markets. The study aims to identify potential ways to receive marketing information from which the process of adapting products to foreign markets, and ways to obtain optimal balance of marketing information.

Results and discussion

Ukraine's accession to the WTO is necessary to accelerate the competitiveness of agricultural enterprises, which is impossible without a modern information system consulting support. Currently its level does not comply with international experience. A huge amount of advertising information on resources and technology through media imposed on agricultural production. It is not always objective and scientifically sound, which in many cases leads to negative consequences for farmers. To improve the information and consultation of agricultural production under the Law of Ukraine "On the advisory activity" (2004) creates extension services.

However, local counsellors generally do not have sufficient training and rapid access to scientific information resources, and systematic training of the traditional methods and technologies requires a significant investment and a long time. On the other hand the system Ukrainian Academy of Agrarian Sciences (2006) of running a significant number of completed researches has developed, which hampered the widespread introduction of imperfect supply of scientific and technological information in agriculture production.

In a market economy, one of the key factors of competitiveness is the ability of companies to provide not only high performance but also directly production for producers to express themselves on the market and favourably present your company, products or services, and quickly get analytical and marketing information necessary for the development business. And now that opportunity has a worldwide network of Internet services companies which are large, medium and small businesses worldwide. Unfortunately our agricultural sector uses very little power of the Internet, and almost no farms in this network.

Most major foreign companies are now actively involved in the creation of marketing knowledge about the market. For example, a company Henkel created a system called IDIS, which analyzes all available User info and chooses a decision based on the criteria of "most successful solution of the lessons learned." In Coca-Cola since 1997 using info-cascade system, which according to the company's management is an integral part of the infrastructure. This system aims at organizing information flows in areas such as brand promotion, planning, and global marketing. The system uses information not only domestic sales, but many materials research and statistical data that can be worn both quantitative and qualitative. When developing new programs to promote brands or new advertising campaign system uses the results of existing studies and experience gained in different markets.

At creating a market knowledge system there is a transition from isolated sources, information to a new system that combines in itself all source, data and knowledge in the company, resulting in universalization all principles work with information. Market knowledge system is the expert system promoted in which integrated knowledge. Experts company for management making and development will search algorithms answers to all arising in marketing question. Managing these knowledge allows evaluate not only some market aspects, but and receive whole picture, not just answers to the question "what happened?" but and explain "why did this happen?". Market knowledge system allows immediately adjust everyone problems and needs arising in companies track synergy that occurs when impact to different elements of the marketing mix. In other words, the system marketing knowledge is the most advanced system marketing information in modern terms.

We consider it necessary to introduce in this monograph first experience in dealing with similar issues in the United States. From this sample was not chosen randomly, as in this country is the soul of common and highly developed process of information provision with farmers. Ways to implement it for years and are polished to a highly operating system level. Information on Data ware farms taken from my own experience, the accumulation of information on the results of the program Faculty Exchange Program, that allows you to submit your own mind impartial information collected from the middle of the process.

First we note the government agency providing agricultural information (and in their composition and vegetable-grocery companies. This process is carried out by the USDA, which is on the website http://marketnews.usda.gov/ created specifically for entrepreneurs provides complete information about the market for agricultural products. We believe this is the right project - as contain a huge amount of information shared and the directions concerning marketing, economics, agriculture and all other industries that might be useful for entrepreneurs and analysts. Importantly, it contains a block-components of internal and external information, which are important components of information support adaptation vegetable-grocery subcomplex products to foreign markets. In practice, it works like this: the entrepreneur, going to the site can live with the constant updating of information to learn about the state of the market, current prices absolutely all kinds of agricultural products for which it is sold and bought on that day; sales and demand for the products of interest to the enterprise, predictive information that will help the company navigate the market and successfully plan current activities, findings and expert advice and more. The constituent elements of the online resources you can count to infinity, as it is really impressive for its scope and depth of the project. On the creation and maintenance, work is constantly a large number of ministries and special services staff. We believe this resource is a real economic engine, providing process information support marketing activities of enterprises fully, completely, and by state basis simplifies, and cheapens the process of obtaining this very important information for the study subjects.

Second in the U.S. were first created and successfully operate consulting services and is very popular at the time direction, who are trying to implement most of the - system Extension Offices. These offices are established almost everywhere in the country and help businesses solve current problems specifically related to the

organization of agricultural production (in our case vegetable-grocery subcomplex), provide answers to any outstanding questions regarding classes, conditions and requirements for the cultivation and processing of climatic forecasts, and more. These organizational structures should provide an answer to any question that may arise in the company as much as possible and pressed together to make the fullest. Often such structures are professors, teachers, involved in cooperation objectives universities and research organizations.

Taken together, these techniques make the process of adaptation of information products vegetable-grocery subcomplex Ukrainian companies to foreign markets integrated and extremely efficient.

Contradictions in the above example, in Ukraine the current state information of marketing activity are not as impressive. Some universities (National University of life and environmental science) attempt at its base to offer advice, there are some informational resources that provide marketing information to businesses vegetable-grocery subcomplex, but it happens quite spontaneously, the work is not established, and that it is important in our view - not systematic or feedback. Important for businesses in this case is the need to pay for this information and its cost is rather high.

We emphasize that one of the most important points that are not solved in Ukraine is to provide feedback at all levels of the system in order to develop effective measures of interaction information that will enable the process to improve information support marketing activities of enterprises vegetable-grocery subcomplex in general and bring it to the international level as described above.

Consider the real situation on the use of marketing information on Ukrainian enterprises to reflect what we have carried out their own market research companies vegetable-grocery subcomplex with respect to their information provision.

Eight business vegetable-grocery subcomplex in Ukraine were processed by us including: “Power” (Nikolaev), “Dovzhyk JSC” Institute of Vegetables and Melons, private sector and other vegetables. virtually no system information of marketing. In the enterprise of “power” - which is marketing service, marketing and information support activities given the necessary attention. Vegetable-grocery subcomplex market and the level of marketing support are in close communication directly proportional. The more accurate and better information provision is held, the more complete and accurate is a general view of the current situation on the market. However, it should be noted that 90% of surveyed companies we noticed that from defective information of market conditions affected vegetable production. Their view, improvement of information provision substantially changes the situation on the market vegetable-grocery subcomplex.

Exchange of information between enterprises vegetable-grocery subcomplex and their customers is very important. Since this exchange allows to clearly define what types of products should produce and what kinds of services to be provided. These services and products are additional costs, but they are also useful for manufacturers to improve the quality of their products. Also manufacturers often faced with the uncertainty of demand. Accordingly, manufacturers offer additional products and services needed trade relations.

An analysis conducted by market research firms concluded that:

1. Since all companies responded to the questions it suggests that marketing activities in one form or another takes place at each of the studied companies.
2. To more advanced facilities, such as “power” and “Vitmark Ukraine” system of information support marketing functions well, on the other, the weaker companies is hardly involved.
3. In most lacking a comprehensive approach to the use of information system marketing activities.
4. Unfortunately the enterprises except “Vitmark Ukraine” has virtually no global correlation country level and neighboring countries.
5. There is low quality and relevance of the external input information received by now.
6. At the low qualification of workers is engaged in marketing activities in the company, no modern methods of implementation.
7. Most companies use a slightly popular and Information capacitive currently online resources.

Considerable position in international marketing is adaptation products to the markets of other countries. Which area do not belong to products, it’s huge percentage of the success of its sales in the foreign market determines how well it was adapted to the market of this country.

For vegetables grocery businesses in Ukraine this complex issue is particularly acute. Criticality question formed two factors:

- Firstly, quite difficult to adapt vegetables products given its characteristics (seasonality, climate dependency short cue shelf life, a great number of varieties, etc..)
- Secondly, difficult financial position vegetables grocery enterprises under complex absence or low level of functioning marketing services to businesses, which prevents to make necessary research and prepare properly to the adaptation process in complex products vegetables grocery to foreign markets.

Investigated problems can consider the example of the U.S. market carrots. Despite the small variety of varieties of carrots produced, there is a fairly large intra varietal adaptability to the relevant product market consumption. That is one sort of carrot produces the following forms:

- Grown to full size according to variety;
- With interruption at the appropriate stage of growth (in the market is the need for small size carrots for ease of preparation);
- With interruption at the appropriate stage of growth and to implement cut into 3 parts (Baby Carrot) - which is in demand for weighty market segment;
- Produced with skin;
- Produced skinless.

That is an example of one variety of vegetable crops in seeing 5 species adaptation and products relevant to market. Choosing the certain type of product for the production and sale of market needs is dictated by each importing country. It should be noted that this example is informative enough, since the U.S. is one of the world's largest manufacturers, importers carrots. Accordingly, in the target “GF Grimmway

Farms" there is very efficient and highly intensive work with marketing service, the results of which are based further development and vector directing production of certain products.

In general, the most interesting question in our view is to identify sources of information, including marketing service companies receive highly specialized information for foreign markets to adapt products vegetables grocery under complex to them. As told the top manager "GF Grimmway Farms", they based on the consumer opinion and preferences and receive information through a direct survey of large traders or directly to end users. But it should be noted that this method of obtaining information for the further adaptation of products to foreign markets is possible to use only the large powerful enterprises in vegetables grocery subcomplex with offices or subsidiaries in other countries. Or possible for this level of development companies when they are financially able to order international research in local marketing companies on the domestic markets, as well as plans proceed enterprise.

Based on the abovementioned facts consider it necessary to offer the following ways to find sources of information for adaptation products of vegetables grocery subcomplex to foreign markets (Table 1).

Table 1: Potential ways to receive marketing information to tailor products vegetables grocery subcomplex to foreign markets

No	Way	Pros	Cons
1	Cooperation with vegetables grocery subcomplex companies in other countries that are already working on the international market for equal sharing marketing information is available on the domestic market importer	1. Low level of spending on information. 2. New contacts for future cooperation.	1. High chance unfair and presenting information. 2. Ability competition. 3. The need for disclosure of internal business information.
2	Order of marketing research and market demand in domestic market marketing companies investigated	1. No neediness for disclosure of internal business information. 2. Hight accuracy of marketing information.	1. Low level of adaptation marketing information to the system of Ukraine. 2. A high level of expenditure on orders marketing research.
3	Poll traders working in the international market products under vegetables grocery complex	1. Low level costs for obtaining this information. 2. Information is already adapted to enterprises vegetables grocery subcomplex of Ukraine.	1. High probability of failure in presenting information. 2. Distortion information in favor of the trader.
4	Search for information on their own	1. High reliability of market information.	1. Really high costs on business trips to the country market under study. 2. High probability of error in the fullness of information, as well as the study may not be comprehensive.

Source: own compilation

Topical issues stay the seeking information to adapt products in vegetables grocery subcomplex to foreign markets for UK businesses. Since the production of vegetables in Ukraine are developed and produce a satisfactory consumed chi quality output, dos one's favourable climatic conditions which have no other country. The main problem with this is the low level of development and the most critical condition vegetables grocery subcomplex enterprises that own unable to enter international markets. And access to the market through traders is unprofitable. Therefore the bulk of profits from international activities fall on balance trader.

From Table 1 it may be seen clearly that all the possible ways to obtain information with both the positive and negative sides. Therefore, we believe that the use of one of the proposed methods for other formations to enter the foreign market is not enough. For a complete picture of the foreign market and minimize risk in the yield on the market offer a combined use of all proposed ways to find sources of marketing information to tailor products vegetables grocery under the complex to the overseas market. But we need to take into account the financial capacity of enterprises and building on it optimally combine percentages ways to obtain information in the general marketing research project of potential foreign markets for each company.

Conclusion

Analyzing the material presented in this monograph, we can state that the search for sources of marketing information to tailor products vegetable-grocery subcomplex to foreign markets given ground point is rather vague and difficult issue for implemented at enterprises in vegetable-grocery subcomplex of Ukraine. Analysis of the current situation of the information marketing business objects of study in the world were given the example of the United States, using their experience staying in this country and to participate in the program by Faculty Exchange Program.

Our primary market research information of the current state of marketing activity of real business vegetable-grocery subcomplex of Ukraine lead us to the conclusion, that the state of information provision does not satisfy each of the surveyed companies, regardless of its market position and size. Critical in our opinion is the lack of use of feedback in the process of information provision.

Based on the proposed ways above, finding information in mono using is not ideal, it requires an integrated use of all proposed path for maximum efficiency receive marketing information. The main problem is to obtain accurate information, since it depends on the continued operation of the enterprise and the success of his work. Based on this believe that at the moment the best solution of the investigated problem is a combination of all the ways to find sources of marketing information based on the financial capacity of the enterprise. This will maximize to be informed for further adaptation of products in vegetables grocery subcomplex and release it to the international market, which in turn will provide intense development of enterprise and will increase its profitability.

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2.5. MICROECONOMIC APPROACH OF BIOMASS USE OPTIMIZATION IN HUNGARY

Summary
The use of renewable energy sources has been an important topic of scientific researches and many studies since the first energy crisis (1973) in different aspects through either specific or complex examinations. Until the beginning of the 21st century, national and international objectives were focused on the use of different types of renewable energy sources (i.e. solar, wind, geothermal and biomass energy) without any limits, but nowadays the utilization of sustainable potential in a complex way – considering economic, ecologic and social aspects – has been come to the front.
Our present research deals with the renewable energy sources of agricultural origin – i.e. the biomass energy – so it is essential to examine what is the exact role of agricultural production in energy production and how the different energy sources can be utilized.
The research examines the profitability of the sustainable production of renewable energy sources at farm level. In our research, in the production of primary products the minimizing of chemicals, while in the course of manufacturing process the minimizing of CO_2 emission and water use were taken into consideration as sustainability aspects.
For the verification of our hypotheses two methods, life-cycle analysis (LCA) and pivot table were used.

Keywords: biomass, agriculture, renewable energy sources, life-cycle analysis, pivot programming

Introduction

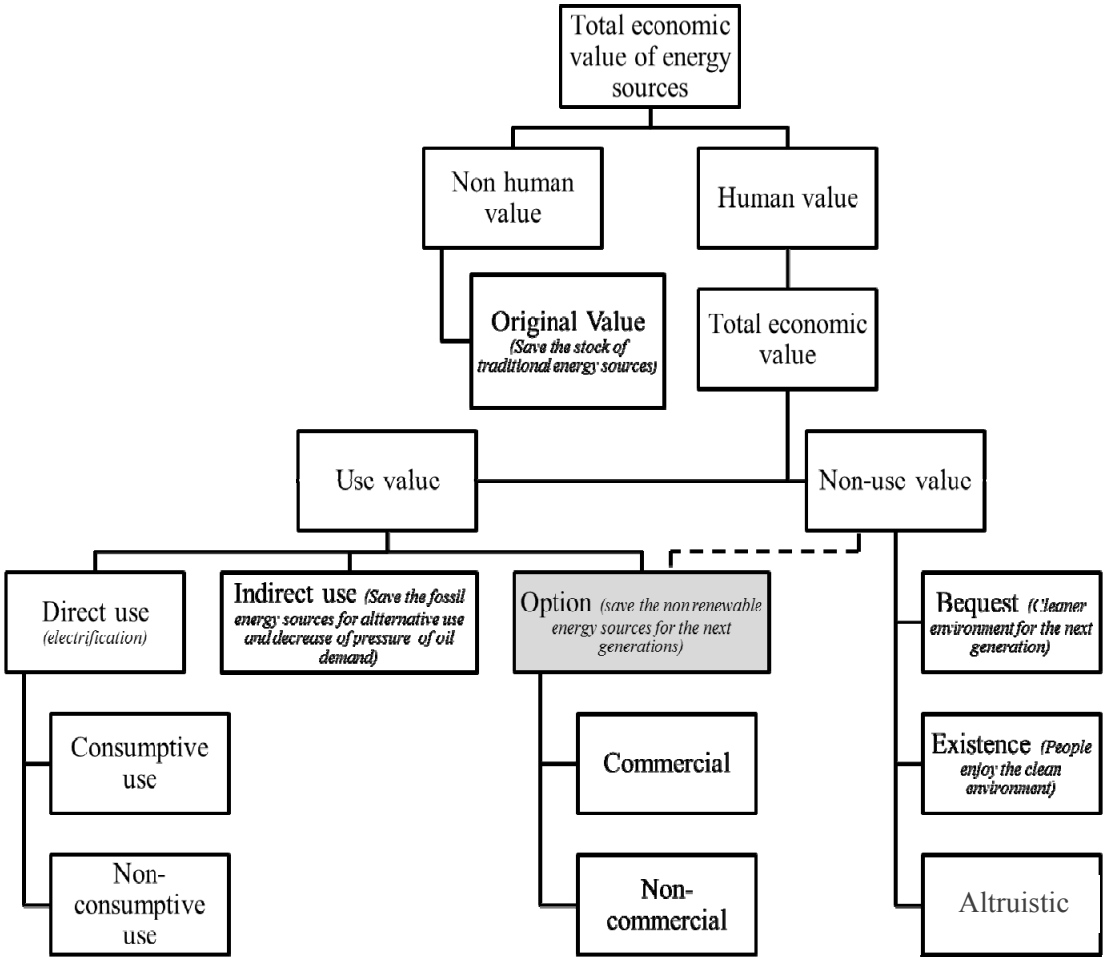
The use of renewable energy sources has been an important topic of researches and scientific publications since the first energy crisis (see Barótfi, 1993; Stróbl, 2000; Hancsók, 2004; Ivelics, 2005), in which the different types of renewable energy sources were discussed in many aspects either separately or in a complex way.

The actuality of the use of biomass energy became very intensive in the past few years, but it has been important since the 1990s, and its importance increased significantly in the past years. The Europe 2020 strategy, the strategic document for the next decade that summarizes the most important directions for the EU, determined five headline targets which global importance is growing currently and shall be growing in the nearest future. One of them "Climate action and energy policy" focuses on reducing greenhouse gas emissions by 20 per cent compared to 1990, increasing the rate of renewable energies to 20 per cent in the whole of energy consumption. In order to fulfil the strategic goals, three priorities are put forward in the Strategy, from which "Sustainable growth" is for promoting a more resource efficient, greener and more

competitive economy. (Törő-Dunay, 2011) The examination and evaluation of this topic was started by calculating the potential of renewable energy sources and by determining different scenarios for the future (see for example Láng et al., 1985; Lukács, 2009; Pylon, 2010; Greenpeace, 2011). Nevertheless, it is important to refer to that how the results of these examinations are connected to the categories of renewable energy sources in the international literature.

The concept given by Figure 1, is based on the principles of economic value of natural resources, considering the main aspects of environmental economics. The classical aspects of environmental economics consider the human values as the initial point, but in case of renewable energy sources, the non-human values are also important. Some authors do not classify the "Value of options" group into the "Utilization value", their place is depending on the initial base of classification. When we classify the values according to the utilization options of the natural resources, the "Value of options" group shall be connected to the "Value of origin". If we make the classification based on the prevention of natural resources or the costs of prevention, then the "Value of options" should be connected to the "Non-utilization value" group.

Figure 1: Economic structure of renewable energy sources



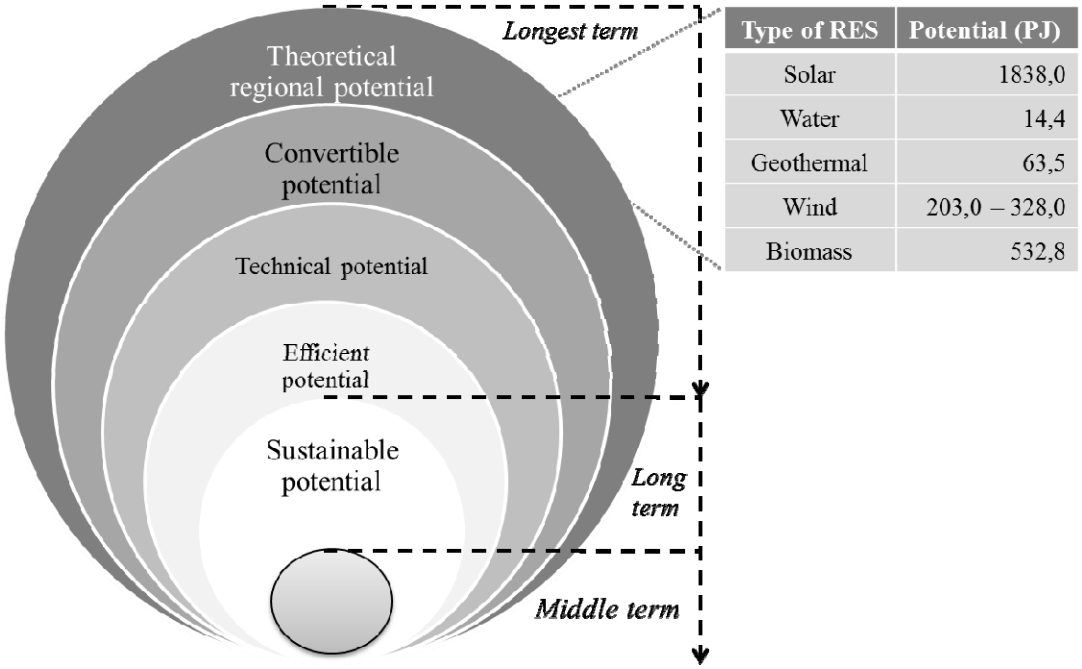
Source: Own construction (2013) based on Menegaki (2008. p. 2244.) and Szlávik (2006)

In that case, when the ultimate goal of a research is to evaluate the financial value of natural resources, then the "Value of options" category will mean a transition stage or a link between the two main groups. The macroeconomic evaluation of renewable energy sources gives another aspect of the assessment of the possible solutions. Figure 2 illustrates the hierarchy of the potential of renewable energy sources according to the Hungarian Academy of Science.

As it is shown, the broadest category is the theoretical regional potential, in which determination no constraints are taken into consideration, only the real or the potential energy producing capacity of the different regions is taken into account. When some constraints (such as the change of the production yields in some sectors, or the production for food supply) are given, then the convertible potential can be calculated.

After optimization of technical and the economic factors, we can determine the technical and the efficient potentials. The narrowest category is sustainable potential, which includes the ecologic, economic and social aspects and requirements, i.e. the most important criteria of long-term use.

Figure 1: The hierarchy of the potential of renewable energy sources



Type of RES	Potential (PJ)
Solar	1838,0
Water	14,4
Geothermal	63,5
Wind	203,0 – 328,0
Biomass	532,8

Source: Own construction, 2013 on Pylon, 2010, 72. p., Hungarian Strategy (2008), Hungarian Action Plan (2010)

The well-known "long-term" use shall be considered only as a general term. As it is illustrated by Figure 2, the use of renewable energy sources may be differentiated according to the length of time focusing on the different potential values. The "longest" period is about 50 years long, which refers to the possible potentials that are based on calculations with long-term data. "Sustainable potential" is for 15-20 years period, which is used in EU and national policies. A smaller part of this period is medium term period, which means the potential that may be realized within 5-10

years. This period may refer to the feasibility of long-term strategies, and in within this period the threats and the opportunities at macroeconomic level may also become clear. The narrowest category is sustainable potential, which includes the ecologic, economic and social aspects as the main criteria of the long-term use of these resources.

In addition to defining the different categories of renewable energy sources, it is also important to introduce the quantifiable data of the different potentials. Table 1 summarizes the most recent calculations made by governmental and EU institutions and different NGOs.

Table 1: Different calculations of Potential of Renewable Energy Sources (RES) in Hungary

Type of RES	Used RES in 2005 (PJ)	Sustainable potential to 2020 (PJ) Calculations of Pylon Ltd.	Hungarian Strategy to 2020 (PJ)		Calculations of Energy Club to 2020 (PJ)
			BAU Plan	"Policy" Plan	
Wind energy	0,04	**15,50**	4,00	6,10	6,30
Solar energy	0,08	**22,00**	0,40	1,70	2,00
Water energy	0,73	2,30	0,90	0,90	1,20
Geotermal energy	3,63	**29,30**	7,30	11,40	**20,00**
Solid biomas	43,56	**150,00**	93,70	130,90	**143,90**
Biogas	0,30	13,20	6,80	12,50	15,00
Biofuels	0,21	*(calculated in solid biomass)*	**19,60**	**19,50**	12,90
Common waste	1,38	4,30	3,30	3,40	3,30
Total	49,93	221,10	136,00	186,40	204,60

Legend: BAU: Business as Usual

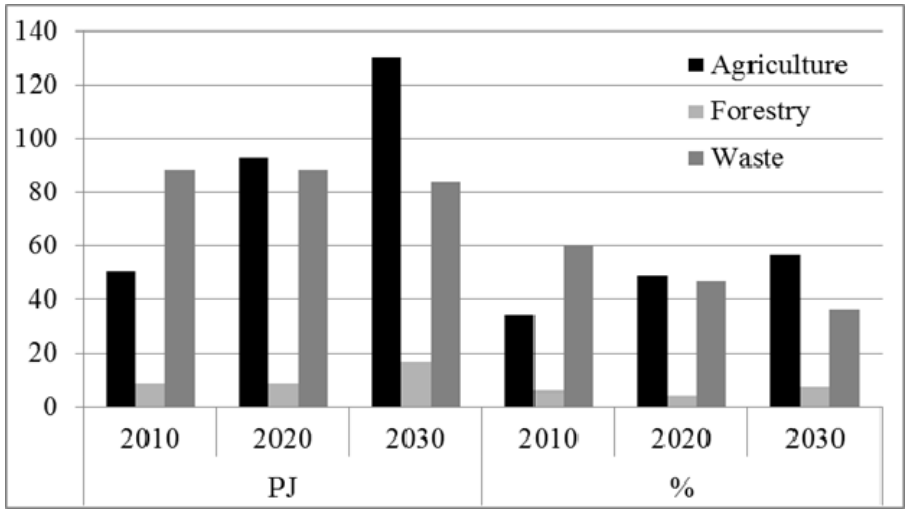
Source: Own construction, 2013 on Hungarian Strategy (2008), Hungarian Action Plan (2010) and Pylon Ltd. (2010)

As it is shown in the Table 1, there are significant differences between the results of various Hungarian calculations. In this regard, it is important to note that the paper of Pylon Ltd. focused on those renewable energy sources which are used for electricity production. That is why the wind and solar energy significantly, while geothermal energy is slightly over-represented. The slight difference between the two biofuel scenarios given by the *Hungarian Strategy for Increasing of Use of Renewable Energy Sources between 2008 and 2020* is due to the compulsory blending ratio of fuels. The compulsory blending ratio of fuels is the only type of renewable energy source which is obligatory in all Member States.

This paper deals with the renewable energy sources of agricultural origin, namely biomass energy, therefore, at first we have to determine the role of agricultural production in energy production, how agriculture can influence energy production processes, and how and to which extent it can utilize different energy sources.

Based on the European Energy Association estimates, agriculture and organic waste can provide significant portion of the biomass potential in Hungary (projected for energy content – see Figure 3.). The role of the forest sector both in relative and absolute terms is extremely low because of the stringent legal background. A further consideration regarding potential expansion of (energetical) short rotation wood plantations is the soil requirements (except for a few hybrids) which is similar to the traditional fieldcrops. Another problem of farmers that energy plantations need the long-term use of the soil, therefore the inflexibility of this cropping method reduces the potential of growth.

Figure 3: Potential of agricultural biomass from international point of view



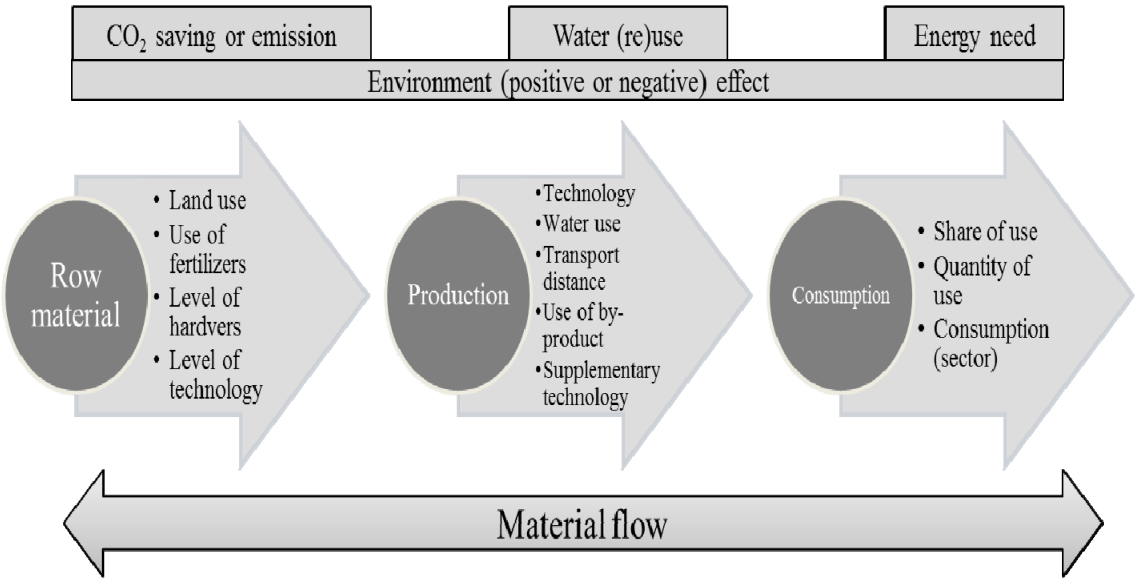
Source: EEA, 2007

Büki (2007) examined the topic from another aspect, namely the relative nominal energy consumption of biomass production. According his calculations, the natural forests have the smallest role, the energy grasses is preferred in case of energy plants, while in case of biofuels, wheat and oilseed rape are preferred.

Agriculture is both the producer and the user of different energy sources (Ángyán et al., 2006). Due to the different types of support, the volume and the composition of agricultural investments have been fluctuating for the past years. The development and investments for energetic objectives represented only 1% of the agricultural investments in 2011 (AKI, 2012). This fact is in accordance with the opinion of Brochers et al. (2008), which implies that the energetic developments in the agricultural sector are realized in an indirect way, not as a specific intent.

In our research in addition to the economic aspects of biomass energy production, we focused on the technical and environmental effects, and made our examinations in accordance with these three pillars. The theoretical base and the structure of our researches are illustrated by Figure 4.

Figure 4: Theoretical aspects of the microeconomic (farm-level) assessment of renewable energy sources of agricultural origin



Source: Own construction, 2012

In one hand, the process takes into account the structure of the production and in the other hand, it is also considers the positive or negative environmental impacts associated with each step. Throughout the entire production process of biomass material flow, the direction of the process is not unequivocal because the different by-products can be utilized not only in the given stage of the process but also in other (previous) stages. For example, the by-products of energy crops can be utilized in animal husbandry or the by-product of bioethanol – it is called DDG (Dried Distillers Grain) – can be used as fodder or may be the raw material of biogas production. This process-oriented logic frame is able to examine the effects and their resources and it is also able to explore the critical factors and to improve efficiency through a detailed analysis of the technological background. (Illés et al., 2013)

The first step of the process is biomass production, which may be a result of an intended process with direct energetic objectives, or, it can be derived from the crop production with food producing purposes as a by-product, and even from livestock production in the form of liquid or solid manure. When we examine the biomass producing processes of crop production (cereals, oilseeds or energy forests) the most important aspect is to evaluate the different features of production. For example, In Hungary, the structure of crop production and land use has not been changed because of the production of renewable energy sources, as it is more typical to use the surpluses of food cereals through the channels of energy industry.

The positive and negative environmental effects of the used energy resources may be determined by the following conditions: (Ericsson et al., 2009)

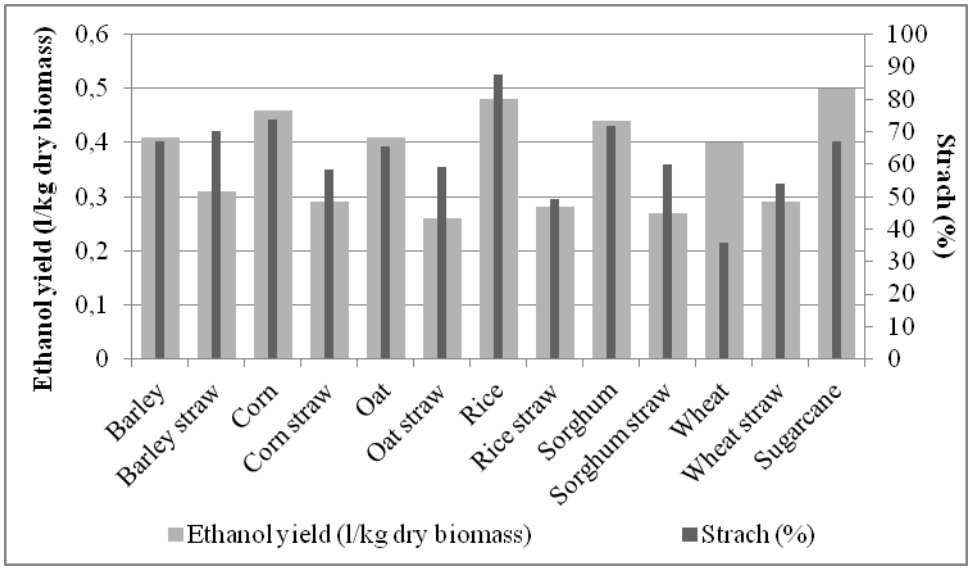
– the effectiveness of the technology,

– the amount and quality of the chemicals used during the production process,

– the technology and intensity of production,
– level of water use.

The level of possible ethanol production may be an additional important determining factor of the environmental effects (see Figure 5).

Figure 5: The carbohydrate ratios and ethanol yields of the raw materials of bioethanol production



Source: Own construction (2012) based on Boros (2007)

Although some authors formulated different opinions in connection with the possible effects of chemicals, the technological level and the costs of production on the biomass energy production and also the cost structure of crop production should be taken into consideration during the optimization process.

Material and methods

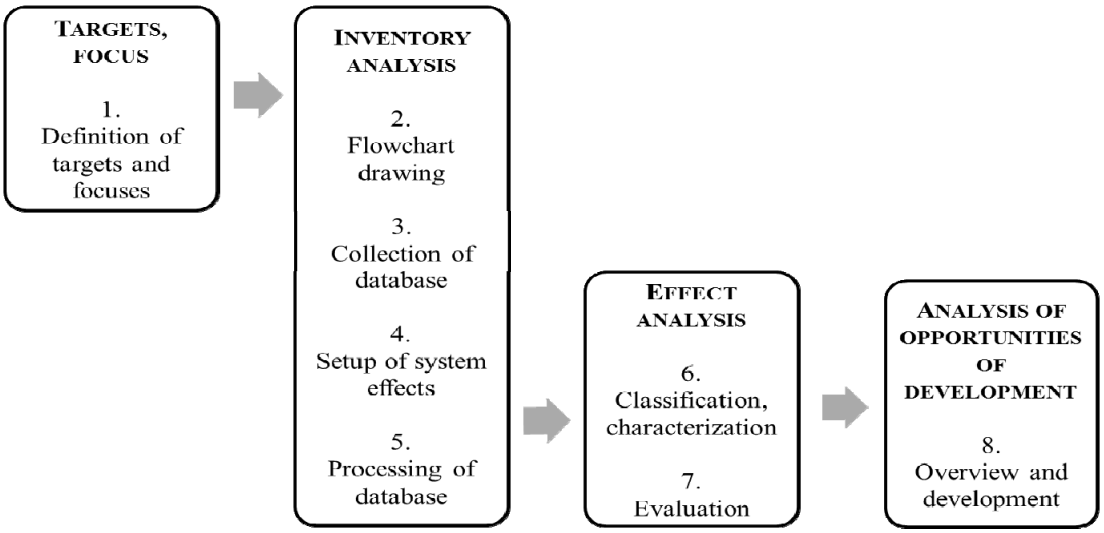
Life cycle Analysis (LCA) is a widely used (strategic) decision supporting tool for both the corporate and governmental sectors. It is most often used for the following purposes:

- preparation or/and planning of product development and/or improvement,
- to distinguish products and services for marketing purposes,
- to analyze materials, energy and emission processes of production or service processes,
- comparison of alternative production processes, services,
- calculation of input/output ratios and/or efficiency analysis,
- critical point analysis for exploration of possible reduction of emissions or energy saving,
- preparation of policy strategies or legislation and planning of the possible effects of these policies,
- calculation of environmental charges and fees or the level of penalties.

The LCA is used in those industrial areas where the natural environment is used intensively or which actions have considerable effects on the natural environment (e.g. waste management, energy or heavy industry).

Before the calculations, it may be necessary to define certain regularities and terms by which the whole method may be simplified. One of the most difficult questions of the LCA is to define those factors and effects which should be taken into account in the assessment. The so-called cut-off rule allows that only the relevant elements can be taken into account in the LCA process. The decision maker must determine that certain threshold, over or under which an effect is leaved disregarded. The advantage of this rule is to make the process cheaper but its threat is worsening the reliability of the results. The sharing or allocation rule allows the solution of those problems when through a (sub)process multiple products or by-products are made, but there is only the overall effect or the whole material flow is known. In this case, the total effect should be allocated on the basis of the physical characteristics of the product(s) or the by-product(s). For the more reliable results, it is suggested to load the method with different partition of the characteristics and to compare the different results of sensitivity analysis. The first step of the whole process is the inventory analysis, at it is shown by the Figure 6.

Figure 6: Standardized process of Life Cycle Analysis



Source: ISO 14040

Using primary and secondary sources, the total production or service process should be prepared in relation of energy and material flow and balance and technical/technological parameters as well.

According to these, the data may have the following characteristics:

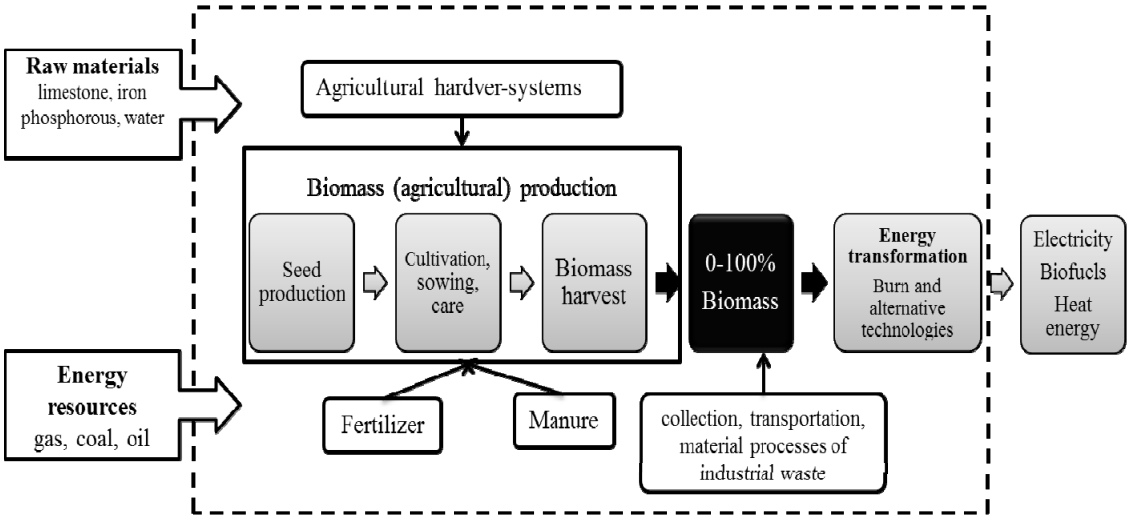
- technological representativeness,
- geographical representativeness,
- temporal representativeness,
- completeness,
- reliability.

After weighting, normalization and classification, indicators may be formed as the results of the life cycle effect analysis. These indicators will agglomerate the long list resulted by the previous step. In this way the data and processes may be processed easier.

The target of the Inventory Analysis – as the second step of LCA – is the exploration of the cause and effect relations. Depending on which conditions and procedures were simplified during the data collection and processing, the individual factors may affect each other in different ways and extent. The sensitivity analysis is suitable for defining not only the degree but also the direction of the interaction. The importance of sensitivity analysis is outstanding because it helps to reduce the potential uncertainty which is derived from the use of estimations or approximations. (Sára, 2010)

By using life-cycle analysis (LCA) as the logical framework of the research can be determined (Figure 7), the examined variables can be specified so as to be adjusted to the research objectives. The optimization process may be realized by linear programming methods.

Figure 7: The logical framework of the life-cycle analysis of biomass energy



Source: own construction, based on Heller et al., 2004.

Linear programming, despite it uses many simplifying methods, is one of the most widely used method for optimization processes of complex agricultural systems. The objective functions of the optimization of biomass production are the following (Bedéné, 2011):

- available maximum income,
- maximum amount of the produced biomass,
- maximum amount of biogas originated from the produced biomass,
- maximum income originated from biogas production,
- maximum amount of bioethanol originated from the produced biomass,
- maximum income originated from bioethanol production,

- maximum amount of biodiesel originated from the produced biomass,
- maximum income originated from biodiesel production.

The main deficiency of the abovementioned calculations is that it calculates with amounts and income values of field crop production, the different costs of energy production and the environmental effects are disregarded by the method.

As the data requirements of linear programming are very high, we considered choosing a simplified model for the examinations of the topic of this paper; therefore, we developed an expert system by using a pivot programming method. The data were accessed from the database of the Hungarian Statistical Office and other official agricultural databases.

Table 1: Changes of the cost items of plant growing in some European regions

	Unit	**Percent of Total Cost**	**Cost (€/unit)**				
			North Europe	Great Britain and Ireland	West Europe	South Europe	East Europe
Fertilizer (N)	kg	12,90	0,88	0,71	0,82	0,63	0,46
Fertilizer (P)	kg	1,70	1,21	0,71	1,33	0,67	0,55
Fertilizer (K)	kg	2,10	0,44	0,36	0,36	0,67	0,30
Glyphosate	l	0,70	5,05	5,60	4,45	4,00	6,40
Labour	h	21,70	18,13	16,00	17,00	8,00	3,80
Plowing	ha	20,30	91,21	74,13	90,60	90,00	38,00
Spaying	ha	20,30	14,29	17,30	13,18	14,00	6,50
Spreading	ha	20,30	15,38	14,83	10,43	15,00	7,00
Cost level		100,00	100,00	93,70	89,2	83,20	41,30

Source: Ericsson et al., 2009. p. 1581.

Because the short rotation energy plantations may be inserted into the micro economic calculations, it is necessary to know the most important characteristics of the different species. (see Table 2.)

Table 2: Some key indicators of short rotation wood fuel types

Plant	**Indicators**					
	Energy content (MJ/kg)	**Average yield (t/ha/year)**	**Energy yield (GJ/ha/year)**	**Moisture content**	**Density (g/cm^3)**	**Rotation**
Oak*	11,5	2,6	2,6	0,4	0,69	106
Beech	11,5	3,7	3,7		0,68	100
Hornbeam	11,5	2,5	2,5		0,83	80
Acacia	11,5	5,1	5,1		0,77	30
Alder	9	3,5	3,5		0,53	50
Lime	9	3,5	3,5			50
Poplar*	9	4,2	4,2		0,50	47
Willow	9	3,9	3,9			45

** average of different types*

Source: KvVm, 2007

It can be seen that although most of the indicators of acacia seems to be the best, in terms of the rotation it would be the worst choice. The number of rotation is an important point of view during the income maximization, that is why the beech could be the optimal choice. As a normative economic criterion, the ability of the soil conditions is accepted for both types of wood.

Results and discussion

In our research, the basic criteria of linear programming were used, but the criteria (attributes) used in our calculations were fixed in contrasts with the LP models. The possible objects of the research were compared by the using these attributes, which were fixed on the basis of natural units or a 10-point scale (Table 3).

Table 3: Objects and attributes of the research

Objects (rows)	Attributes (columns)
BAU corn	Price of raw materials (HUF/ha) Income from by-products (HUF/ha) Average yield (t/ha) Amount of fertilizers needed (kg/ha) Amount of used water (m^3/ha) Usability of biomass (10-point scale) CO_2 burden (10-point scale) Need for additional investment (HUF/ha)
BAU rapeseed	
SUS corn	
SUS rapeseed	
BAU corn + energetical wood fuel	
BAU rapeseed + energetical wood fuel	

Variations of raw material production: BAU - Business As Usual; SUS - SUStainable
Source: own construction, 2013

According to the results, in that case where the quality of raw materials produced by sustainable methods is not incorporated in the price of the product, the use of conventional crop production methods is suggested. Nevertheless, if the use of sustainable production method is not expressed by the product price, there could be another opportunity for compensation, by the selling the CO_2 quota savings, but its conditions are not available in Hungary by now.

Table 4: The results of calculations of expert system

Objects (rows)	Efficiency	Self-production	Sustainability
BAU corn	✔ (1)		
BAU rapeseed		✔ (2)	
SUS corn			
SUS rapeseed			✔ (3)
BAU corn + energetical wood (for heat energy)		✔ (4)	
BAU rapeseed + energetical wood (for heat energy)			

Variations of raw material production: BAU - Business As Usual; SUS - SUStainable
Source: own construction, 2013

After the comparison of the conventional agricultural production systems (BAU) we can make the following statements:

- According to the general economic aspects, corn production means the more favourable option, because of the different selling opportunities – e.g. food, energy production, material for food processing may decrease the risks of the producers.
- When the self-supporting character of agricultural production is preferred, the production of rapeseed is suggested. The investment needed for oil pressing can be covered by machinery investment supports. Diesel engines used in Hungary may also be operated by pressed and cleared vegetable oil; vegetable oils can be sold either for human consumption or for biodiesel production.
- Esterification process is not suggested because its technology needs high investment costs. As the biodiesel market is very unstable, the returns may bring an additional burden for the producers.
- The abovementioned issues are similar in bioethanol production.
- Sustainable biomass energy production may be improved by supplementing the present crop structure by short rotation coppice. In this case, the quality of the soil should also be taken into consideration. The soil demand of energy woods is similar to fieldcrops, therefore it requires a long-term use of cropping area, long-term planning of rotation and nutrient supply.
- If we accept the introduction of energy wood, the machinery used in corn production may be used in harvesting, therefore additional costs should not be calculated.

Conclusion

The European Union has introduced several directives and objectives in connection with the energy sector in the past decades, while the Common Agricultural Policy has also undergone remarkable changes.

The use of renewable energy sources may be considered as the cross section the energy sector and agriculture, not only new solutions but also new challenges are brought by the use of renewable energy sources for all member states. Renewable energy sources became a promising topic with many direct and indirect advantages for policy makers, but only few member states could fulfil their targeted share of renewable energy sources by 2010. As the EU offered many supports and instructions, we may conclude that there is not a general method for being successful.

Positive effects of some activities need special strategy and special measures; it is quite true for the topic of our research, biomass production. For the producers the most important issues are coming from the economic side, therefore yield losses derived from environment friendly and sustainable production should be compensated. Without compensation – either in prices or in the CO_2 quotas – the best solution is intensive field crop production, but ecologic issues should also be taken into consideration and some alternative methods should be developed for the realization of the concept of energetically self-supporting agricultural farms.

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CHAPTER 3

Management and organization of agricultural enterprises

DOI: 10.18515/dBEM.M2014.n01.ch13

Miklós Daróczi

3.1. METHODS FOR COMPLEX DECISIONS ON AGRICULTURAL INVESTMENTS

Summary
Complex decisions on technical investments determine the activity and future success of the enterprises of the agricultural sector. The preparation and formation of the investment and the selection of the final version are essential for both the companies and the national economy. The primary objective of this paper is to develop the decision making process, particularly focusing on the investment efficiency aspects. Our Institute (Institute of Engineering Management) has been doing researches for several decades on agricultural investments. The earlier created theoretical model has been developed in several aspects. The new model will contribute to a more accurate foundation of the agricultural investments and hopefully to a more efficient utilization of the financial resources. One of the most difficult tasks of the enterprises is to find the right way and tools from the business strategy goals to the actual development plans. Most of the SME-s do not consider important to have a written plan. Determining the content, the volume and the quality of the project result requires great caution due to the agricultural particularities and to the multifunctional characters of the agricultural activities. This paper focuses on the new elements and the practical utilization of the developed model. The decision preparation model consists of seven steps which are briefly presented.

Keywords: agricultural investments, decision-making process, choosing assets

Introduction

The Hungarian agriculture can be improved by continuous technical development. The advancing quality standards set serious requirements against the technical means and resources of the sector. A significant portion of the production costs about 60-70% is spent for machinery. For this reason the efficient utilization of the amounts invested as equity capital, debt capital or state subsidy is of crucial importance (Illés et al., 2011).

The primary objectives of this paper are to overview and develop the decision preparation process, particularly focusing on the investment efficiency aspects. Several years ago a theoretical model was created (Daróczi, 2007) focusing on the following areas:

- finding the right way from the business strategy goals to the actual project result,
- justifying and determine the different development versions,
- purchasing vs. hiring,
- choosing the certain physical asset based on complex criteria,
- tendering the financial possibilities,
- justifying the investment from an economic point of view,
- taking risk into consideration.

This paper focuses on the first five elements of the earlier developed model. The aim of the improvement is to increase the practical use of the decision-preparation model. Clarifying the role of the different management methods applied for the project result determination (Meredith and Mantel, 2011).

The "structural plans" used in planning projects, the "weak-point analyses" as a useful management method and the proper use of the so-called "balance equation" can help to justify and to determine the different versions of development. The simplified "break-even analyses" offers a solution to choose between purchasing or hiring the given physical asset. The model indicates the quantity range of work above which purchasing or under which hiring is justified. Choosing the certain physical asset based on complex criteria is also part of the theoretical model. Technical, technological, economic, ergonomic, environmental and other considerations have to be made before selecting the actual asset. Tendering the financial possibilities, justifying the investment from an economic point of view will be presented in the last part of the presented model.

Material and methods

According to my objectives, I reconstructed a dynamic and symbolic model that can be applied more successfully in preparing decisions of investment. The functioning model contains the "structure plans", the "weak-point analysis", the "balance equation", and the simplified "break-even analysis". During the reconstruction of the model, I followed the below mentioned seven steps of the complex process of decision-preparation.

- The structure plans are used in strategy based project management as useful tools of project defining. The function targets of the project result and the necessary technical means can be determined by these structural plans (Görög, 2007).
- The weak point analysis as a management method is used to find solutions for complex problems in a structured way. It is a useful method when we evaluate the actual state of the existing, available technical resources from different point of view.
- The proper elaboration of the so-called "balanced equation" indicates the quality and quantity of work which can be done through the planned machines and means at a given time. The calculations can be based on the production structure and the applied production technologies of the enterprise.
- The classical form of simplified "break-even analysis" as a part of the dynamic model is a useful tool to choose between purchasing or hiring alternatives (Husti, 2011).
- For the complex comparison of the various technical, economic and ergonomic properties the different features have to be converted with mathematical tools in order to be comparable (Temesi, 2002).
- Basic equations and model calculations were created to evaluate the different financial versions based the purchase on equity capital, debt capital or leasing (Witney, 1998).

Combining the listed management tools the main parameters of the project result – quantity and quality dimensions, the time dimension and the budget can be determined. The functioning model runs under MS Excel, which is widely known and does not require a deep knowledge in computer science.

Results and discussion

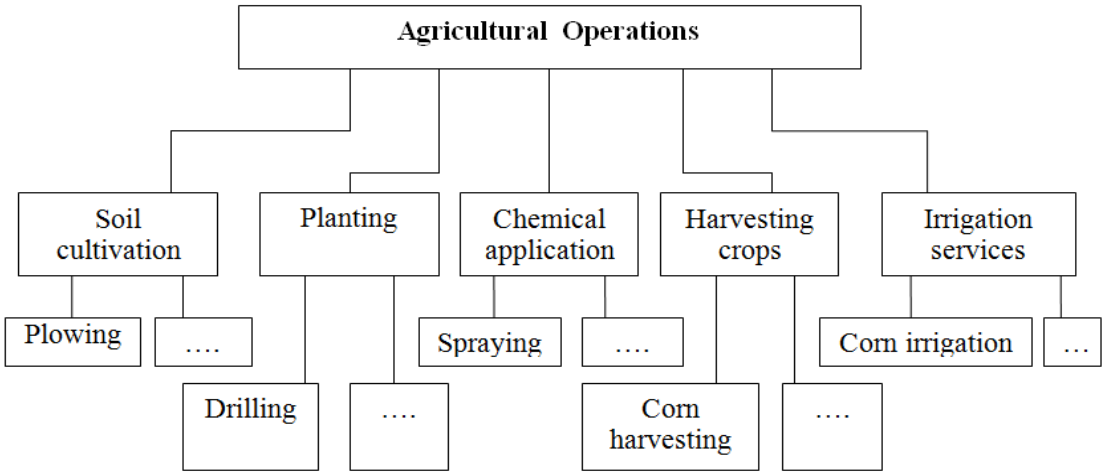
One of the most difficult tasks of managing an agricultural enterprise is to form the actual development versions and to make the decisions related to their realization. Determining the content and the volume of the project result requires great caution due to the agricultural particularities and the multifunctional character of the applied farming technologies.

It is critical to spend adequate time at the beginning of the project to study, discuss and analyze the given situation and the strategic goals of the enterprise. The complex process of defining the planned project result consists of several related steps.

Clarifying the functions

The first step of the decision-preparation is clarifying the functions of the given organization or department of the enterprise. These functions are basically originated from the market needs which depend on several aspects such as the economic and natural environment of the enterprise. The "function-target structure" is a useful management method which is widely spread in project management. It is a hierarchic system of certain functions and can help to determine the demanded functions. In the peak of the structure stands the project result followed by the main functions which can be further broken down to elementary levels.

Figure 1: The "function target structure" of the agricultural contractor



Source: own construction

As an example, Figure 1 shows a part of the "function-target structure" of an agricultural contractor. The examined agricultural contractor provides a number of services including agricultural operations such as soil cultivation, planting, widespread

chemical application, harvesting crops and irrigation services. It means that all the demanded functions are listed in the structure.

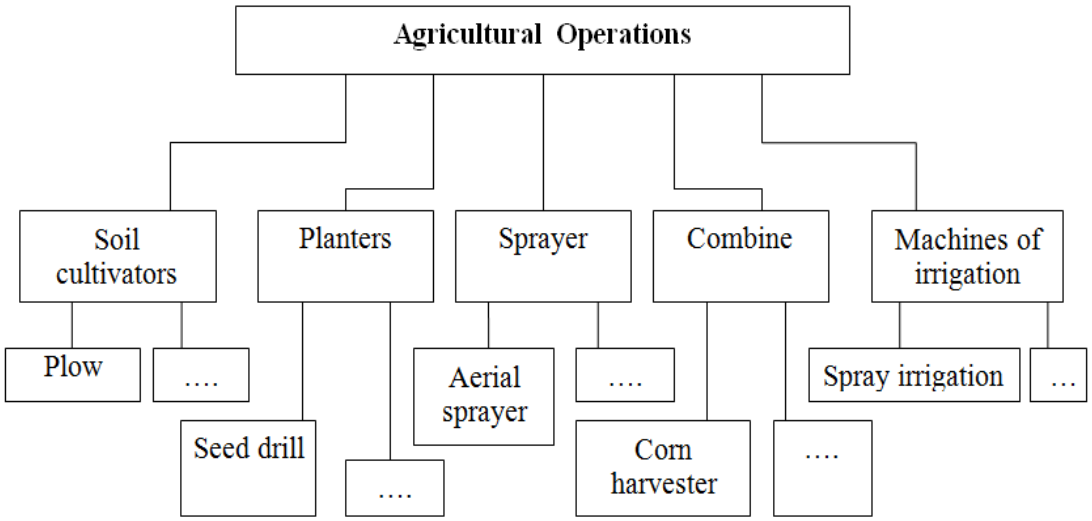
A completed hierarchic system shows all the farming technologies and different services which are demanded by the customers and other farmers in the region. In case of a newly established enterprise the structure has to be constructed from the basic functions and then can be developed with new functions according to the market needs and to the financial possibilities of the enterprise. The function-target structure should be broken down to a depth, where the capacity, the dimensions, the quality and the environmental requirements - necessary for being able to accomplish the project - become evident related to certain abilities.

Determination of the certain assets

The second step of the decision-preparation process, after the exact determination of the functions, is creating the "function-carrier structure".

The function-carrier structure is also a hierarchic system of machines, means and equipment which contribute to set the function in action or to keep it in action. The constructed function-carrier structure is capable of specifying the result of the project, in other words, to determine the required machines and means for the examined enterprise (Figure 2).

Figure 2: The "function-carrier structure" of the agricultural contractor



Source: own construction

As we have known all the demanded functions and machines the preliminary project definition can be completed, but the considerable part of the development projects are not realized as "green-field" investments but for modernization of the existing means, expansion of the existing functions, or creating new functions. Therefore, the planned developments should be fitted to the existing technical background, or rather examined if it is capable of serving its function.

The "weak-point analysis"

In the third step of the decision-making process, the quantitative and qualitative composition of the demanded machinery must be compared with the existing, available machines and equipment of the enterprise. It is a difficult and complex task because many aspects and specifications have to be taken into consideration. The "weak-point analysis" is a breaking-down method of the management techniques, aimed to examine complex systems in a structured way. It helps to structure the problem and to find the main reasons and right solutions (Susánszky, 1982). The examination of different agricultural operations and complementary activities by the tool of "weak-point analysis" is very useful for determining the current situation of a department or an enterprise from biological-, technological-, technical-, economic-, and human related point of view. The essence and also the advantage of this method is that the analysis can be extended to the complete innovation chain, or can be used just for a part of it (Assen et al., 2009). Complicated and complex activities can be observed more effectively at a necessary depth after breaking it down to smaller parts. To carry out a "weak-point analysis" or construct structure plans, the required breakdown depth should be determined which needs a serious theoretical knowledge and practical experience as well. Since there is no general rule for this, it is always determined by the actual target and the circumstances.

As an example, Table 1. shows a part of the "weak-point analysis" of the examined agricultural contractor. The rows of the matrix contain the technical, ergonomic and environment related reasons, causes of the development, while the columns represent the economic consequences coming from the given situation. The applied matrix can be replaced or extended with other or new reasons and consequences.

Table 1: The "weak-point analysis" of the agricultural contractor

Consequence / Reason	Quantity loss	Quality problems	Change/ replace	Extra costs	Less income	Missing function	....
Hazardous			M_1				
No more operation						E_1	
Pollute environment				E_2			
Technologically out of date		M_2					
High energy consumption				M_3,E_3			
Unreliable					M_4		
Economically out of date					E_4		
Low capacity	E_5				M_n		
Low performance			E_m				
....							

Where: $M_1 – M_n$ machines, E_1 - E_m equipment
Source: own construction

For the successful analysis, the matrix should be extended to the whole range of machines and means of the enterprise, including each sector, branch, all the farming technologies, the activities and operations to be carried out. The weak-point analysis delivers the available means, while structure plans points out the required physical means. Comparing the two results makes clear which machines and means ought to be replaced, converted or obtained.

The "balance equation"

The fourth step of the decision-preparation process aims to determine the amount of farming operation which should be performed in certain duration of time. Beside the former "structure plans" and "weak-point" analysis, the "balance equation" method should be also used to determine the degree of supply of physical means. This "balance equation" or rather inequality method is well known in the related papers (Husti, 2011).

$$m \leq x * h * p$$

where:

***m*:** quantity of the work to be done [shift-hours, nha]
***x*:** number of the machines [pcs]
***h*:** term available for the accomplishment of the work [shift-day]
***p*:** specific capacity of a given machine or tool [ha/shift-hours].

The calculation was based on the production structure and the applied farming technologies. The proper elaboration of the equation indicates the quality and quantity of work which has to be done through the planned machines and means at a given time. Table 2. shows an example for the basic input data to the calculation

Table 2: Basic input data for the "balance equation" calculations

	Months					
	May	**June**				**July**
Decades	**…**	**1.**	**2.**	**3.**	**0.**	**…**
Shift-day/decade *(days)*	**…**	7	7	7		**…**
Shift-hours/day *(hours)*	**…**	10	10	10		**…**
Number of machines *(pcs)*	**…**	3	4	2		**…**
Machine capacity *(hours/decade)*	**…**	210	280	140		**…**
Capacity demand/decade *(hours)*	**…**	80	70	110		**…**
Capacity demand/month *(hours)*	**…**	110	240	90	440	**…**
+/- capacity demand *(hours)*	**…**	-20	**30**	**60**		**…**

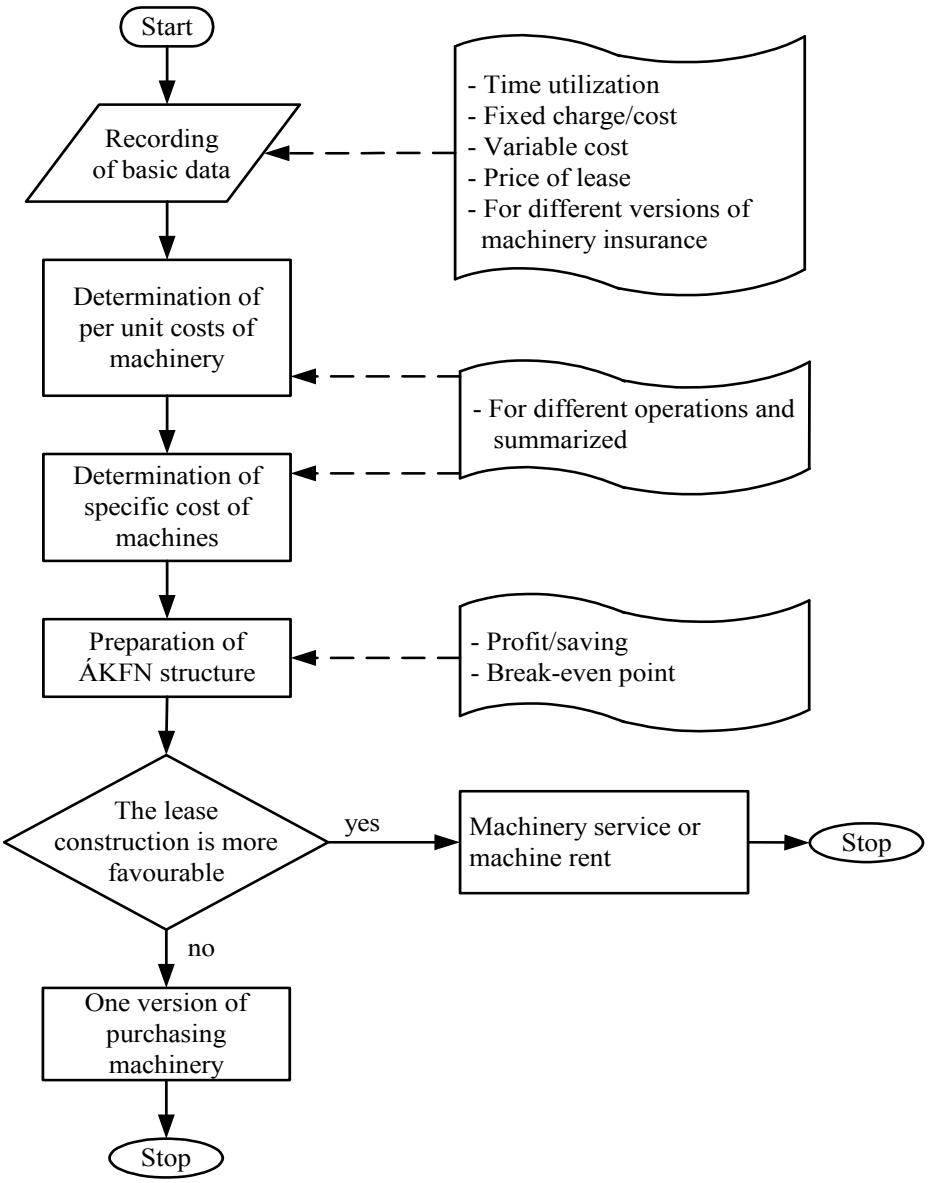
Source: own construction

Based on this information the actual project and development versions can be created. If the results of the analysis indicate that further machines or means are required for the enterprise, it should be examined which way they can be obtained.

The "break-even analysis"

In the fifth step of the decision-making process the simplified "break-even analysis" offers a solution for deciding between purchasing machines or hiring contractors (Sullivan et al., 2011). It indicates evidently the quantity range of work, above which the former, and under which the latter is more advantageous. Beside the arising fixed and variable costs, the model shows the realized savings as well. Figure 3. summarizes the process of revealing of the possible ways to meet the demanded physical means.

Figure 3: Break-even analysis for - purchasing vs. hiring machines



Legend: ÁKFN structure is used for calculating revenue (Á), costs (K), margin (F) and profit (N).
Source: own construction

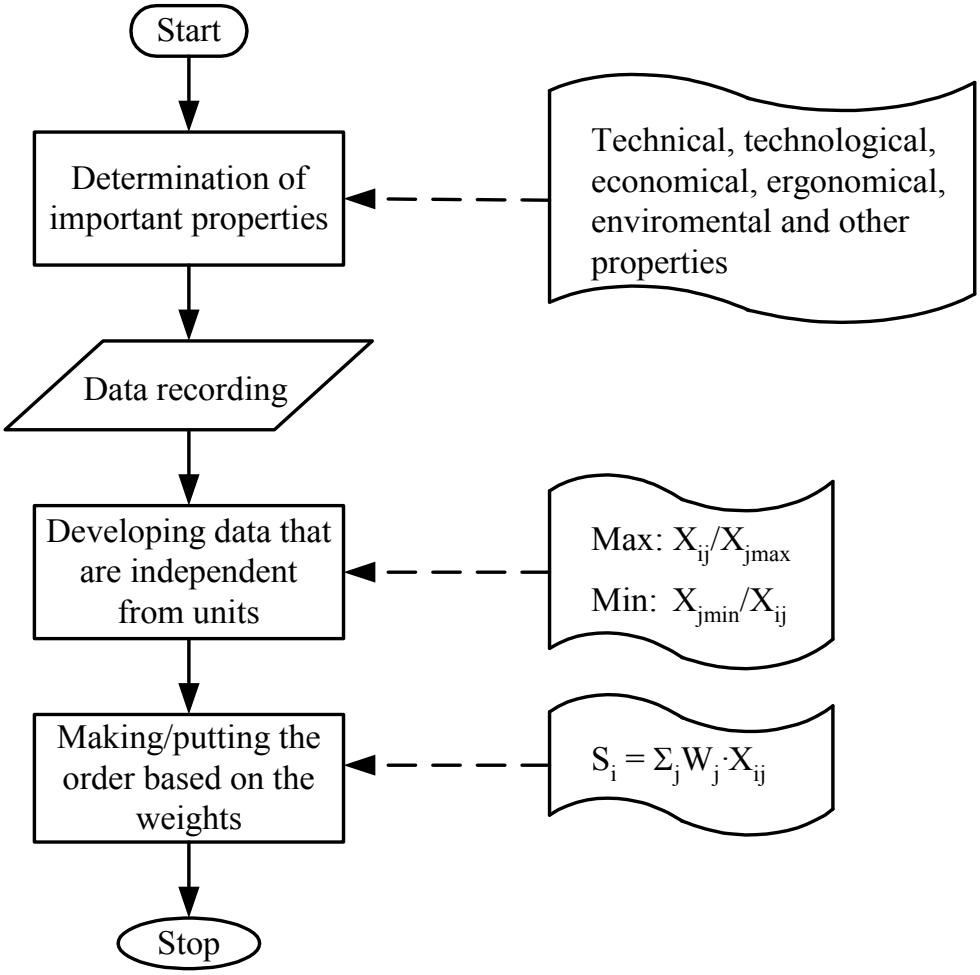
The comparing of complex criteria

This part of the model is for selecting the actual physical means and development version. On the buyer's market several dozens of means, equipments and technical solutions are available for the investor. Therefore, technical, technological, economical, ergonomic, environmental and other considerations have to be made before selecting an actual model.

For the complex comparison, the various features have to be converted in order to be comparable, i.e. the units should be eliminated and they must have the same direction. Generally, half of the characteristics (X_1- X_n) are correct if they reach the maximum, while the other half of them (X_n- X_m) if they reach the minimum value. But it can also occur that correct values are others then the extreme ones. Different characteristics must be converted to have the same direction.

If the single aspects cannot only be put in order of importance, but they can also weighted according to their importance, then the order among the possibilities will be defined by the weighted sum of the values (Figure 4).

Figure 4: Complex evaluation of the development versions, putting them in order



Source: own construction

The financing possibilities

This part of the model deals with the financing possibilities and their tendering which should be acquisitioned to provide the required means. There are more financing models that can be taken into account during the preparation of the investment decision (Table 3).

Table 3: List and denotations of the essential financing versions

Denotation	Name of the version		Denotation
A	Investment from own resources	Using subsidizations	**E**
B	Investment from credit	Using subsidizations	**F**
C	Acquisition through financial leasing	Using subsidizations	**G**
D	Acquisition through financial leasing investing own sources		
H	Acquisition through financial leasing using subsidizations and investing own sources		

Source: own construction

The following scheme of model calculation helps better understanding of the tendering process (Table 4).

Table 4: Basic data and quantities used in the calculations

Bé:	Market value (HUF)	**Lht:**	Repayment of leasing credit (HUF)
Se:	Own resource (HUF)	**Lhk:**	Interest rate of leasing (%)
B_0:	Total expenses (HUF)	**Tn:**	Increase of capital (HUF)
B_0*:	Present value of the total expenses (HUF)	**Tnk:**	Interest of the investments (%)
D_t:	Discount rate (%)	**T:**	Subsidization (%)
Ht:	Capital redemption of credit (HUF)	**Hkt:**	Interest rate subsidization of credit (%)
Hk:	Redemption of interest of credit (HUF)	**Lhkt:**	Interest rate subsidization of leasing (%)
Hkl:	Interest rate of credit (%)		

Source: own construction

The basic equations used in the calculations are summarized in Table 5.

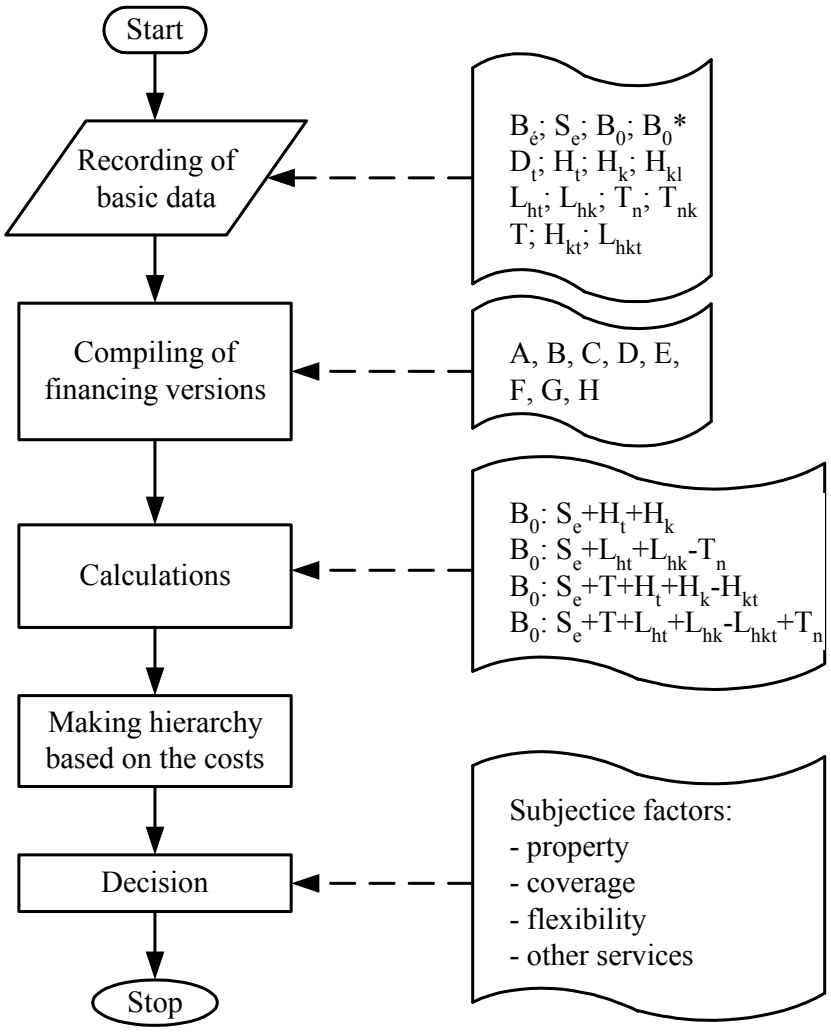
Table 5: Basic equations used in the calculations

Version	Equation	Version	Equation
A	$\mathbf{B_0}$ = Se	**E**	$\mathbf{B_0}$ = Se + T
B	$\mathbf{B_0}$ = Se + Ht + Hk	**F**	$\mathbf{B_0}$ = Se + T + Ht + Hk – Hkt
C	$\mathbf{B_0}$ = Se + Lht + Lhk	**G**	$\mathbf{B_0}$ = Se + T + Lht + Lhk – Lhkt
D	$\boldsymbol{B_0}$ = *Se + Lht + Lhk – Tn*	**H**	$\boldsymbol{B_0}$ = *Se + T + Lht + Lhk – Lhkt + Tn*

Source: own construction

The most favorable financing solution for the entrepreneur is the one that has the lowest expenses in the given situation and bringing the highest increase of income and having the most beneficial features for the enterprise (Figure 5).

Figure 5: Determining the financing method for the acquisition of means



Source: own construction

Conclusion

One of the most difficult tasks of managing an enterprise is to form the actual development versions and to make the decisions concerning to the realization.

The elaboration of a project means concretizing of the strategic plans creating a link between the activities of the strategic and the operative management. Special approach, knowledge of numerous management methods and a lot of experience are required for being able to solve this complicated task.

In my research, I have examined how problems related to forming of projects emerge in typically multifunctional agricultural enterprises, which aspect should be taken into consideration and which methods can be applied to solve them.

Due to the agricultural particularities and the multifunctional characteristic of the activities determining the content and volume of the result of the project is not simple, but the prudentially created plans of function-target and function-carrier structure throw light on the demanded physical means.

Most of the development projects are not realized as green-field investments, thus the planned developments should be fitted to the existing technical background or rather its function-performing capability should be considerately examined. This can be accomplished by the weak-point analysis which examines the already existing means.

Comparing the different features of the examined assets the most suitable one can be chosen based on the mathematical methods and the technical, economic and ergonomic aspects.

The financial versions can be evaluated by the created equations and model calculations. After the quantitative values the qualitative aspects should also be taken into consideration.

I proved that after the simultaneous use of the „structure plans", „weak-point analysis", "break-even" methods and the created tools together with confronting the results will clearly show which assets, machines and means should be replaced, converted, purchased or hired.

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3.2. EFFECT OF EUROPEAN FUNDS ON THE DEVELOPMENT OF AGRICULTURAL FARMS IN POLAND

Summary
The paper strives to present the level of diversification of agricultural development in Poland resulting from the uneven utilization of European funds allocated to this aim. Development of agriculture is determined significantly by the scale of investment in this sector. Therefore, this article analyses the measure "*Modernization of agricultural farms*" of RDP 2007-2013 and the state of the utilization of its measures by agricultural farms in the individual regions of Poland. The degree of activity and efficiency of beneficiaries in acquisition of European funds were determined in the paper and an attempt was made at identification of factors diversifying it.

Keywords: RDP 2007-2013, European funds, agricultural farm

Introduction

Agriculture is a special sector, standing out among other sections of national economy. It is due to the fact that production in this sector is based on living animals and undergoes their biorythms. It is also characterized by long cycles of production and seasonality. Capital turnover is much slower than in the other sectors of economy. Moreover, agriculture fulfills not only an important social and biological, but also a feeding function. Ensuring food security, which became crucially important after the experiences of the Second World War, inclined 6 countries: Federal Republic of Germany, Italy, France, Luxembourg, Belgium and the Netherlands to form the European Economic Community in 1957. Specificity of agriculture was acknowledged by the treaty founding the organization and known as the Treaty of Rome, which recognized "the particular nature of agricultural activity, which results from the economic and social structure of agriculture and from structural and natural disparities and different production structures between various agricultural regions".

In practice it led to subjecting food economy to the state protectionism.

The objectives specified in article 39 of the Treaty of Rome were to contribute to:

a) increase in agricultural productivity by promoting technical progress and the more efficient utilisation of the factors of production,
b) increase in farmers' incomes, ensuring a fair standard of living for the agricultural community,
c) stabilisation of agricultural markets;
d) ensuring the continuous availability of supplies to people;
e) ensuring the reasonable prices for consumers.

The first plans and premises of establishing a common market, agricultural union or "green pool" in Western Europe appeared in the fifties of the 20th century. At that time, the ministers of agriculture of the Netherlands – S.L.Mansholt and France – P. Pflimlin at the conference in Stresa, Italy, addressesd the issue of formulating the principles of agricultural policy, which have been in force until this day. These comprise: the market unity, Community (European) preference and financial solidarity.

Common Agricultural Policy is the oldest EU policy, yet it comprises the greatest number of regulations. It was launched to protect the agriculture of Western Europe, destroyed during the war. It was meant as a protective mesure against market fluctuations and ensure a constant growth of agricultural production experiencing food deficiency in Europe. Common Agricultural Policy was first implemented on 14 January, 1962 by signing the Brussels agreements. At that time the crucial decisions were made concerning the method of functioning of the Common Organisation of the Market in Cereals (Musiał and Legutko, 2000).

The legal foundation of CAP financing is Art. 40, paragraph 4 of the Treaty of Rome, which assumes that one or several agricultural guidance and guarantee funds may be set up. Finally, in 1962 the European Agricultural Guidance and Guarantee Fund was set up by Regulation No 25 of 1962 of the Council. A duality of the common agricultural policy comprising the market policy and structural policy rendered necessary separation two sections within the Fund: Guidance and Orientation. (Czapla and Guba, 2002)

Guarantee Section financed common agricultural policy; Orientation Section was the source of funding for structural transformations of agriculture and multifunctional rural development. For over 45 years of common agricultural policy implementation, the objectives stated in the Treaty of Rome have not been changed. The support instruments have been changed, since additional objectives supporting structural transformations of agriculture have been determined.

Common Agricultural Policy was successful enough to allow for a fast satisfying the demand for agricultural products and then led to an overproduction phenomenon. The costs of CAP were growing dramatically and during the peak period exceeded 70% of the EU budget. Many experts criticised export subsidies applied in the EU for their negative effect on economic cooperation with other countries. Liberalisation of food trade led to a gradual decrease in these subsidies. Despite a considerable gradual reduction, expenses on agriculture still account for c.a. 45% of the European Union budget, whereas the phenomenon of surplus production remains a serious problem and must be restrained by a complicated and costly system of regulations. Therefore, subsequent regulations were introduced in the nineties of the 20th century, which were to stop constantly growing overproduction and decrease the prices of agricultural products, at the same time avoiding a decline in farmers' incomes. The directions of changes of agricultural policy were a response to changing external (criticism of GATT, later WTO) and internal (criticism of consumers an tax payers) conditions.

Summing up: Common Agricultural Policy, which is a common, transnational agricultural policy comprising the membership in a common open market but also the unity of European interests and financial solidarity, has undergone evolutionary

development and subsequent reforms. It has been shaped also under the influence of actual crisis situations and has become increasingly more dependant on difficult, changing environmental and climatic conditions. The changes resulted also from the subsequent EU extensions which caused a deepening disparities in agriculture due to the natural conditions, structure and size of farms and structure of production. Despite the above mentioned facts, Common Agricultural Policy does not solve all problems, since it addresses the entities of various size and scale of activities (farm with large production potential but also small subsistence farms). Small farms prevail in many countries and regions in Europe, or at least they are significant for the agrarian structure. They constitute an important entity of agricultural economy, engaging a considerable human potential and capital. They function in all European Union states. Their activities encounter similar problems as faced by large commercial farms. Due to small scale of production and low incomes, small farms usually are unable to meet the challenges posed by globalisation of food turnover, growing competition or increasing requirements of the community pertaining to a widely understood natural environment protection.

Poland is a specific example of a developed country where a large number of so called small "family" farms remained, in which subsistence farms, allocating up to a half of their entire product to their own needs, account for as much as 2/5 of the total number. (Zegar, 2012) Among the other farms almost 2/3 are semi-subsistence farms.A considerable group of these farms are developing relatively fast, adjusting to the market principles and uses the EU Common Agricultural Policy instruments. However, small farms, which constitute a majority, wrestle with a problem of effective utilisation of their resource and are unprofitable. They are mainly grouped in the south-eastern and central regions of Poland. Their flexibility and adjustment to the market requirements progress slowly, however the farms more and more frequently apply for and use the European Union funds affording them a quicker adjustment to the market and becoming competitive. Small family farms are usually associated with a relatively small scale of production, great biodiversity, modern technologies, ecological equilibrium and environmental quality, as well as with high quality of manufactured products targeting selected groups of consumers and preserving rural cultural heritage.

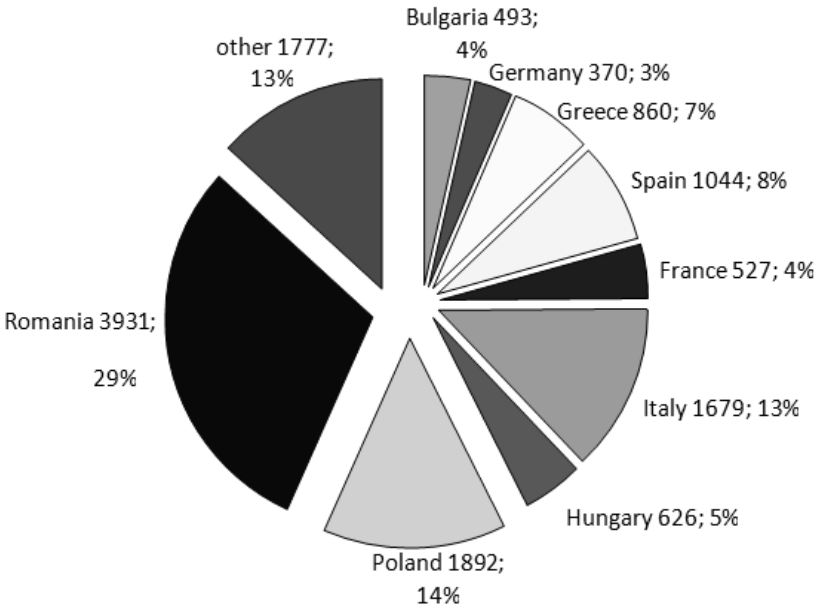
However, there is still no clearly defined borderline between a family farm, small and big farm. There are also several definitions of "agricultural farm" functioning in Polish subject literature and in practice. However, as the most common is considered the definition used for statistical purposes, which states that: an agricultural farm denotes ploughlands with forest lands, buildings or their parts, equipment and livestock, if they constitute or may constitute organized economic entity and laws connected with running an agricultural farm.

According to the results of Agricultural census 2010 (in: Charakterystyka gospodarstw rolnych. Powszechny Spis Rolny, 2012), in June 2010 the number of agricultural farms in Poland was 2 280 thousand (of which 1 892 thousand farms were

conducting agricultural activities, whereas in 2011 the number of farms decreased to 1 583 thousand). Of this number almost 100% of farms belonged to private sector[1].

Figure 1 shows the position of Poland among selected European Union countries, in which the number of agricultural farms exceeded 300 thousands.

Figure 1: Agricultural farms conducting agricultural activities in 2010 in the European Union countries



Source: SAEPR FAPA based on EUROSTAT (2011)

Average farm area in Poland is 10.1 ha whereas an average economic size of a farm in Poland is 3.6 ESU (at EU average -11.3 ESU). For comparison, an average economic size in Slovakia is 7 ESU, while in France 54 ESU.

Material and methods

Presented article strives to evidence the level of diversification of agriculture in Poland resulting from unequal utilization of European funds allocated to this purpose. The empirical material constituted of statistical data originating from EUROSTAT, GUS and the Agency for Restructuring and Modernisation of Agriculture (ARMA) reffering to RDP 2007-2013 measure *"Modernisation of agricultural farms (MAF)"*.

Descriptive and comparative analysis, and cause-and effect analyis were the methods applied in the paper, whereas the results were presented graphically.

[1] Agricultural Census 2012 was conducted eight years after the previous analogous census. The census is particularly interesting and decisive, since it had place after Poland's integration into the European Union. Collected data is crucially important for many organs of both state administration and institutional structure of EU, OECD and FAO.

Description of the programme

In 2007, a new financial perspective spanning the years 2007-2013 (RDP 2007-2013) was launched in the European Union member states. Its main objective is realisation of the concept of multifunctionality of agriculture and rural areas, and economic strenghtening of agricultural farms (Kornalska and Treka, 2012). At the same time it aims at ensuring the instruments to diversify economic acivities towards creating alternative sources of income and improving the quality of life in rural areas. (Rowiński , 2004)

RDP 2007-2013 (Rural Development programme) is composed of 4 axes:

- Axis 1 (Economic) : Improvement of the competitiveness of the agricultural and forestry sector
- Axis 2 (Environmental): Improving the environment and the countryside
- Axis 3 (Social) : Improvement of the quality of life in rural areas and diversification of rural economy
- Axis 4: LEADER.

The measures planned under Axis 1 and Axis 3, among these: Modernisation of agricultural farms and Diversification into non-agricultural activities, are still the most popular among farmers – beneficiaries, which has been reflected in the structure of RDP budget.

Initiating the *Modernisation of agricultural farms* (MAF) measure was determined by the fact that agricultural farms in the Republic of Poland are in the process of adjustment to the functioning on the European Union Common Market. There is a great need for the financial support of the investments targeting the improvement of the competitiveness of agricultural farms through modernisation of technical infrastructure of production, adapting the profile, scale and quality of production to market needs, improvement of food safety, improvement of animal welfare, natural environment protection or work safety.

The objective of the measure is supporting modernisation of farms to increase their efficiency through better utilisation of agronomic inputs, including introduction of new technologies of production, improvement of production quality, diversification of agricultural activities, but also harmonisation of conditions of production with the requirements of the natural environment protection, hygiene of production and animal welfare. The aim of the measure is also ensuring the agricultural producers running dairy production a possibility to adjust to changing conditions due to the planned termination of milk quota system in 2015. Under the framework of MAF the support will be provided for investments in modernisation or development of the primary crop or livestock production, excluding production related to forestry and fisheries. The operations may concern manufacturing of both food and non-food products (including agricultural products used for renewable energy generation), but also preparation of agricultural products produced on farm for wholesale or direct sale. The activities may also comprise investments on generating and utilisation of renewable energy for the needs of agricultural production.

The aid will be granted for the investments which will not cause an increase in production for which there is no market.

Financial assistance may be provided for the investments on farm adjustment to the standards resulting from the European Union legislation:

1. Provisions in force – provided that the investment is made by a beneficiary of the measure "Setting-up of young farmers" according to a business plan, whereas the farm adjustment will be accomplished before 36 months from the start up of running the agricultural farm;
2. Newly introduced provisions – provided that the adjustment will be accomplished during the period of no longer than 36 months from the day when the standard came into force.

According to the main objective of the measure, the aid is granted for the investment which:

1. will contribute to improvement of total results of the farm:
   a) increase in gross added value (GVA) on farm, particularly in result of rationalisation of technology of production or introducing innovation, change of profile or scale of production, improvement of the quality of production or increasing product added value, or
   b) improvement of the situation on farm pertaining to protection of the natural environment, or
   c) improvement of the situation on farm concerning animal welfare, or
   d) improvement of the situation on farm concerning the hygiene and safety of production, or
   e) improvement of the situation on farm concerning road infrastructure,
2. satisfies the requirements stated by the law regulations;
3. has been justified as to the amount of expenditure;
4. is not of an investment replacement character.

The beneficiaries must fulfill the following conditions:

- European Size Unit (ESU) – the farm where the investment is made is economically viable (the farm economic size equals at least 4 ESU) and is run by a person possessing adequate professional qualifications (where justified the qualifications may be completed during the so called transitional period).
- Both tangible and intangible investments on modernisation of agricural production are supported by MAF, in particular:
  1. Tangible investments:
     a) construction or renovation involving modernisation of buidings or houses,
     b) purchase or installation of machinery or equipment, including computers,
     c) setting up, modernisation of orchards or perennial plantations,
     d) purchase, installation or construction of the elements of technical infrastructure directly affecting the conditions of conducting agricultural activity, preparation for sale or direct sale;
  2. Intangible investments:
     a) purchase of patents, licenses, including software licenses,
     b) services connected with preparation of technical or economic documentation concerning the project and techical supervision, directly connected with the project realization.

In most of the farms in Poland, both the amount and quality of equipment necessary for agricultural production are insufficient, therefore modernisation of farm technical facilities is necessary. Because of high costs of major equipment and relatively low incomes generated by agricultural activity in Poland, it is permissible to purchase second hand equipment, but no older than 5 years.

Leasing of machines or appliances is also permissible. The programme beneficiary may be a physical person, legal person or partnership running agricultural activities in the field of crop or livestock production. The physical person must be of age but below the retirement age.

The financial support under this measure may granted for investments adjusting the farm to the Community standards which have been in force for less than 36 months. The investments may involve adjustment to the standards resulting from the implementation of directive 91/676/EWG on water protection against pollution caused by nitrates from agriculture:

- adaptation of farms to the standards stated in programmes aiming at reduction of nitrogen outflow from agricultural sources in the appointed, particularly threatened areas (PTA).
- Programmes of activities targeting individual PTAs, on the basis of local legal acts (decree of the director of general or regional directorate of water management) have been launched since 2004 and span 4-year periods. These programmes comprise among others farm adjustment concerning storage of natural fertilizers and bulk animal feeds.
- The support under Modernisation of agricultural farms (MAF) measure may be also granted for investments adapting the farms owned by the beneficiaries of ”Setting up of young farmers” scheme, included in RDP 2007-2013, to the community standards in the areas of hygiene of production and animal welfare.

The aid is granted in the form of reimbursement of the eligible costs (parts of costs incurred by investment realisation).

The maximum amount of financial aid granted for one beneficiary per one farm under the measure, during the period of RDP realisation cannot exceed 300 000 PLZ (76 848.2 EUR). The amount in euro is indicative. (Zieliński and Żmija, 2012)

The operations which eligible costs exceed 20 thousands PLZ, will be accepted for funding. The limit does not apply to the activities comprising exclusively agricultural farm equipment in appliances for natural fertilizer storage or projects connected with adjustment to the Community standards (Dokument rządowy PROW 2007-2013, 2012).

Aid intensity under the programme framework

The level of aid is a maximum of:

- 40% of the costs of investment eligible for financial aid;
- 50% of the costs of investment eligible for financial aid realized by a physical person who was under 40 years old on the day of application submission;
- 50% of the costs of investment eligible for financial aid, realized in the mountain areas, other less favoured areas, in agricultural areas within the NATURA 2000

network or in the areas where restrictions associated with the Framework Water Directive implementation apply;

- 60% of the costs of investment eligible for financial aid realized by a physical person who was under 40 years old on the day of application submission, in the mountain areas, other less favoured areas, in agricultural areas within the NATURA 2000 network or in the areas where restrictions associated with the Framework Water Directive implementation apply;
- 75% of the costs of investment eligible for financial aid realized because of the enactment of Nitrate Directive – applies to the contracts signed before 30 April, 2008.

Financial aid granted under the "Modernisation of agricultural farms" measure may partially overlap the aid granted under the same measure, implemented in the framework of the National Restructuring Programme.

In order to eliminate a double financing of the same operations from two different sources, administrative checks will be carried out by the Agency for Restructuring and Modernisation of Agriculture and Agricultural Market Agency.

Table 1: Quantified target values for joint monitoring indicators

Indicator type	Indicator	Target value 2007-2013
Product	Number of agricultural farms which obtained aid *(also under "new challenges" scheme)*	63 214 *(1 588)*
	Total value of investments (EUR) *(also under "new challenges" scheme)*	4 796 890 923 *(172 840 278)*
Outcome	Number of farms, which introduced new products and/or technologies *(also under "new challenges" scheme)*	47 404 *(1 183)*
	Increase in gross added value on farms which obtained aid (in EUR) *(also under "new challenges" scheme)*	1 330 000 000 *(48 358 284)*
Effect	Economic growth	Growth by 50.1% (including 0.41% from RDP)
	Labour productivity	Growth by 47.8% (including 0.49% from RDP) Target value 22 270 EUR per person

Source: RDP 2007-2013, state document based on Dokument rządowy PROW 2007-2013 (2012)

The list above shows the indicators used by the Agency for Restructuring and Modernisation of Agriculture for monitoring of the implementation and realization of the Modernisation of Agricultural Farms measure. At the same time they indicate the main financial-economic assuptions of the measure.

Discussion

Since its transition to the free market economy system, Poland has been making up for the losses due to economic banckwardness and previous lack of democracy, among others through realisation of strategy of development and the European Union policy. It has been evident in the first place in industries, transport, infrastructure, agriculture or protection of the environment. It should be emphasized, that the changes connected with the system transformation after 1989 are positively perceived by a majority of citizens. However, some of the changes still involve a number of distressing phenomena, such as a necessity to adjust to changing cultural or social circumstances. It is particularly difficult for the oldest age groups but also for rural communities.

Since 1994, when Poland made effort for its membership in the European Communities, Polish agriculture has been in the first place covered by the adjustment schemes to satisfy the integration requirements, and next by the activities aimed at improving the competitiveness of agricultural farms.

Accession of Poland to the European Union in 2004 completed the pre-accession period, whereas it raised hopes and evoked considerable interest among Polish farmers in financial assistance which became available from the EU funds. At the same time, potential beneficiaries became apprehensive, reluctant and lost in a multitude of measures offered by individual assistance programmes. The most common barriers were legal procedures and also legislative problems. A serious problem in Poland is the specificity of Polish agriculture and rural areas, particularly considerable land parcelling and accompanying agrarian overpopulation. Therefore, rural development became a priority in Poland (Drygas, 2008). It has been a complicated process involving many entities, whereas the problems which must be solved are usually complex and have been established for many decades. In Poland it refers to 93% of the country area and concerns almost 15M people, which is 39% of the country population.

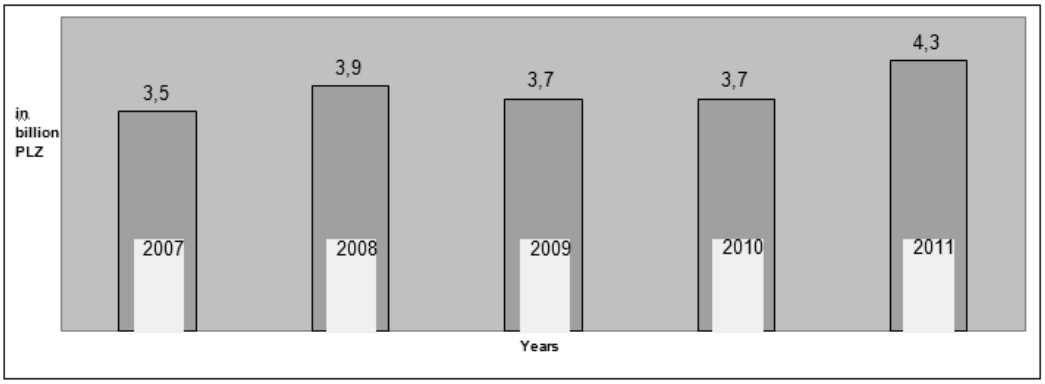
Poland, as a not very rich country, where rural areas cover such a large part of the territory and their inhabitants make up a considerable proportion of the citizens, cannot afford ignoring the problems of agriculture, non-utilisation or low efficiency of possessed resources utilisation. Therefore, recognition of Polish agriculture potential, the ways of its more effective utilisation and analysis of necessary adjustments seems important. (Klepacki, 2003)

Agriculture in Poland is of greater social and economic significance than in the other EU member states. However, it does not mean that the condition of agricultural sector is on a high level. According to EUROSTAT data published in 2007, six Polish voivodships, where agriculture share in national economy is considerable in relation to the other sectors, are among the poorest regions of the European Union.

Currently prevailing opinion among farmers is that not only large area farms are viable, but also smaller ones possessing below 50 ha, on condition they will “hit on an idea for business” and will manage their resources more cost-effectively.

As results from Agribus research, conducted by Martin & Jacob Agency (Badanie Agribus 2012), investment outlays in agriculture and hunting increase every year (Figure 2).

Figure 2: Investment outlays (in billion PLZ) in agriculture and hunting



Source: Agribus research, 2012, Martin &Jacob Agency

The data above are coherent with the data supplied by GUS, according to which modernisation, construction of farm buildings, machinery, appliances and tools occupy dominant position among the investments, reaching 1.6 billion zlotys. In 2012 farms purchased 19.3 thousand tractors (11 percent more than in 2010). It is also reflected in financial situation of farmers.

Data of the Main Statistical Office (GUS) reveal that expenses on maintenance and running of agricultural farm constitute 56% of the household expenditure (34% are living expenses, 10% expenses for luxury goods). All investments in farms have been equally co-financed from the European Union funds.

Table 2: Number of submitted applications, signed contracts and their values within the MAF measure in the years 2007, 2009 and 2011

Year	Category	Country/Poland
2007	Submitted applications	18 372
	Signed contracts	14 335
	Amount (PLN)	1 820 226 280,97
2009	Submitted applications	24 863
	Signed contracts	20 327
	Amount (PLN)	2 968 667 653,88
2011	Submitted applications	34 676
	Signed contracts	ongoing
	Requested amount (PLN)	5 149 900 534,18

Source: Author's own studies based on ARMA data (Dokument rządowy PROW 2007-2013, 2012)

Modernisation of buildings and purchase of machines are among the main tasks financed under the Modernisation of Agricultural Farms measure. The measure is a part of RDP 2007-2013, Axis 1 (Economic) - Improving the competitiveness of the agricultural and forestry sector. A farmer, the beneficiary using assistance under the

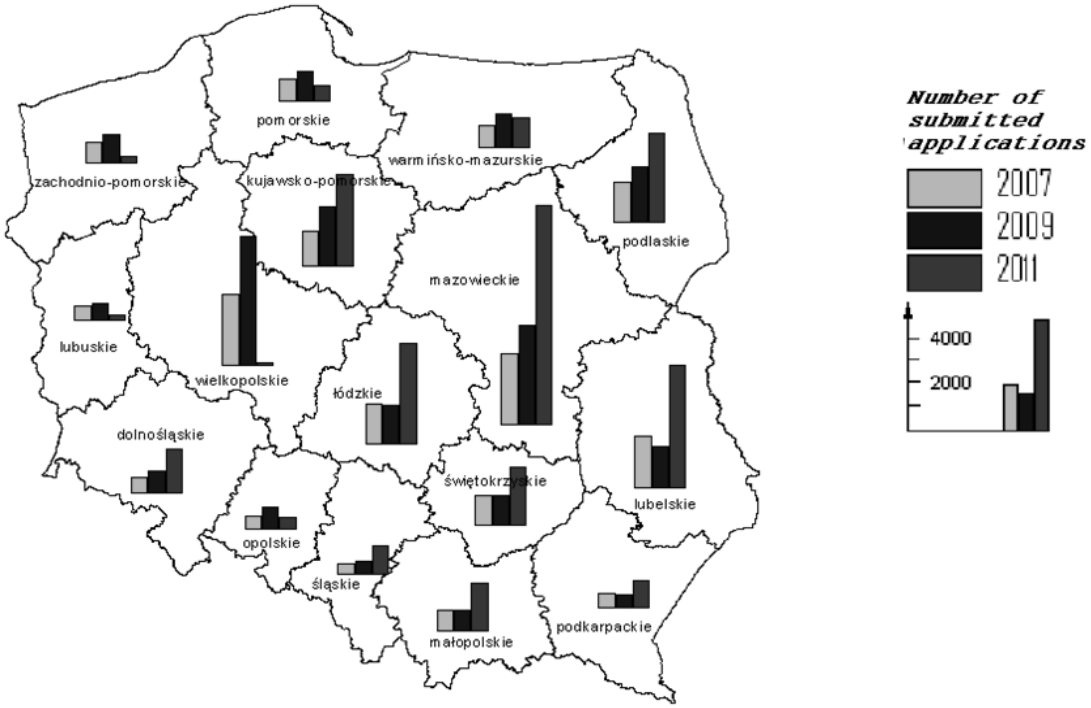
MAF measure may obtain financial assistance to the amount not exceeding 600 thousands zlotys (in which 50% is his own input and 50% the EU funds).

There were three rounds of fund allocation under MAF measure in Poland, respectively in 2007, 2009 and 2011.

Each successive opportunity of application for external funds aimed at supporting investments in farms brought a definite increase in the number of applications (see at Table 2.). Due to formal reasons (for example missing information or incorrectly filled applications), many of the submitted applications were not taken into consideration, yet it did not prevent further applications for funds.

Figure 3 shows activeness of agricultural farms in individual regions of Poland. The second call for proposals indicates a considerable increase in the activeness. This group comprised not only new beneficiaries but also the farmers who have not used the maximum amount of allocated funds.

Figure 3: Call for proposals under MAF measure per regions



Source: Authors' own studies on the basis of ARMA data (2012)

Table 3 shows indicative degree of funds utilisation per one rural inhabitant, per one farm and per 1 ha AL. Despite considerable activeness of farmers, the data presented above are not satisfactory. In comparison with other European countries Poland occupies a far place in the ranking of countries - beneficiaries of Rural Development Programme. (Szumski, 2007)

Table 3: Utilization of funds allocated to MAF in Poland (as of 31.12.2011)

Utilization of funds within the Framework of RDP	Poland
Total [zł]	4 182 230 915.06
Total [€] ass. 1€ = 4,00 zł	1 045 557 728.76
Per one rural inhabitant [zł]	411.24
Per one rural inhabitant [€]	102.81
Per farm [zł]	2 641.96
Per farm [€]	660.49
Per 1 ha AL [zł]	258.53
Per 1 ha AL [€]	64.63

Note: assuming 1€ = 4,00 zł
Source: Authors' own studies based on ARMA 2012 (ARiMR , 2012)

The ratio of the amount of granted assistance to the number of farms (as stated by GUS) and the number of entities registered in the register of producers kept by ARMA shows that: Zachodniopomorskie, Warmińsko-Mazurskie, Pomorskie, Kujawsko-Pomorskie, Lubuskie and Wielkopolskie voivodships reached the highest indicators (Figure 4). These voivodships are the largest ones considering the farm area and number of agricultural farms.

Figure 4: Amount of assistance co-financed from the EU, allocated by ARMA in 2002-2011 per agricultural farm and entity registered in the Producers' Register (31.10.2011.)

Source: statistical elaboration by ARMA 2012 (ARiMR, 2012)

Conclusions

Due to natural, historical and cultural conditions, agriculture both in Poland and in the European Union countries is highly diversified both in its agrarian structure, directions of production, its intensity and the level of generated incomes.

The diversity of the European funds absorption in Poland results from the size of agricultural sector. Analysis of utilization of the assistance granted since the beginning of implementation of the programmes co-financed from the EU funds until 31.12.2011 as per regions, revealed that the highest amount of payments was realized for the following voivodships: Mazowieckie, Wielkopolskie, Lubelskie – where the highest number of large area farms is operating.

Efficient utilization of the EU funds for investment purposes is not favourable for the regions with dispersed agrarian structure, small area farms and greatly dispersed lands owned by individual farms.

In "big" voivodships farmers have a better access to agricultural extension specialists and professional help in the area of European funds.

Farmers reveal a great interest and efficiency in the EU funds acquisition.

The structure of expenditure of agricultural farms looks positive and rational (almost 60% is expenditure on investment in farm). All EU grants affected not only increase in farm income, but primarily the level of investment in farms.

Increasingly higher funds end up on Polish farms and farmers are no longer afraid to use the EU assistance.

Poland's accession to the European Union opened a new chapter in rural development. Capital mainly targeting the agriculture and rural development reached Polish country.

CAP has its values resulting from the community character, but has to allow for such high diversification of agriculture as observed e.g. in Poland. It requires application of various support instruments. It cannot be conveyed only to equalizing the level of support, but it is necessary to use the instruments characteristic not so for the countries as for the regions. Sometimes a local or even individual approach will prove necessary. For solving the problems of small farms, not only the policy connected with the CAP 2nd pillar should be important, but also the EU cohesion policy, therefore the participation of local governments is crucial.

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3.3. ECONOMIC IMPACTS OF MASTITIS AND REPRODUCTIVE DISORDERS IN THE HUNGARIAN DAIRY HERDS

Summary
The sharp competition among dairy herds in the EU caused the recognition in herd managers that the main sources of losses related to herd health should be discovered. The object of this study was to quantify average annual losses due to mastitis and reproductive disorders in dairy herds. The study included 8 Hungarian herds with 6,825 Holstein-Friesian cows, altogether. The results showed that the decrease in milk production of cows suffering from subclinical mastitis means 58.9 EUR loss per cow per year. The amount of discarded milk, early culling due to mastitis and the drug costs were responsible for 49.5 EUR, 39.1 EUR and 12.9 EUR extra costs, respectively. Therefore, the average annual loss due to mastitis was 160.4 EUR per cow in 2011. Milk losses, early culling and drug costs caused 67.6% (108.4 EUR), 24.4% (39.1 EUR) and 8% (12.9 EUR) of the total amount of losses, respectively. Annual loss of income related to reproductive disorders exceeded 227 EUR. Increased calving interval caused the majority of this loss (70.9%, 161 EUR). Premature disposal owing to reproductive disorders also had large economic impact, causing 13.4% (30.5 EUR) of the total loss. Treatment cost brought about 16.9 EUR (7.5%), while increased number of services per cow was responsible for 8% (18.7 EUR) of the total expenditures.

Keywords: economic losses, mastitis failure, reproductive failure, dairy herd

Introduction

The competition among dairy producers is getting even sharper nowadays. In this challenging situation Hungarian dairies are only able to survive by continuously increasing the efficiency and thereby the profitability of their production (see also Illés, 1998). The level of animal health is a major influencing factor of the profitability on dairy farms, thus, it is strongly advised to explore herd-level diseases causing the greatest economic losses. Having quantified economic losses cost-benefit analysis of new management implementations becomes possible. Studies and surveys of the recent decades show that mastitis and reproductive disorders are responsible for the greatest herd-level losses.

Economics of mastitis

Mastitis is the most common and most costly disease on the dairy farms of developed countries (Seegers et al., 2003). Several risk factors affect its occurrence, thus making mastitis prevention a difficult task. In addition, numerous production parameters are influenced by this disease, causing huge herd-level losses, both

decreased income (hidden loss) and increased direct cost (Huijps et al., 2010; Leblanc et al., 2006; Østergaard et al., 2005; Seegers et al., 2003, Valeeva et al., 2007).

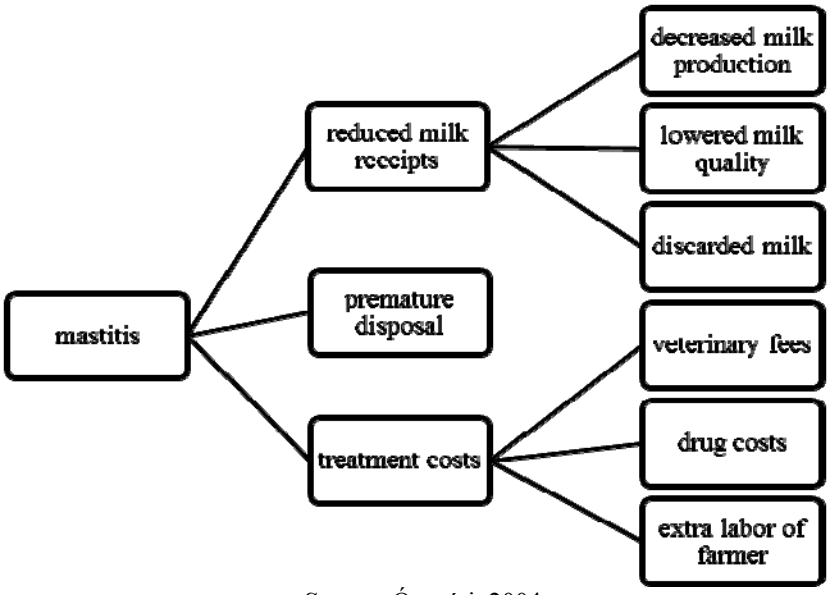
The health status of the udder is mostly measured by somatic cell counts (the number of somatic cells per millilitre milk; SCC/ml), which – according to recent studies – remains under 50,000 SCC/ml if the mammary gland is healthy. When the udder becomes diseased, the SCC increases (Hagnestam-Nielsen et al., 2009; Halasa et al., 2009).

Basically, we have to make a distinction between clinical and subclinical mastitis. In the clinical cases, we can find changes on the udder and in the milk during physical examination, while the subclinical cases are indicated only by the elevated SCC of the milk. It has to be emphasized, that according to the surveys made so far, the economic impact of the subclinical form is much larger than the losses caused by clinical mastitis. In practice, the clinical form is identified in the milking parlours, however, the subclinical form, which is more difficult to detect, is diagnosed with either California Mastitis Test (CMT) or in laboratories with precise cell counter devices (Rafai et al., 2003; Wolfová et al., 2006).

Most authors classify mastitis pathogens into infectious pathogens and environmental pathogens. Infectious pathogens are able to spread from one cow to the other within the herd, in which milking hygiene has an important role. Environmental pathogens originate from the faecal contaminated keeping place of the animals, threatening udder health during lactation as well as during the dry period. It has to be mentioned that some pathogens are able to spread both ways (Rafai et al., 2003).

On the modern large-scale dairy cattle farms, *Staphylococcus aureus* causes the greatest economic losses among the infectious pathogens, which is widespread also in Hungary. *Coliform* bacteria are one the most important environmental pathogens; according to the survey of Ózsvári (2004) they cause 160 EUR loss per infected cow annually. Sources of herd-level losses due to mastitis are shown in Figure 1.

Figure 1. Sources of herd-level losses due to mastitis (Ózsvári, 2004)



Source: Ózsvári, 2004

Reduced milk receipts

Reduced milk receipts make two-third of the total losses related to mastitis (Ózsvári et al., 2001; Ózsvári et al. 2003a; Wolfová et al., 2006). This source of loss originates from decreased milk yield, lowered milk quality and the amount of discarded milk, of which decreased milk production plays the most important role (Table 1).

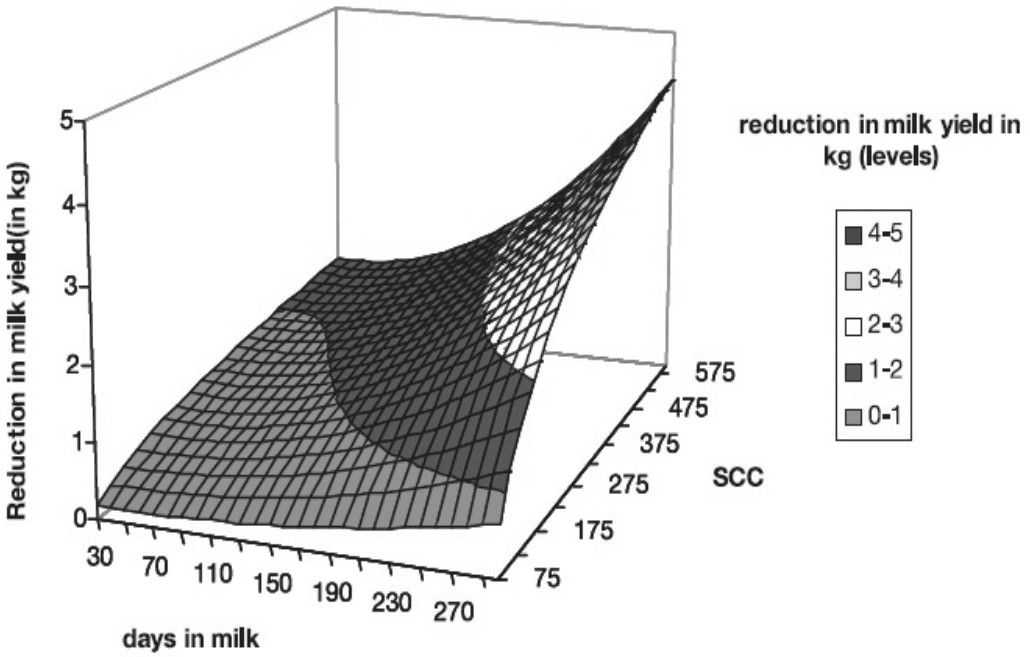
Table 1. Annual milk yield decrease per cow related to mastitis

Study	Milk yield decrease (kg/cow/year)
Blosser, 1979	386
Mcnab- Meek, 1991	170
Ózsvári, 2004	211
Østergaard et al., 2005	385

Source: own construction

The more severe the mastitis, the more the milk is lost. Severity of mastitis can be expressed by the elevation of SCC. According to more recent studies the udder has to be considered healthy if the somatic cell count of the produced milk is under 50,000 SCC/ml, however, in our present study we used 250,000 SCC/ml as a threshold to regard cows as being diseased with subclinical mastitis, because above this threshold we can find mastitis pathogens in almost all cases (Ózsvári, 2004). Daily milk production loss depends not only on the SCC of the milk, but also on the number of lactation and days in milk (Figure 2).

Figure 2. Relationship among SCC, stage of lactation and milk production



Source: Seegers et al., 2003

The largest milk production loss occurs in cows in their second or later lactation and in the later stages of lactation, that is why management measurements against subclinical mastitis should mainly focus on these animals. According to the study of Hagnestam-Nielsen et al. (2009), the milk yield decrease above 500,000 SCC/ml is 3-9% in cows in their first lactation and may reach 18% in cows with more lactations! In addition, older cows represent a higher proportion in the herd, thus making them responsible for the majority of the herd-level milk production losses.

Mastitis cases are usually treated with antibiotics, but milk for human consumption must not contain antibiotic residues, so the milk produced during the withdrawal time of the medication is discarded or fed with the calves. In the second case the farm can reduce its production costs by spending less on milk powder, however, the chance for infectious diseases to appear (especially Johne's disease and salmonellosis) is higher (Blosser, 1979; Mcnab- Meek, 1991; Swinkels et al., 2005). Different studies showed different financial losses related to discarded milk (Table 2).

Table 2. Losses related to discarded milk

Study	Loss (USD/cow/year)
Dobbins, 1977	7.72
Blosser, 1979	12.88
Ózsvári, 2004	26.9
Wolfová et al., 2006	39[a]
Cha et al., 2011	20[b]

[a]: EUR/cow/year; [b]:USD/mastitis case
Source: own construction

In several countries farmers are encouraged to improve udder health with quality premiums based on milk SCC. In Hungary producers are not permitted to buy milk from the farm above 400,000 SCC/ml (Ózsvári, 2004; Valeeva et al., 2007).

Cost of premature disposal

Culling of cows can be classified into voluntary and involuntary culling. Voluntary culling means that it is economically not beneficial to keep the cow in the herd anymore because of its low production or unfavourable genetics. If a health problem as a forcing factor leads to the disposal of the animal, it is called involuntary or premature culling. Mastitis is the second most common reason of premature disposal, running up to 5-17% of the total disposals. The raising cost of heifer for replacement can be reduced by the slaughter value of the culled cow (Ózsvári, 2004; Seegers et al., 2003). If the cow dies there is no salvage value. The mortality rate of mastitis caused by Gram negative pathogens is higher than caused by the Gram positive ones. Hazlett et al. (1984) found *Escherichia coli* in 74% of the lethal mastitis cases, while the presence of *Klebsiella spp*. and *Staphylococcus aureus* were shown in 8% of the samples, respectively.

Cost of mastitis treatment

This expenditure consists of veterinary fees, drug cost and the cost of the extra labour of the farmer (Ózsvári et al., 2003a). According to the study of Bar et al. (2008), treatment cost could reach 30% of the total losses related to clinical mastitis cases. Veterinary fees may vary on a wide range; in the study of Wolfová et al. (2006) this cost amounted to 14.73 EUR/cow/year. On the farms which employ a veterinarian with fix salary (it is widespread in Hungary), this cost factor is not taken into account, because the fee of the vet does not depend on mastitis incidence.

Several mastitis treatment options exist, which differ in antimicrobial spectrum, way of application, duration of the effect, and its cost (Ózsvári et al., 2003b). So when we choose a treatment, it is an economic decision, too. Mostly antibiotics or antibiotic-NSAID (non-steroidal anti-inflammatory drug) combinations are used to treat the mastitis, however, it may come up that culling is the economically optimal decision instead of treating the animal. According to the study of Wolfová et al. (2006) antibiotics were used in 97% of the clinical mastitis cases. Treatment costs showed significant differences among farms, because of the following factors: severity of clinical mastitis, average duration of the disease and intensity of the treatment. More intensive treatment led to reduced milk production loss and lower cost of culling, but it was necessarily cost-efficient, too. Table 3 shows drug costs according to Cha et al. (2011) and Wolfová et al. (2006).

Table 3. Drug cost of a clinical mastitis case

Study	Drug cost/case	Drug cost in percentage of clinical mastitis treatment cost
Cha et al., 2011	23.50 USD[a]	32[a]
	15.50 USD[b]	43.7[b]
	19.50 USD[c]	39.4[c]
Wolfová et al., 2006	10.6 EUR	NDA

NDA: No data available
[a]Gram positive pathogen; [b]Gram negative pathogen; [c]other pathogen
Source: own construction

Mastitis cases mean extra cost on the one hand by extending working hours (if the worker is paid on an hourly basis) and on the other hand the employee has to spend time on treating cows with mastitis instead of doing any other work generating income on the farm. Extra labour consists of discarding the milk, time spent on treatment, cleaning devices used for milking separately and for treatment and time spent on diseased cows. This source of loss is usually not taken into account on farms run by families (Blosser, 1979; Ózsvári et al., 2003a; Steeneveld et al., 2011; Swinkels et al., 2005; Wolfová et al., 2006).
In Table 4, you can see total losses related to mastitis according to different studies.

Table 4. Total annual losses due to mastitis

Type of mastitis	Study	Loss/cow/year	Currency
Clinical and subclinical	Blosser, 1979	117.4	USD
	Ózsvári, 2004	105.9	
Clinical	Seegers et al., 2003	119	GBP
	Wolfová et al., 2006	65.1	EUR
	Bar et al., 2008	71	USD
Subclinical	Yalcin et al., 1999	100	GBP
	Ózsvári, 2004	73.5	USD

Source: own construction

Economic aspects of reproductive disorders

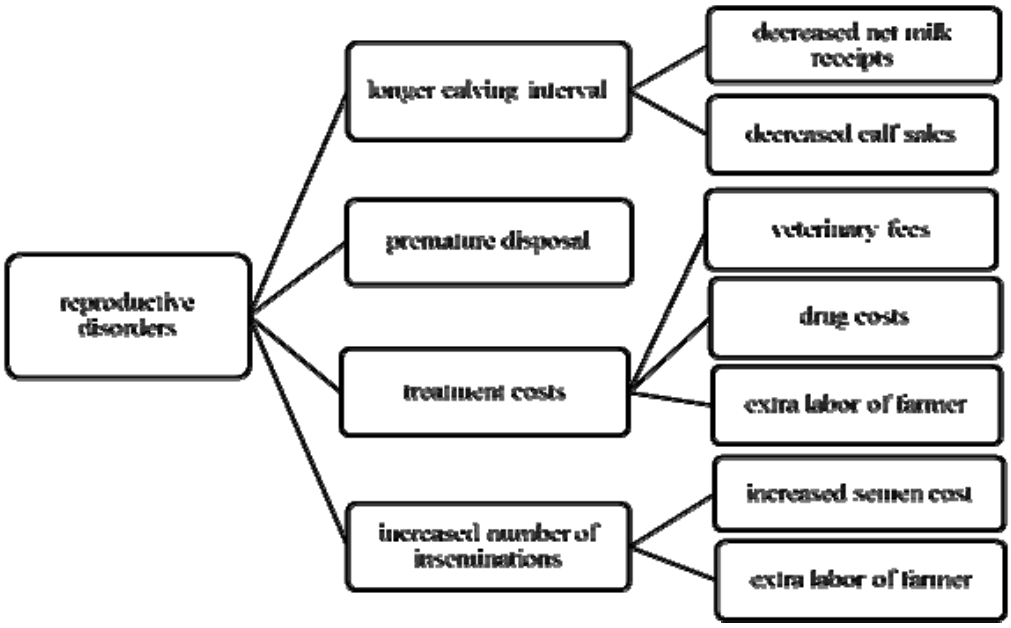
In Hungary the most common reproductive disorders which are responsible for poor reproductive performance, are the ovarium disorders, retained placenta and metritis (Vucseta, 2002). Retained placenta is predisposing cows to metritis and endometritis, but usually it does not increase the chance of culling, only if accompanied with complications. Endometritis and subclinical endometritis decrease pregnancy rate and increase number of days open, causing serious financial losses on the farm. Dairy cow nutrition is also an important factor in optimal reproductive performance, especially in postpartum ovarian function. Inadequate feeding may lead to delayed cycle after calving, meaning more days open, as well (Goshen- Shpigel, 2006; Leblanc, 2008).

Reproductive performance of the cows effect the number of calves sold, premature culling due to reproductive failures, drug costs and the number of inseminations directly, while its most significant indirect effect is influencing milk yield and net milk receipts.

Decreased reproductive performance results in decreased net milk receipts (milk receipts over feed costs), increase of culling due to reproductive disorders, less heifers for replacement, increased semen usage and higher veterinary costs (Meadows et al., 2005; Olynk-Wolf, 2008; Ózsvári, 2004). Sources of herd-level losses due to reproductive failures are shown in Figure 3.

Fertility of dairy cows has been decreasing worldwide. It is often explained with the increasing milk production and – as a result – the altered metabolism and hormonal changes. Low fertility is the number one reason of premature culling in dairy herds and reproductive disorders are one of the most important factors decreasing profitability on modern dairy farms. It means that herd level losses could be reduced significantly through shorter calving interval and smaller culling costs by improving reproductive performance (Meadows et al., 2005; Mee, 2007; Ózsvári and Kerényi, 2004).

Figure 3. Sources of losses due to reprodutive failures



Source: Ózsvári, 2004

According to Inchaisri et al. (2010), the greatest annual losses related to reproductive reasons are caused by the following factors:

1. low conception rate,
2. low heat detection efficiency,
3. length of voluntary waiting period (days from calving to first insemination),
4. postpartum disorders,
5. fetal mortality.

Optimal reproductive potential is a basic interest of dairy farms. Newborn heifers will play an important role later as heifers for replacing culled cows and on the other hand, bull calves sold for slaughtering bring about income for the farm, as well. Financial losses related to abortion are shown in Table 5.

Table 5. Losses due to abortion

Study	Loss (USD/case)
Eicker- Fetrow, 2003	600-800
Peter, 2000	600-1000
Pfeiffer et al., 1997	624[a]
Thurmond- Picanso, 1990	640
Weersink et al., 2002	1286[b]

[a]: abortion caused by *Neospora caninum*; [b]: together with loss from milk yield decrease

Source: De Vries (2006)

Longer calving interval and days open

One of the greatest problems among dairy farmers in Hungary is extended calving interval. The realistic goal would be to reduce calving interval under 400 days, however the Hungarian average was 438 in 2011 (Animal Breeding Performance Testing Ltd., 2011). As the calving interval is increasing, the annual milk yield is decreasing. As a result of premature disposals due to extended calving interval, the possibilities for voluntary culling become even poorer, putting the lid on genetic improvement of the herd (Meadows et al., 2008; Ózsvári et al., 2007).

Several studies have shown that increased milk production results in reduced fertility through the effect of negative energy balance on hormone levels, causing longer calving interval. However length of the Hungarian average calving interval can only partly be explained with this effect, because in countries with much higher milk production (e.g. the Netherlands) calving interval is about 30 days shorter (Inchaisri et al., 2010).

Usually 12 months long calving interval is considered optimal (= 85 days open), which means that the cow produces maximal milk yield and calves born at this interval during her lifetime, but it can be achieved only with strict reproductive culling (Meadows et al., 2005; Ózsvári, 2004). The number of days open increases in line with the extension of calving interval. According to the international literature the optimal length of the service period (days from calving to conception) would be 85 days, but under 100 days is still very good. Table 6 shows the calculated losses due to the non-optimal calving interval in a Hungarian dairy farm.

Table 6. Calculated losses due to longer calving interval in a Holstein-Friesian Hungarian dairy farm with 1100 cows (EUR/cow/year)

Calving interval (months)	11	12	13	14	15	16	17-18
Lactation 1	20	**0**	113	232	333	375	454
Lactation 2	106	**0**	316	204	369	343	555
Lactation 3	8	7	**0**	315	234	271	465
Lactation 4-9	176	**0**	298	483	624	592	755
Average cow	*56*	**0**	*179*	*265*	*380*	*372*	*498*
Per day longer calving interval for an average cow (EUR/cow/day)							
Per average day	1.9	**0**	3.0	2.9	3.2	2.5	2.6

Note: The calving interval with highest net milk receipts is set at zero. So, in this farm the optimal calving interval is 12 months.
Source: Ózsvári et al., 2007.

Cost of premature disposal

The most common reason for culling due to a reproduction disorder is the longer calving interval. Replacement heifer is expected to produce higher return than the cow staying in the herd with fertility problems. It is advisable to cull the non-pregnant cow after the 13th month of lactation, because afterwards her keeping in the herd is loss-

making (De Vries, 2006). Premature disposals due to infertility account for 20-40% of the total disposals (Meadows et al., 2005), causing 60.4 USD loss per cow annually in Hungary (Ózsvári, 2004).

Treatment cost

Since the relationship between treatment cost of reproductive failures and the length of calving interval depends highly on the reproductive disorder in the background, this expenditure is classified as auxiliary cost instead of loss due to extended calving interval. According to the results of Ózsvári (2004), this source of loss accounted for 12.4 USD per cow per year in Hungary. Numerous studies have dealt with the economic aspects of selective treatment so far. In this case the decision of treating the animal at all and the treatment used is based on the production parameters of the individual and the characteristics of the disease (severity, pathogen). Selective treatment was found to be economically beneficial only among certain farm characteristics (Leblanc, 2008).

Economic aspects of insemination

Optimal time of conception is one of the most important elements of reproductive management on dairy farms. In order to achieve this goal, the efficient heat detection is a key element. Heat detection efficiency is less, than 50% in the USA, which causes more than 300 million USD loss in dairy cattle industry (Meadows et al., 2008). As a consequence of the growing herd size, time available for heat detection becomes even less, furthermore, modern high-yielding cattle breeds show the signs of oestrus for a shorter period and less intensively. This change led to the invention of devices that support the farmer in oestrus detection. It is important to note that the realizable profit depends on the initial heat detection efficiency: higher profits can be realized if the initial efficiency is lower (Table 7).

Table 7. Profit related to improved heat detection efficiency

Study	Efficiency at the start (%)	Improved efficiency (%)	Profit/cow/year
Pecsok et al., 1994	20	30	83 USD
	60	70	13 USD
De Vries and Conlin, 2003	35	45	27 USD
	55	65	8 USD
Inchaisri et al., 2010	30	50	53.30 EUR
	50	70	11.20 EUR

Source: Meadows et al. (2008); Inchaisri et al. (2010)

Another option for achieving better conception rate is introducing an oestrus synchronization program (e.g. Ovsynch) on the farm. Timed ovulation facilitates artificial insemination without heat observation. Its major advantage is that no extra

labour is required, making it less sensitive to wages. Increased semen usage due to suboptimal conception rate was blamed for 14.8 USD additional expenditure per cow in Hungary according to the results of Ózsvári (2004).

Materials and methods

The data of 6,825 Holstein-Friesian cows from 8 large-scale Hungarian dairy herds were collected in 2011. All the farms included in this study used loose, deep-bedded system, diseased animals were kept separately and the herds were free from tuberculosis, brucellosis and bovine leucosis. Although the milking systems applied were different on every single farm, cows with mastitis were always milked separately. In all herds calvings were carried out in small groups, in straw-bedded calving stalls with loose system. In the examined period the average daily milk yield was 28.60 kg with 3.6% milk fat, 3.3% milk protein and 443,500 SCC/ml. The average length of lactation was 360 days and the average calving interval reached 423 days. Milk samples were taken with sterile needles. SCC was determined with Fossomatic device by Animal Breeding Performance Testing Ltd..

The aim of our research was to quantify the average annual economic losses caused by mastitis and reproductive failures on Hungarian dairy cattle farms. Its basic logic is that by changing the value of production indexes it is possible to calculate how many additional returns would be derived from the absence of the disease in the herd.

Calculation of losses due to mastitis

Losses related to mastitis can be divided into 3 main categories: reduced milk receipts, costs of treatment and costs of premature disposal. The decreased milk-production, the discarded milk and the lowered milk quality cause the reduced milk receipts. In the calculations we have to take into account that every kg of milk that is not produced means a saving of 0.5 kg milk concentrate (Ózsvári, 2004). Treatment costs consist of veterinary fees, drug costs and farmer's extra labour cost, however, the farms involved in our study employ their own veterinarian with fix salary, thus, making it a fixed cost, so we do not have to take the vet fees into account in our calculations using partial budget method. The extra labour of the farmer can also be regarded as a fixed cost, hence, this activity is also a part of the job of the farm employees with fix salary.

The individual SCC (1000/ml) and milk yield (kg) data of the milk tests of 5,881 milking cows over the study period (01.01.2011-31.12.2011) were used in the calculations. Production data used to calculate annual losses caused by mastitis were obtained from the farms' logs. When quantifying the financial consequences of decreased milk yield, the cows having SCC more than 250,000/ml were regarded as ones with subclinical mastitis (consequently producing less milk), because above this threshold we can show the presence of udder pathogens in almost all the cases, while cows with SCC under 250,000 SCC/ml were regarded as healthy ones. According to the results of Raubertas and Shook (1982), Radostits et al. (1994) and Ózsvári et al. (2001, 2003a), who claimed that milk production loss can be identified above 100,000

SCC/ml, irrespectively of being able to find pathogens in the milk, we compared the milk yield of the groups of cows producing above and under 100 000 SCC/ml, too. After calculating the average difference between the milk yield of healthy cows (control group) and that of cows with subclinical mastitis and in view of the selling prices of raw milk the losses due to reduced milk yield could be calculated.

The average difference between the daily milk yield of healthy cows and those with subclinical mastitis was calculated and then the annual decrease of milk production on herd-level was determined. Having known the selling price of raw milk and the cost of milk concentrate, the annual losses on cow herd and herd level was calculated, so the data of different farms with similar production system became comparable.

When calculating the economic effect of decreased milk quality, in Hungary we only have to quantify the reduced milk receipts due to elevated SCC, because in Hungary milk fat and milk protein content does not play a role in determining the milk price, so the decrease of fat% and protein%, another result of mastitis, does not effect the farmers' receipts directly. The quality of the bulk tank milk met the requirements of the Hungarian food standards in all decades on all farms, so in our survey the decreased milk quality was not a factor effecting profitability.

When using udder infusions with antibiotics against mastitis, milk has to be discarded, which is also a source of economic loss. Knowing the number, type of udder infusions and the way of application, we could calculate the total withdrawal time (days) in the study period (01.01.2011- 31.12.2011), taking the average daily milk yield and the selling price of raw milk in 2011 into account, the annual losses due to discarded milk became quantifiable.

Treatment costs were calculated by summing up the amount of the parenteral and udder infusion products used for mastitis treatment over the study period, and then these numbers were multiplied by the individual buying-up prices in 2011.

Losses from premature disposal were calculated as the difference between the replacement cost of heifers and the slaughter value of culled cows.

Calculation of losses due to reproductive disorders

In the calculations, which were based on international methods, the fertility problems had three effects: longer calving interval, premature disposal and other costs. In the economic model the calving interval with highest yearly net return is defined as optimal, while the differences between that and every other calving interval indicate the losses as the decrease in income per cow per year (so-called obscured loss).

According to the international and Hungarian references the length of calving interval significantly influences two factors, namely, the net milk receipts (margin between gross milk receipts and feed costs) and calf sales. The number of lactations affects the milk production; hence, the cows were grouped by lactations in calculating the losses due to reduced net milk receipts. The number of calves born per year will decrease with longer calving intervals, therefore, the net income (margin between calf price and rearing costs) of calves born per year will diminish, as well. Considering calf sales only, the shortest calving interval is optimal.

Other costs include the fertility treatment costs and expenses due to the increased number of inseminations compared to that assumed to be optimal. Experts consider 1.8 to be the optimal insemination index on average, which means 1.5 for heifers and 2 for cows (Radostits and Blood, 1985; Szenci, 1999; Ózsvári and Kerényi, 2004). Losses resulting from extra number of inseminations were calculated by dividing the optimal insemination index with the average insemination index on the farms and multiplying the result with the number of AI-s applied in 2011, so we got the optimal number of AI-s in 2011. Then by subtracting the optimal number of inseminations from the number of performed AI-s and multiplying the result with the average cost of an AI, the cost of extra inseminations became quantifiable.

Treatment costs include the veterinary fees, drug costs and extra labour of the farmer. However, the employees on the farm get a fix salary on an hourly basis, it is not needful to take the extra labour cost of the farmer into account. Drug costs were calculated as the multiplication of the number of all pharmaceutical products used for reproductive treatment and their buying prices in 2011. Losses due to early culling were calculated as the margin between the slaughter value of culled cow and the cost of replacement heifer, just like in the case of mastitis.

Production data and prices

In the calculations we used the average production and price data in 2011. In 2011 the mean buying-up price of raw milk was 32.23 eurocent, 1 kg of milk concentrate cost 27.27 eurocent on the farms involved in our study. Culled cows were sold at a price of 62.18 eurocent/kg and the cows' mean weight was 566.5 kg. Raising a replacement heifer up amounted to 1,224 EUR. 3,989 calves were born alive and calf mortality was 13.4%. Calves weighed 103.5 kg on average when they were sold, their selling price was 2.71 EUR/kg, while their rearing cost came up to 171.2 EUR. Insemination index was 3.15 in the studied population in 2011. The average insemination cost on the farms involved was 9.81 EUR.

Results and discussion

Losses due to mastitis

According to our assumption if the SCC of the milk increases above 250,000/ml, the cow has subclinical mastitis and its milk yield reduces. In our calculations we compared the average milk yield of the cows above and under 250,000 SCC/ml, however we also checked the difference above and under 100,000 SCC/ml (Table 8).

In the study 62.7% of the animals were considered healthy on average (under 250,000 SCC/ml) and 37.3% of the cows produced milk above 250,000 SCC/ml. Although it has to be noted that the large number of animals does not even mean a guarantee that the group of cows compared had the same production level before being diseased. But based on the milk test values of the compared groups of cows we can state that milk yield decreases as the SCC increases. Cows with subclinical mastitis produce 2.70 kg less milk daily on average as compared to the healthy ones (under 250,000 SCC/ml).

Table 8. Average daily milk yield decrease under and above 100,000 SCC/ml and 250,000 SCC/ml

Individual SCC (1000/ml)	Average milk yield (kg/day)	Number of cows	Daily milk yield decrease (kg)
<100	31.40	2,193	4.50
>100	26.90	3,688	
<250	29.50	3,688	2.70
>250	26.80	2,193	

Source: own calculations

The average decrease in milk yield and losses resulting from subclinical mastitis are shown in Table 9. The losses due to reduced milk receipts are decreased by the value of milk concentrate not consumed (every kg of milk not produced means 0.5 kg milk concentrate not consumed by the cow). We calculated the difference between the milk production of the healthy cows and that of cows with subclinical mastitis and we also compared the milk yield of the cows with milk above 100,000 SCC/ml and that of cows with milk under 100,000 SCC/ml.

Table 9. Average milk yield decrease and losses related to subclinical mastitis

		Above 100,000 SCC/ml	Above 250,000 SCC/ml
Average decrease in milk production	kg/milking cow/day	4.50	2.70
	kg/cow/year	888	317
Savings in milk concentrate	EUR/cow/year	121	43.2
Losses	EUR/cow/year	165	59

Source: own calculations

Table 9 shows the average decrease in milk production owing to mastitis, which is more than 317,000 kg milk annually on a farm with 1,000 cows. If we examine the losses due to subclicinal mastitis with a 100,000 SCC/ml threshold, the decrease in milk production exceeds 888,000 kg milk in the same farm. If we take the savings of milk concentrate into consideration as a compensation factor, the losses from decreased milk yield due to subclinical mastitis amount up to 60 EUR per cow per year, which means nearly 60,000 EUR annually on a 1,000-cow farm!

In the farms involved in our study the withdrawal period because of the mastitis treatment was on average 5.37 days per cow annually. That means 178.2 kg discarded milk per cow-year, which causes a 49.5 EUR loss; on a 1,000-cow farm it almost reaches 49,500 EUR annually!

Table 10 shows that reduced milk receipts are 108 EUR per cow per year and in a farm with 1,000 cows the losses exceed 108,000 EUR yearly. Losses related to decreased milk production are responsible for the greatest share (54.3%) of the reduced milk receipts.

Table 10. Annual reduced milk receipts (EUR)

	Annual reduced milk receipts (EUR)	
	per cow	in herd *
Loss related to decreased milk production	58.9	58,900
Loss related to discarded milk	49.5	49,500
Total loss	***108.4***	***108,400***

* in a 1,000-cow herd
Source: own calculations

Drug costs related to mastitis resulted in 88,161 EUR annual costs on the farms studied in 2011. It means 12.9 EUR treatment cost per cow per year on the model farm with 1,000 cows it exceeds 12,900 EUR yearly. Premature disposal due to mastitis costs 39.1 EUR per cow per year on average, in a 1,000-cow farm this expenditure exceeds 39,000 EUR.

Table 11. Annual loss due to mastitis (EUR)

	Annual loss (EUR)	
	per cow	in herd *
Reduced milk receipts	108.4	108,400
Treatment costs	12.9	12,900
Cost of premature disposal	39.1	39,100
Total	***160.4***	***160,400***

* in a 1,000-cow herd
Source: own calculations

In the herds examined the average annual losses owing to mastitis exceeded 160,000 EUR (Table 11). Annual losses amounted to 160.4 EUR per cow on average.

Economic losses due to reproductive disorders

Table 12 and 13 show the lactational and annual milk yields categorized by the lactation number and the calving interval.

Table 12. Average lactational milk yield per cow (litres of milk/cow)

Calving interval (months)		11	12	13	14	15	16	17-18
	n	381	437	347	284	208	195	485
1. lactation	1,081	8,396	8,789	9,352	9,805	10,368	10,275	10,423
2. lactation	683	9,699	9,865	10,465	10,327	10,668	10,264	10,761
3. lactation	331	8,902	9,071	9,604	10,130	9,855	10,355	10,169
4-9. lactation	242	8,247	8,255	8,892	8,438	9,367	11,246	9,084
Average milk yield per cow	*2,337*	*8,782*	*9,067*	*9,656*	*9,855*	*10,266*	*10,365*	*10,337*

n: number of cows
Source: own calculations

Table 13. Average annual milk yield per cow (litres of milk/cow/year)

Calving interval (months)		11	12	13	14	15	16	17-18
	n	381	437	347	284	208	195	485
1. lactation	1,081	9,148	8,789	8,642	8,421	8,317	7,733	7,178
2. lactation	683	10,568	9,865	9,670	8,869	8,558	7,724	7,411
3. lactation	331	9,699	9,071	8,875	8,700	7,906	7,793	7,003
4-9. lactation	242	8,986	8,255	8,217	7,247	7,514	8,463	6,256
Average milk yield per cow	*2,337*	*9,568*	*9,067*	*8,923*	*8,464*	*8,235*	*7,800*	*7,119*

n: number of cows
Source: own calculations

Our results confirm the literature data stating that the milk yield is lower for first-calf heifers in comparison to cows with more calves and milk production per cow per year decreases as calving interval increases.

Table 14 shows that the highest net milk receipts (milk receipts over feed costs) per cow is reached at an 11-month-long (<350 days) calving interval in the herds studied. The average net milk receipts were 1,105 EUR per cow in 2011.

Table 14. Net milk receipts (milk receipts over feed costs) per cow per year for different calving intervals (EUR/cow/year)

Calving interval (months)		11	12	13	14	15	16	17-18
	n	381	437	347	284	208	195	485
1. lactation	1,081	1,193.3	1,146.5	1,127.2	1,098.4	1,084.9	1,008.7	936.3
2. lactation	683	1,378.5	1,286.8	1,261.4	1,156.9	1,116.3	1,007.6	966.7
3. lactation	331	1,265.2	1,183.2	1,157.6	1,134.8	1,031.2	1,016.5	913.5
4-9. lactation	242	1,172.1	1,076.8	1,071.8	945.3	980.2	1,104.0	816.0
Average net milk price income per cow	*2,337*	*1,248.1*	*1,182.7*	*1,163.9*	*1,104*	*1,074.2*	*1,017.5*	*928.6*

n: number of cows
Source: own calculations

Table 15 shows the annual net return resulting from milk and calves and the losses calculated. Increased calving interval goes hand in hand with lesser calves sold. Annual net return exceeded 1,180 EUR per cow. The calving interval with highest net return is set at zero.

Taking both the net milk receipts and calf sales into account, the economically optimal calving interval is 11 months (<350 days) on average in the population surveyed, as well as, in each lactation the shortest calving interval is optimal. Average loss per cow per day shows the loss per each extra (open) day compared to the optimal calving interval. An average cow with 14-month-long calving interval produces 1.82 EUR loss per open day. Average daily loss per cow varies between 1.64-2.44 EUR according to the different length of calving intervals and reaches its maximum at

12-month-long interval: 2.44 EUR. The average cost of an open day was 1.59 EUR in 2011. Longer calving interval resulted in 161 EUR loss per cow per year in 2011 based on the data obtained from 2,337 cows with an average calving interval of 423 days.

Table 15. Average net return and losses per cow (EUR/cow/year)

Calving interval (months)		**11**	**12**	**13**	**14**	**15**	**16**	**17-18**
	n	381	437	347	284	208	195	485
1. lactation	1,081	1,286.9	1,232.4	1,206.7	1,172.2	1,153.9	1,073.4	995.5
2. lactation	683	1,472.1	1,372.8	1,340.8	1,230.7	1,185.3	1,072.3	1,025.9
3. lactation	331	1,358.8	1,269.2	1,237.1	1,208.7	1,100.2	1,081.2	972.7
4-9. lactation	242	1,265.7	1,162.8	1,151.2	1,019.1	1,049.1	1,168.7	875.2
Average income per cow	*2,337*	1,341.8	1,268.7	1,243.3	1,177.8	1,143.2	1,082.2	987.8
Average loss per cow		0	73.1	98.5	163.9	198.6	259.6	354
Average daily loss (EUR/cow)		0	2.4	1.6	1.8	1.7	1.7	1.8

n: number of cows
Source: own calculations

Premature disposal related to reproductive reasons caused 30.5 EUR loss per cow per year on average. Treatment costs due to reduced fertility resulted in 16.9 EUR loss per cow annually, while the cost of increased number of inseminations was 18.7 EUR per cow per year on average in 2011.

Total costs related to reproductive failures exceeded 227 EUR per cow yearly (Table 16)! Longer calving interval caused the majority of this loss (70.9%, 161 EUR). Premature disposal owing to reproductive disorders also had large economic impact, causing 13.4% (30.5 EUR) of the total loss. Treatment cost brought about 16.9 EUR (7.4%), while increased number of services per cow was responsible for 8% (18.7 EUR) of the total expenditures.

Table 16. Annual losses related to reproductive disorders per cow

Source of loss	**Annual loss per cow**	
	EUR	**%**
Longer calving interval	161.0	70.89
Premature disposal	30.5	13.43
Treatment cost	16.9	7.44
Increased number of inseminations	18.7	8.24
Total	***227.1***	***100.00***

Source: own calculations

Conclusions

In regards 6,825 cows involved in our study three-quarter of the economic losses were so-called obscured losses (decreased income). In practice, they are usually underestimated by the farmers, therefore, less attention is paid to avoid these losses. Considering the average production level of the population examined, the optimal calving interval is 11 months (<350 days) that can be achievable by shortening the average calving interval by 70 days, which is impossible and probably not beneficial in practice. However, shortening the calving interval with 10 days in the population surveyed would bring about a higher profit with several ten thousands euros and it can be achieved in the short run. Based on these data it can be concluded that the farmers (and of course, veterinarians) should pay more attention to the obscured production losses, namely, improving udder health and milking hygiene (thus minimizing the decrease in milk production owing to subclinical mastitis), as well as, improving reproductive management, particularly by shortening the calving interval, since these factors have the largest economic impact on the profitability of dairy farms.

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3.4. ECONOMIC IMPACTS, CONTROL AND ERADICATION OF BOVINE VIRAL DIARRHOEA VIRUS

Summary
Infections with Bovine Viral Diarrhoea Virus (BVD) are endemic in cattle populations worldwide and result in major economic losses; hence, many countries have begun BVD eradication programs. The authors estimated the losses caused by BVD, and the estimated annual losses in 2012 amounted to 4.5 million EUR in Hungary. In a dairy cattle farm with 1000 cows the acute clinical BVD could cause more than 166,264 EUR estimated yearly loss and the BVD-MD could be blamed for more than 10,203 EUR loss per year on average. The presented losses are probably underestimated as some disease effects are difficult to quantify, though they can indicate the income realizable in case of freedom from the disease, so can be the starting point of cost-benefit analysis of an eradication program. In the early 2000s, the control studies have shown that the seropositivity in northern and western European countries ranged between 1-95%. Systematic BVD control aims to deliver a targeted reduction in the prevalence of BVD virus on sectoral, regional or national basis. In the Scandinavian countries, the eradication program is based on detecting and removal of PI animals without the use of vaccines. These programmes have been very successful, and by the late 2000s, the cattle herds' BVD infection in Scandinavia decreased below 0.1%, but in several western and southern European countries, the prevalence still ranged between 35-90%. In Hungary, the seropositivity was 40-50% in the 1970s, 60-70% in the 1980s, and 95% in 1999. The latest survey data in 2008 showed that the infection rate was 67.8% and 42.5% for herds and animals, respectively. The eradication has been obligatory in Lower-Austria since 2004, in Switzerland since 2008 and in Germany since 2011 with the use of vaccines. Mandatory eradication program started in Scotland in 2012, and began in Ireland in 2013 applying the Scandinavian method.

Keywords: BVD virus, economic losses, eradication programme

Introduction

Bovine Viral Diarrhoea Virus (BVDV) is the denomination of a heterogeneous group of viruses in the family *Flaviviridae*, genus *Pestivirus* with two accepted genotypes or species (BVDV-1 and -2), which are economically important pathogens that primarily infect ruminants (Varga et al., 1999). Prevalence of BVDV-1 and BVDV-2 vary across the world: BVDV-2 represents around 50% of the virus isolates in North America, whereas BVDV-1 dominates in Europe, with more than 90% (Lindberg et al., 2006). Most isolates of both viral species are well adapted to cattle and acute infections with such low-virulent strains generally go unnoticed unless there are other contributing factors. According to their ability to cause cytopathic effect (CPE) in cell cultures, BVDV strains are classified as cytopathogenic (cp) or non-

cytopathogenic (ncp) biotypes (Houe et al., 1995). Ncp is the most common naturally occurring biotype including BVDV-1 and BVDV-2 strains, and is the only biotype that can lead to persistent infections of BVDV. The cp biotype occurs much less frequently, cp BVDV strains were isolated almost exclusively from MD cases. Both cp and persisting ncp biotype can be simultaneously isolated from animals succumbing to MD. These isolates are called a ”virus pair” (Meyers and Thiel, 1996, Ramsey and Chivers, 1953). BVDV virulence varies markedly, and due to a transient immunosuppression acute infections are often exacerbated by secondary infections. This is how BVDV plays its role in other disease syndromes, including respiratory and enteric conditions. Bovine viral diarrhoea virus also interferes extensively with reproductive functions. Depending on the time of infection, there may be a significant reduction in conception rates and an increased number of abortions, malformations, stillbirths or births of persistently infected calves. The latter are immunotolerant to the persisting virus.

Infection with BVDV can result in a wide spectrum of clinical diseases ranging from subclinical infections to a highly fatal form known as MD. In the typical cases the diagnosis is clear based on the observed clinical signs and lesions' characteristics of animal. The majority (70-90%) of BVDV infections are subclinical. The likely source of these BVDV infections are cattle that are immunotolerant and persistently infected (PI) with ncp BVDV (Bálint, 2005).

The accurary of available diagnostic test is crucial for the success of a control program. For BVDV infection, several diagnostic test, aiming either to detect the virus itself, virus components, virus antigens or to detect viral-specific antibodies, are available (Varga et al., 1999).

In control programs, the performance of a diagnostic test, with regard to sensitivity and specificity, is highly dependent on the program's objectives. For example, antibody detection in bulk milk or pooled blood/serum/plasma is useful in initial screening for classification of herd status, but is not useful for monitoring a recently cleared herd to reconfirm its status or detect reinfection. Available diagnostic tools must be evaluated according to the specific objectives or phase in the control or eradication program at the level of the herd and of the region (Houe et al. 2006).

Virus isolation is usually considered the most reliable direct virus detection technique. Virus isolation requires cell culturing facilities which derived from kidney, testis or nasal turbinate epithelium of cattle. ELISA tests can be used for BVDV antigen detection. Antigen ELISAs have the advantage of being fast and inexpensive, obviating the need for cell culture facilities, and usually offering high sensitivity and specificity (Lindberg, 2003; Varga et al., 1999). The presence of BVDV ribonucleic acid (RNA) can be detected by reverse transcriptase-polymerase chain reaction (RT-PCR). This technique offers high sensitivity, making it suitable for testing specimens with potentially low quantities of virus, as well as PI animals, or other biological materials (Belák and Pallagi-Pordány, 1991). The most commonly used antibody detection techniques are the virus neutralisation test (VNT) and antibody-specific ELISAs (Becher et al., 2003).

The economic losses caused by BVD

The prevention of infectious diseases, which cause severe clinical signs and high mortality, is essential and clear for everyone. Most of the infectious diseases, which cause great economic losses, has been eradicated from the European countries (including Hungary) or their incidence could be decreased significantly. However, in the cattle herds in most of the European countries (including Hungary), there are still some widely spread infectious disease which primarily appear in chronic forms. These diseases do not often cause clinical symptoms and mortality, but the production parameters are weakening and over a long period can cause significant financial losses to the producers. In Hungarian cattle herds there are two viral diseases appearing mainly in their chronic forms which cause great economic losses; the Bovine Viral Diarrhoea and Mucosal Disease (BVD–MD), and the Infectious Bovine Rhinotracheitis (IBR).

The BVD is a major pathogen of cattle that causes significant economic losses worldwide in the cattle industry; for example in the Irish herds the annual total loss is estimated to be 102 million EUR (Byrne, 2010). An acute BVD outbreak has several negative effects on the production of dairy herds; it reduces the reproductive performance (more cows will remain empty), the milk production and the weight gain in calves, and increases the mortality rate, the risk of secondary infections and early culling (Ózsvári et al., 2001). The BVD virus can cause a wide range of lesions not merely in cattle with clinical signs but also in both infected cattle without any signs and in their progeny. In addition, the BVD virus has a strong immunosuppressive effect, which predisposes different diseases, such as pneumonia, mastitis, and diseases of bovine digits (Murphy, 2012).

An acute BVD outbreak caused an estimated average loss of 85 EUR per cow in Ireland (Byrne, 2010), 137 EUR per cow in United Kingdom (Bennett and Mawhinney, 1999), 74 EUR per cow in the Netherlands (Wentink and Dijkhuizen, 1990) and 59 EUR per cow in Denmark (Houe, 1994). The estimated average annual losses per cow caused by BVD are 34 EUR in Canada (Chi, 2002), 31 EUR in United Kingdom (Gunn et al., 2004) and 48 EUR in Ireland (SAC, 2010).

The estimated annual losses caused by BVD in Hungary

The BVDV occurs widely in the Hungarian large-scale dairy herds. The prevalence of the infected herds is estimated to be about 95% (Kudron, 1999; Ózsvári et al., 2001). The annual risk of the introduction of the BVDV into intact herds, which are 5% of all herds, is between 30-50%, that is, 1.5-2.5% of the total cattle population can have acute, clinical incidence of BVD yearly. The cattle of any age is exposed to the risk of infection but often certain age groups within a herd are affected by the disease (Kudron, 1999; Ózsvári et al., 2001).

The estimated losses caused by BVD in Hungary, based on the national cattle population, and the average Hungarian price and production data of the year 2012, are shown in Table 1.

Table 1. The estimated losses caused by BVD in Hungary (thousand EUR/year)

Sources of losses	Low*	High*
Drop in milk production	47.4	78.9
Abortion	26.3	525.6
Mortality of cows	38.9	1,296.4
Premature disposal of cows	97.2	890.8
Mortality of calves up to 1 year	1,196.4	4,785.7
Total loss per national herd	1,406.1	7,577.4
Total average loss per national herd	4,491.8	
Total loss per cow (EUR)	4.3	23.1
Total average loss per cow (EUR)	13.7	

*Depending on annual risk of infection of the BVD negative herds (30 or 50%) and minimum and maximum effects of the disease on production (extreme values), low and high estimation of losses caused by BVD were carried out.
Source: own calculations

The annual estimated losses caused by BVD were approximately 4.5 million EUR on an average at national level, but if the rate of incidence is higher and the disease effects are more severe, the damage can come close to 7.6 million EUR. The loss per cow averaged 13.7 EUR yearly.

The estimated losses caused by both acute clinical BVD and BVD-MD complex in a herd with 1000 cows are shown in Table 2 and 3.

Table 2. The estimated losses caused by acute, clinical BVD in a dairy farm with 1000 cows (EUR/year)

Sources of losses	Low	High
Drop in milk production	9,627.0	
Abortion	79.7	1,594.1
Mortality of cows	7,864.3	157,285.7
Premature disposal of cows	19,648.9	108,069.0
Mortality of calves or cattle up to 1 year	3,764.9	14,985.7
Total losses per herd	40,966.4	291,561.6
Total average losses per herd	166,264.0	

Source: own calculations

Table 3. The estimated losses caused by BVD-MD in a dairy farm with 1000 cows (EUR/year)

Sources of losses	Low	High
Abortion	79.7	1,594.1
Mortality of calves or cattle up to 1 year	3,764.9	14,985.7
Total losses per herd	3,826.1	16,579.8
Total average losses per herd	10,203.0	

Source: own calculations

The annual estimated losses per herd caused by acute BVD could be 166,264 EUR on an average, but if the disease effects are more severe, the damage can come close to 291,561 EUR. The annual losses resulting from chronic BVD were estimated to be 10,203 EUR per herd, but with severe disease impacts could exceed 16,579 EUR on herd-level.

The extent of losses is likely to be underestimated compared to the real damages caused by BVD, since many effects of the disease are difficult to be estimated. Having acquired the relevant data the losses coming from the immunsupression, reproductive disorders, subclinical effects and drug treatments can also become calculable.

The chronic BVD is also detrimental to the production parameters, hence, the control of chronic BVD infection can contribute to increase the profitability of dairy farms.

Prevalance of BVD virus in Europe

Infections with bovine viral diarrhoea virus are endemic in most cattle-producing countries throughout the world. Approximately 50% of all herds have PI animals, and 90% of all cattle become exposed during their lifetime. In endemic areas, a high correlation between BVDV prevalence and cattle density has been shown. BVDV occurs in most of the cattle-producing countries and causes significant economic losses to the cattle industry. This led in several countries to carry out epidemiological, as well as, cost/benefit studies and initiate eradication or control programs (for example Denmark, Finland, Ireland, Norway, Sweden). Before starting these programs the seroprevalence in the EU ranged from less than 1% in Finland, through 19% in Norway, 46% in Sweden, 64% in Denmark to 95% in England (Greiser et al., 2003). Between 2009 and 2010 a study was conducted about seroprevalance of BVD in the EU. According to study findings the prevalence was between 35-90% in France and Italy, less than 10% in Austria, also less than 0,1% in Sweden and Denmark and was below 0,01% in Finland and Norway. Cattle herds of Great-Britain, Spain, Portugal, Germany, the Netherlands, Switzerland and Belgium had a BVDV prevalence rate more than 90% (Di Labio, 2011).

In 2011 no BVD cases have been reported from Finland and Norway, and only two from Denmark, one of which was due to import of a BVDV vaccinated PI carrier from a non-free country. In Sweden two cases were detected in 2010 and one in 2011, all due to direct or indirect contact with herds still under investigation with suspected routes of transmission supported by molecular epidemiological investigations (Stahl and Alenius, 2012).

In Hungary, BVDV was deemed to cause severe respiratory, enteritis and abortion cases in the late 1950's (Áldásy and Szabó, 1959), but the virus was isolated only a few years later (Manninger et al., 1963). The seroprevalence of BVDV in Hungary was 40-50% in the 1970s, 60-70% in the 1980s, and 95% in 1999 according to representative studies (Kudron, 1999).

In Hungary between 2006 and 2008 a nationwide representative survey was carried on the prevalence of BVDV. 16 Hungarian counties (out of 19) participated in the survey (except for Vas, Nógrád and Heves counties) and in these counties

epidemiologically closed herds were randomly selected where there was no vaccination against BVD. In the selected cattle herds those animals were also randomly selected that did not show any clinical signs, and certainly did not have maternal antibodies. The laboratory tests were carried out by using the ELISA method, and 1,176 blood samples sent from 59 cattle herds. Out of the 1,176 samples 500 proved to be positive (42.5%), 34 were doubtful (2.9%), while 642 were negative (54.6%). Regarding the cattle farms, out of 59 herds sending samples for investigation there were 40 having at least one BVD positive animal (67.8%), while among the blood samples of 19 herds no positive was identified (32.2%). Among these latter herds there were several ones, where the samples were collected from old cows milking already through several lactation periods, therefore the seronegativity clearly indicates the BVDV free status of the given herd. Even among the positive cattle herds we have found a few where the prevalence of seropositivite animals was rather low (<5%) (Mester, 2009).

Eradication of BVD

Control and prevention

At present, in most parts of Europe, BVDV is being controlled mostly on a voluntary basis. Control and eradication of BVDV is possible either with or without vaccines. Vaccines are available in many countries, but the take-up rate is very varied, from below 20% up to 75% (Moening and Brownlie, 2006). The strategy of control or eradication of BVDV depends on national regulations and financial resources. In the United Kingdom, Ireland, the Netherlands and Slovenia, only inactivated BVDV vaccines are licensed. The Scandinavian countries and Austria do not permit the use of BVDV vaccines, instead, large-scale eradication schemes are in place. The first large-scale eradication schemes were launched in 1993-1994 in the Shetland Islands, Denmark, Finland, Norway and Sweden (Lindberg et al., 2006).

BVDV causes both transient and persistent infections and can escape from the host's immune responses during both events. Transient infection occurs in cattle of all ages. Oronasal infection results in transient viraemia and virus excretion is low before it is eliminated by a standard immune response. However, if infection occurs in a pregnant animal, the virus escapes by crossing the placenta to the foetus where it infects a wide variety of cells without killing them. Before day 120 of the gestation a foetus lacks a mature adaptive immune response; all viral antigens are accepted as its own and are forever seemingly ignored by the foetus' or the calf's cell-mediated and humoral adaptive responses. The foetus becomes immunotolerant to these viral antigens and will not respond to them throughout the rest of its life. The virus has simply escaped from the host's adaptive immune response, resulting in an animal that is persistenly infected (Nettleton, 2013). PI calf will continuously excrete millions of infectious virions every day of its life. Approximately 1% of one-year-old cattle are persistently infected. Transiently infected animals with high, long-lasting antibody levels and persistently infected animals with high levels of viraemia have provided important targets for diagnostic efforts (Houe et al., 2006). The most important factors of prevention are to detect and remove PI animals, avoid the introduction of BVDV

and minimize the possibility of the introduction (Bálint, 2005). The basis of eradication without vaccines is the recognition and removal of PI animals from the herds. The Scandinavian countries and also some other regions in Europe are aiming at complete eradication of BVDV without use of vaccines (Lindberg, 2003).

In many countries, vaccines are used to control BVDV infections. Modern vaccination programs are designed not only to prevent clinical cases, but also to avoid viraemia and foetal infection. The inactivated, as well as, live vaccines may prevent foetal infection under controlled experimental conditions (Patel et al., 2002).

Classical BVDV vaccines are of two different types; live attenuated and inactivated (Bálint, 2005; Graham et al., 2004). The attenuated vaccines can clinically protect immune-competent animals against viral challenge. Live attenuated vaccines did not protect completely against congenital infection, and vaccination of PI cattle did not protect from developing MD after superinfection with a cp strain. If the vaccine strain is closely related to the ncp BVDV strain in the PI animal, early onset of postvaccinal MD can occur, as it was observed several times. If the vaccine strain is not closely related to the persistently infecting ncp strain, during replication, the live vaccine strain might recombine in the PI animal with the respective ncp wild type strains of BVDV, and this recombination can lead to the development of the delayed onset of MD. A further disadvantage of the attenuated live virus vaccines is their immunosuppressive effect (Bálint, 2005; Coggins et al., 1961; Kecskeméti et al., 1998; Simonyi and Bíró, 1967).

The inactivated BVDV vaccines are safe, the original strains and the possible other agents are completely inactivated, thus, reversion to virulence and recombination after vaccination with the field virus strain is impossible. The inactivated vaccines are not immunosuppressive, and do not infect the foetus. The drawback of these vaccines is that they are expensive and during inactivation immunogenic activity can decrease (Makoschey et al., 2004).

Eradication methods

Eradication of BVD is possible with selection, generation change, or use of inactivated vaccines (Varga et al., 1999). During the 1990's a systematic strategy to control BVDV, based on thorough knowledge of the epidemiology of the disease and, therefore, focused on prevention of foetal infection in early gestation, evolved within eradication programs in the Scandinavian countries (Lindberg and Alenius, 1999).

PI animals are the main source of infection within the infected herd, because they shed virus in very high concentrations in all fluids of the body throughout their life (Moen et al., 2005). PI calf is immunotolerant to BVDV, generally seronegative, and shed large quantities of virus throughout its life. The key role of PI animals in the maintenance of infection within herd is further supported by vast empirical evidence from the Scandinavian BVDV control schemes, showing that virus circulation essentially stops as soon as the last PI animal is eliminated from the herd (Lindberg and Houe, 2005). Experiences from the Swedish BVDV control program have shown that self-clearance, i.e. the process whereby an infection is eliminated from a population without intervention, is an important and frequent phenomenon that works in favour of BVDV control (Stahl et al., 2008).

The Scandinavian strategy is based on three central elements: (1) biosecurity to avoid introduction of infection into BVDV free herds; (2) elimination of PI animals in infected herds to reduce virus circulation; and (3) continuous monitoring of free herds for early detection of reinfection (Lindberg and Alenius, 1999). The PI animals are seronegative, so in the Swedish method this has been used as a mean of identification, namely, after the individual serological tests, the seronegative individuals are virologically tested. There are other strategies for PI identification through direct virus detection, such as antigen testing of newborn calves by using e.g. ear-notch samples (Stahl and Alenius, 2012).

Herd diagnosis is defined as diagnosis that is based on testing samples from multiple representative individuals in a herd. The common goal is to detect the presence or absence of a given disease within the herd without testing every animal separately. Diagnosis can involve testing several animals individually, or the pooling of samples (serum/plasma/milk) from several animals before testing. For BVDV, the following tests have been used on herd level diagnosis; 1) detection of antibodies in bulk milk; 2) detection of antibodies in individual or pooled serum/plasma samples from young stock or in pooled samples of milk or serum/plasma from primiparous cows; and 3) virus detection in bulk milk. If the antibody test using bulk milk and the spot tests of young stock indicate the presence of PI animals in the herd, the next step is to identify individual PI animals. The methods of continuous monitoring used to confirm infection-free status are essentially the same as those used to establish initial herd status. However, the accuracy of the relevant tests depends to a large extent on three situational factors: time period immediately after removal of PI animals (clearance); time and mode of herd re-infection; and re-emergence of PI animals (Houe et al., 2006).

The Scandinavian BVDV control strategy had proved to be successful, thus, several other European countries have launched their control and eradication programs of BVD. Despite the different conditions at the start of the projects in terms of legal support, and regardless of initial prevalence of herds with PI animals, it took all countries approximately 10 years to reach their final stages (Stahl et al., 2008). Lower-Austria launched a regional program on a voluntary basis in 1997, used the successful Scandinavian method. The program became compulsory in 2004 and extended to the entire country. In 2008 92% of all herds in Lower-Austria were certified as free from BVDV (Rossmanith et al., 2010).

The eradication program was launched in 2008 in Switzerland applying an alternative approach. The Swiss compulsory program is based on the identification and removal of PI animals through antigen testing of all newborn calves. They do not use serological testing. The alternative approach was needful because of the very high initial seroprevalence, the high cattle density, the frequent cattle movements and the use of shared summer grazing in mountain pastures. In the first phase, which is the eradication phase, all cattle in the country were sampled (ear-notch or blood) and tested for antigen. 1.5 million cattle were tested and more than 12,000 PI animals were detected. In the second phase, which was called the calf phase, almost 700,000 calves, which were in the uterus during the first testing, were tested within five days of birth, and around another 5,000 PI animals were identified. The third phase, which is the

surveillance phase, is ongoing and carried out in accordance with the principles used in phase two. Until 2011, around 3.5 million animals have been tested and the prevalence of PI animals among newborn calves has decreased by 95% (Di Labio, 2011).

A compulsory control program was introduced in all German states as of the 1st of January 2011. There is obligatory testing of all calves, with direct virus detection from ear-notch samples using ELISA or/and RT-PCR. In the BVD free herds voluntary vaccination is being applied (Gaede et al., 2004). The vaccination includes a first immunization with an inactivated vaccine and 4 weeks later a second immunization with a modified live virus vaccine, which is an element of biosecurity (Moennig et al., 2005, Seeger et al., 2012). Mandatory eradication program launched in Scotland in 2012, in Ireland in 2013 applying the Scandinavian method (Barrett et al., 2011; Becher et al., 2003; Graham et al., 2011).

Large-scale control efforts have also implemented in Brittany in France (Joly et al., 2005), in the Netherlands (Moen et al., 2005), in Germany (Moenning et al., 2005) and in the Lecco and Como regions of Italy (Luzzago et al., 2004). Time-limited, project-type control efforts have also been implemented in the Rome area (Ferrari et al., 1999), as well as, in Greece (Billinis et al., 2005) and Galicia in Spain (Lindberg at al., 2006).

Conclusions

It is clear that unless BVDV control efforts are harmonized across Europe, there will always be a threat of spreading BVDV, including the less prevalent BVDV-2 and any new types that may emerge across the continent. Efficient systematic control measures with or without the use of vaccines will provide the necessary protection. A challenge for the future is to find a joint platform where differences in needs and preconditions between member states can be accommodated. The OIE has added BVDV to its list, a strong signal that the disease has become an international priority.

The most important export markets of Hungary apply restrictive control measures as regards IBR and BVD, aiming at the prevention of import of infected animals and their animal products. The launch of a compulsory BVD eradication program in Hungary would mean a forward step to meet the animal health requirements of the international live animal and animal products trade. In order to achieve a successful eradication, national obligatory provisions should be applied to all cattle herds. Hungary would have a significant economic, environmental and animal welfare benefits if the disease was eradicated. One of the basic criteria for a successful eradication program is to detect and remove all the PI animals as soon as possible from the cattle herds. The rate of BVD infection increases with age. Hence those farmers, which are able to solve the detection and disposal of PI animals, and the separation of different age groups, can quickly complete the eradication among their calves.

Based on the results of the latest survey in Hungary the prevalence of BVDV is smaller than expected. Therefore, it is possible the make a herd replacement of a very infected farm by using BVD free breeding animals from free herds to help starting a national eradication program.

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This book provides a wide overview of the agriculture in the CEE countries. The international group of authors offers a diverse and complex insight into different fields of agricultural sectors in this region. Besides describing important theoretical aspects, such as agricultural policy, financial system and the questions of competitiveness, the book also show some practical solutions which were implemented successfully in the different countries and can be applied as „best practice" in the future.

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The countries of Central and Eastern Europe have long-time traditions in agriculture. Although their national economy and agricultural sector have undergone fundamental changes in the recent decades, which have brought success and problems as well, the role of this sector has remained important both in economic and social aspects. This book collects the latest results, case studies and experiences from the different countries, which may be used by theoreticians and practitioners and, of course, in education.

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