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Preface

This volume of 'Problems of World Agriculture' presents a set of reviewed papers in English contributed to the international conference 'Polish agriculture and food economy within the EU framework' organised by the Chair of Agricultural Economics and International Economic Relations in the Warsaw University of Life Sciences in 2008. The aim of the conference was to investigate the current economic and social problems in Polish agriculture and food economy against a background of similar problems in the neighbouring countries as well as wider in the perspective of the international economic relations. In several cases due comparisons have been made, in particular related to the recent Polish accession to the European Union.

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Polish farms in the light of quality requirements

Abstract. After the accession of Poland to the European Union farmers have to fulfil high food quality requirements. In accordance with the requirement 172/2002 of the European Commission, they should keep documentation regarding their part in the product's flow in the food chain. This paper focuses particularly on the analysis to what degree requirements are satisfied by the analysed farms. A cluster analysis and a point assessment technique were used.
Key words: farms, quality requirements, traceability

Introduction

The need for high product quality[2] and food safety is acknowledged by European Union and at first of all by consumers. After the accession of Poland to the European Union Polish farmers have to fulfil more legal and market requirements than before. In the past few years, newer or stricter product liability laws, enacted in the European Union (EU) and in other major markets of the developed world, have prompted large global retail chains (e. g. Carrefour, Metro, Tesco etc.) to formulate their own supplier standards for product and process quality [Krieger et al. 2007].

A responsibility for fulfilment of requirements regarding to product safety (e.g. HACCP[3], ISO 9000[4], EUREPGAP[5], GMP 13[6], Q&S[7]), marking of GMOs (genetically modified organisms) and T&T[8] (tracking and tracing) lay upon all participants of various steps of the food supply chain [Jarzębowski 2005]. The full range of quality requirements is too extensive a subject to be discussed fully in a brief paper. Therefore it is focused only on an examination of the fulfilment of requirement 172/2002, which defines that each step of supply chain should keep a documentation regarding the product's flow. This requirement was a reaction to a number of food scandals which lowered the consumer protection and the

[1] MSc, e-mail: agnieszka_bezat@sggw.pl
[2] Product quality – increased shelf-life and improved texture, flavour and colour [Voort et al. 2007].
[3] HACCP – Hazard Analysis Critical Control Points is a food safety methodology that relies on the identification of Critical Control Points (CCP's) in food production and preparation processes [Eurogran… 2008].
[4] ISO – International Organization for Standardization [ISO… 2008]. ISO 9000 is a series of standards that define, establish and maintain an effective quality assurance system for manufacturing and service industries [Searchdatacenter… 2008].
[5] EurepGAP – Euro Retailer Produce Good Agricultural Practices is a private sector body that sets voluntary standards for the certification of agricultural products around the globe [Eurocert… 2008].
[6] GMP 13 is to the feed industry what HACCP is to the food industry. The animal feed certification is a European rule that is expanding all over the European Community as a tool of quality guarantee for agricultural supplies [KMC… 2008].
[7] Q&S – Quality and Safety is a German quality system which sets requirements for the meat, fruit and vegetables supply chains [Krieger et al. 2007].
[8] T&T (Tracking and Tracing): Tracking means the inquiry of the current status of a delivery of a good etc.; Tracing means ex post reconstructable history of delivery [Klaus i Krieger 2002].

trust of the consumer in the food quality. It can be assumed that the market demands traceable products and traceability have compulsory character [Parlińska & Bezat 2007].

Vertically-oriented quality requirements, like the requirement 172/2002, are set at several or all stages of the supply chain. These vertically-oriented approaches aim to ensure a guarantee of chain's wide quality. In accordance with the requirement 172/2002 farmers, as the first step of food supply chain, should warrant the traceability of their products, as well as withhold unsafe products. It is significant that farms make up the first step of food supply chain and they have a big influence on the product's quality in the whole chain. Besides, farmers wishing to become suppliers in the more demanding retail markets, either locally or globally, need to customise for the market requirements.

Methods

The aim of the article is to determine if the Polish farmers meet the quality requirements. The traceability of food products is particularly examined.

The first step of supply chain, namely farmers, is analysed. It is assumed that farms, due to their position in the food supply chain, have a big influence on the quality of final products which are bought by consumers.

The data were collected by interviewing farmers with help of a standard questionnaire in March 2008. The surveyed sample include 30 farms from Łódzkie and Mazowieckie voivodeships. The interview was conducted personally with each farmer.

To organise data into meaningful structures an econometric method, namely cluster analysis, was used. This research was made by using the Statistica 8.0 Software. The analysis helps to group objects of similar kind into respective categories by using a measure of association or a similarity distance, so that the objects in a group are similar and the objects in different groups are not similar. In other words, cluster analysis is an exploratory data analysis tool which aims at sorting different objects into groups, in a way that the degree of association between two objects is maximal if they belong to the same group and minimal otherwise. The most straightforward way of computing distances between objects in a multi-dimensional space is to compute Euclidean distances between them, which is probably the most commonly chosen type of distance [Luszniewicz & Słaby 2001].

The analysis was carried out with regard to four points, namely age of farmers, their level of education, acreage of farms and labour resources. Before starting the cluster analysis, the data were normalised by using the following equation:

$$X_j' = \frac{X_j - Min(X_j)}{Max(X_j) - Min(X_j)}$$

Normalisation of data was performed for age of farmers, level of education, acreage of farms and labour. The cluster analysis's results are shown in the next part of the article.

Because in the literature author couldn't find any formula for estimation of traceability's fulfilment, the point assessment method was used and following equation was proposed. Each farm was assessed in 2 categories, namely stock and crop production, with regard to the state of documentation of the products' flow. Farmer's family own consumption of the products was included. For each type of production three most important from author's point of view control points were chosen. For each farm the results

of calculation could be more than -3 and less than 3. This scale results from the used calculation formula (see following equation).

$$T\&T = P_{plant}\left[(1-C_p)*(Q_{p1}+Q_{p2})+Q_{p3})\right]+P_{stock}\left[(1-C_s)*(Q_{s1}+Q_{s2})+Q_{s3})\right]$$

where:
T&T is a level of traceability's fulfilment
P_{plant} is a share of crop production in the total farm's revenue
P_{stock} is a share of stock production in the total farm's revenue
C_p is a share of plant products' own consumption in the total crop production
Cs is a share of stock products' own consumption in the total stock production
Qp1 is an answer to the first question referring to crop production: 'Do you keep a documentation of sales of plant products? (write YES or NO)' (1. control point)
Qp2 is an answer to the second question referring to crop production: 'Do you use codes for identification of plant products' lots you are going to sell? (write YES or NO)' (2. control point)
Qp3 is an answer to the third question referring to crop production: 'Do you keep a documentation of purchases of crop production inputs, e.g. nitrogen fertilizer? (write YES or NO)' (3. control point)
Qs1 is an answer to the first question referring to stock production: 'Do you keep a documentation of sales of animals? (write YES or NO)' (1. control point)
Qs2 is an answer to the second question referring to stock production: '„Do you use codes for identification of animals you are going to sell? (write YES or NO)' (2.control point)
Qs3 is an answer to the third question referring to stock production: 'Do you keep a documentation of purchases of stock production inputs, e.g. animal feed? (write YES or NO)' (3. control point)

Answer 'yes' gives 1 point, answer 'no' gives 1 point, no answer gives 0 points. The results of the calculation are shown in the next part of the article.

Results

A cluster analysis was performed on the 30 observations (30 farms). For calculating dissimilarities the raw Euclidean distance was used. The results are shown in Figure 1. (dendrogram).

One of the alternative ways of interpreting the results is a visual analysis of observations. The visual analysis of the dendrogram (Figure 1) suggests clustering observations (farms) into 3 groups.

Using the visual interpretation one can say that cluster 1 is formed by farms numbers 30, 28, 27, 29, 18, 17, 4, cluster 2 by farms nos. 14, 24, 9, 7, 26, 25, 22, 15, 13, 21, 12, 11, 6, 2 and cluster 3 by farms nos. 20, 19, 23, 5, 16, 8, 10, 3, 1.

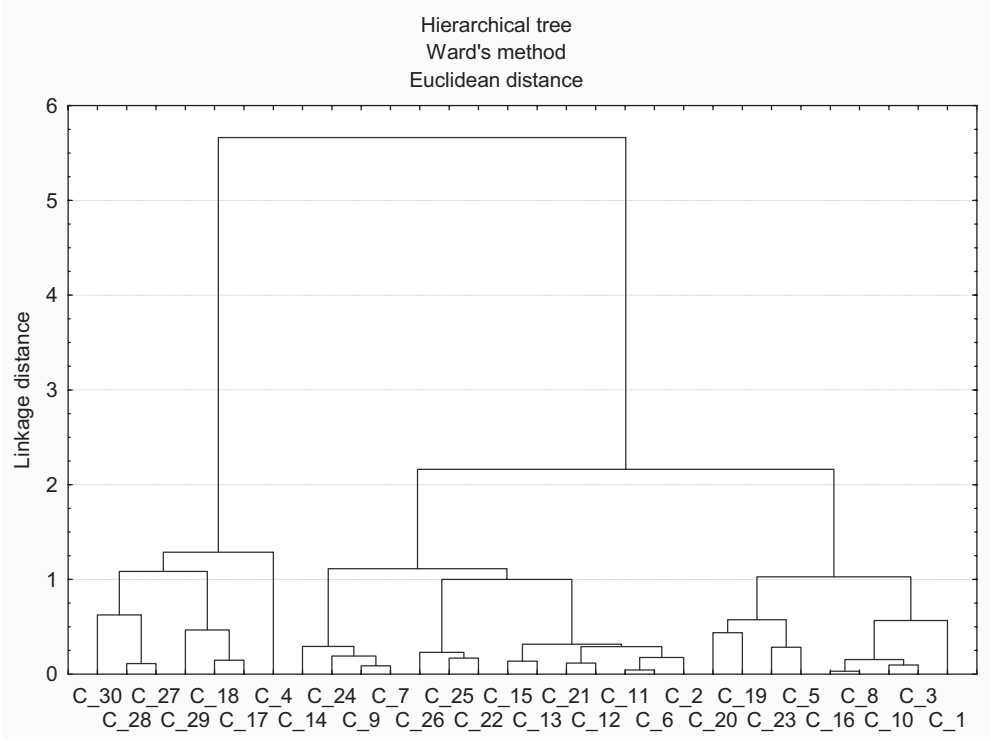

Fig. 1. Results of cluster analysis
Source: own research using STATISTICA 8.0 Software

All data which were used in the cluster analysis were normalised and are in the range of <0,1>. For the age of farmers the variable value 0 indicates the youngest farmer and 1 the oldest one. For the level of education the variable value 0 means a primary school, 0,3 a vocational education, 0,7 a secondary school and 1 a higher school. For the area of farms the variable value 0 indicates the smallest farm and 1 the biggest one. For the labour resources the varaible value 0 means the farm with the smallest labour potential and 1 the farm with the biggest labour resources.

The first cluster is built from farms which are run by the youngest farmers (see Fig.2). Their age averages 25 years. Those farmers have the highest level of education (secondary school and higher school). The second cluster is characterised by small farms (about 10 hectare) with poorly qualified labour. The farms in this group are managed by the oldest farmers. The farmers have primary or vocational education (see Fig. 3). In the third cluster, the small and the middle farms were grouped (about 17 hectare). The farmers in this group have a secondary school education (see Fig. 4).

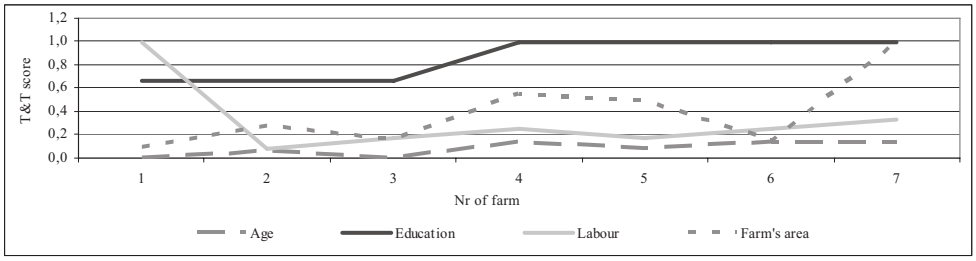

Fig. 2. Characteristics of farms in the first cluster
Source: own research

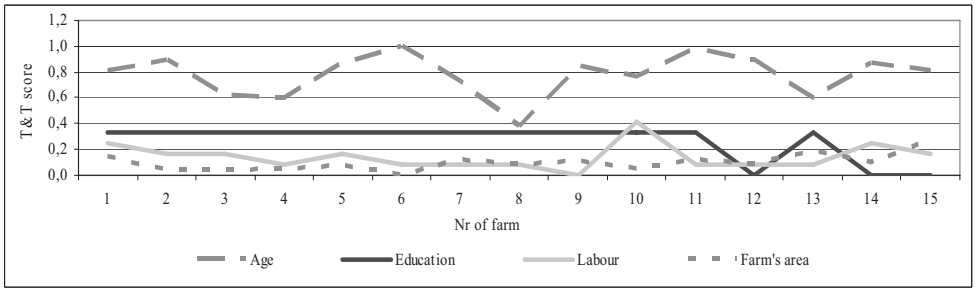

Fig. 3. Characteristics of farms in the second cluster
Source: own research

Fig. 4. Characteristics of farms in the third cluster
Source: own research

Using the survey's data it has been analysed, whether the traceability is guaranteed in each of the groups. The results of fulfilment of the traceability requirements are shown in Table 1. Using the point assessment technique for each farmer, the indicator of the fulfilment of traceability settlements has been calculated.

Table 1. Results of cluster analysis and point assessment of traceability

No of farm	No of cluster	Age of farmer	Education	Labour stock	Acreage of farm	Traceability score T&T
4		0,0	0,7	1,0	0,1	3,00
17		0,1	0,7	0,1	0,3	2,27
18		0,0	0,7	0,2	0,2	0,71
27	1	0,1	1,0	0,3	0,5	2,98
28		0,1	1,0	0,2	0,5	1,00
29		0,1	1,0	0,3	0,1	1,00
30		0,1	1,0	0,3	1,0	1,00
2		0,8	0,3	0,3	0,1	-1,10
6		0,9	0,3	0,2	0,0	-2,90
7		0,6	0,3	0,2	0,0	-0,02
9		0,6	0,3	0,1	0,0	-0,90
11		0,9	0,3	0,2	0,1	-1,95
12		1,0	0,3	0,1	0,0	-1,00
13		0,7	0,3	0,1	0,1	2,80
14	2	0,4	0,3	0,1	0,1	0,90
15		0,8	0,3	0,0	0,1	-0,43
20		0,8	0,3	0,4	0,0	0,10
21		1,0	0,3	0,1	0,1	1,76
22		0,9	0,0	0,1	0,1	0,98
24		0,6	0,3	0,1	0,2	0,96
25		0,9	0,0	0,3	0,1	0,90
26		0,8	0,0	0,2	0,3	0,92
1		1,0	0,7	0,2	0,4	-0,30
3		0,6	0,7	0,1	0,1	0,00
5		0,5	0,7	0,5	0,2	-0,53
8		0,7	0,7	0,1	0,1	1,98
10	3	0,6	0,7	0,0	0,1	-0,20
16		0,7	0,7	0,1	0,2	0,37
19		0,9	0,7	0,7	0,0	-1,00
23		0,6	0,7	0,3	0,2	0,98

Source: own research using STATISTICA 8.0 Software

The biggest value of the indicator of traceability fulfilment can be observed in the first group of farmers. Above the level of 0 it can be assumed that the traceability is at least partially satisfied. It is the case of 14 farms which belong to all three clusters. In the first group 100% of the analysed farms meet the requirements of traceability (at least partially). The features that determine a satisfactory level of traceability's fulfilment in the first cluster are age and education of farmers (see Fig. 2).

On the basis of data collected from the survey it can be observed that 60% of farms document activities that take place during the production processes (products' flow). Only 65% of farmers have a regular buyer. Furthermore, we can see that only 50% of them are able to keep a documentation enabling the traceability in order to get a better price for their products.

Conclusions

The quality and safety market requirements that farmers have to fulfil are still growing. To improve own competitiveness and to assure a stable position in the market farmers should be able to supply their buyer with whole information referring to products quality and to contribute to establishing the product traceability from a field to a buyer.

During the analysis it was determined that only a half of the farmers keep required documentation concerning the traceability. For the rest of them it can be difficult to sell their raw products, because in the near future the requirements of big food processing companies (their buyers) will grow. So if they want to have big and regular buyers they have to be prepared for keeping the documentation of all products and all production processes. Using this analysis results, it can be interpreted that these farmers who do not keep documentation of the products' flow do not have enough knowledge about the traceability. It was shown that the younger and better educated the farmers are, the higher level of traceability's fulfilment they achieve.

To fill the knowledge gap would be possible by carrying out of professional training or by giving farmers information about the relevance of traceability's fulfilment. Farmers that are not able to fulfil the traceability's requirements in the future can have difficulties with selling their products. This can lead to a shutdown of their production.

References

Eurocert – European Inspection and Certification Company. S.A. [2008]. Available at http://www.eurocert1.com/certificate_uk.asp?certificate_id=64&organization=6. Accessed May 2008.

Eurogran [2008]. Available at http://www.eurogran.com/en/quality/food_safety/haccp_quality_control_system/. Accessed May 2008.

ISO. [2008]. Available at http://www.iso.org/iso/about/discover-iso_isos-name.htm. Accessed May 2008.

Jarzębowski S. [2005]: Obligatoryjne systemy zarządzania jakością. *Food&Drinks.*

Klaus P., Krieger W. [2002]: Gabler Lexikon. Logistik. Management logistischer Netzwerke und Flüsse. 2 edition. Wiesbaden, pp. 475.

KMC. [2008]. Available at http://www.kmc.dk/News%20&%20events/060123gmp13.asp. Accessed May 2008.

Krieger S., Schiefer G., da Silva C. [2007]: Costs and benefits in food quality systems: concepts and a multi-criteria evaluation approach. Agricultural management, marketing and finance working document 22, Agricultural Management, Marketing and Finance Service (AGSF), Rural Infrastructure and Agro-Industries Division, Food and Agriculture Organization of the United Nations, Rome, pp. 2-39.

Luszniewicz A., Słaby T. [2001]: Statystyka z pakietem komputerowym STATISTICA PL. Teoria i zastosowania. Akademia Oeconomica. C.H. Beck, Warszawa.

Parlińska M., Bezat A. [2007]: EAN Code as a part of effective traceability on the example of wholesale markets. *Roczniki Naukowe Stowarzyszenia Ekonomistów Rolnictwa i Agrobiznesu* vol. IX, no. 4, pp. 133-137.

Searchdatacenter. [2008]. Available at http://searchdatacenter.techtarget.com/sDefinition/0,,sid80_gci512546,00.html#. Accessed May 2008.

Voort van der M., Baricicova V., Dandar M., Grzegorzewska M., Schoorlemmer H., Szabo C., Zmarlick K. [2007]: EU Access report 06. Quality requirements for vegetable and fruit products in the European Union. Training Manual: Product Quality Standards including UN-ECE Quality standards for onions. Wageningen UR Library, Lelystad.

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Impact of the accession to the EU on the performance of agricultural holdings in the Baltic States and Poland: a comparative study

Abstract. In the result of the EU enlargement not only a united legislative and economical body was formed on European basis, but also the support payments in many branches of economy in the new member states have increased substantially, including those in agriculture and rural development. A brief characteristics of place of agriculture in the economy of the Baltic states and Poland is given in the article, as well as that of the changes in total amount of support achieved before the entry into the EU. The effect of this support upon different agricultural holdings performance parameters (net value added, production net value added, net investments) in the period of years 2002-2006 is studied. A comparative analysis gave basis for the conclusions on the specificity of support use in the economic activity of holdings in different states.
Key words: accession to the EU, subsidies for agriculture, net value added, production net value added, net investments

Agriculture in the economy

After the EU made a political decision on its enlargement and admission of new members, a majority of the Central and Eastern European countries, Baltic states and Poland among them, has chosen the way of integration into the European Community. Accession to the EU brings challenges to the entire national agricultural system. There is an increased competition in agricultural and food products in local markets. Also higher production, environmental and product quality standards were introduced. The lack of qualification and skills in the agricultural labour force has been emphasized which increased the need for financial resources and financial instruments that would help to diversify agricultural activities, renovate and modernize agricultural production, create conditions for a further development. In general terms EU-accession has been positive for the agricultural sector of the new member states because of the increased product market, financial support for agriculture, farmers' competitiveness and trade quantities.

The goal of the article is to research the changes in total amount of support achieved by the Baltic states and Poland before and after the accession to the EU and its effect upon different agricultural holdings performance parameters such as net value added (hereinafter NVA) and net investments. All calculations are made by authors and based on data collected by FADN national Liaison Agencies in the Baltic states and Poland.

Agriculture plays an important role in the national economy of the Baltic states and Poland despite the fact that it contributes only a small share towards the gross national

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product. Though since 1995 it has decreased twice, still it substantially exceeds the average values of the EU-15 and the EU-25 (Table 1). If on the average in the EU in 2005, comparing to 2002, a slight decrease of gross value added in agriculture was observed, the situation in the Baltic states was quite the opposite. The highest growth showed Estonia (almost 40%) and Latvia (20%). Growth in Poland attained 22%.

Table 1. Agricultural output (EUR million) and gross value added share in the Baltic states' and Poland's GNP

Country	Gross value added share in GNP, %			Gross value added at producer prices		Crop production output		Animal production output	
	1995	2000	2004	2000	2005	2000	2005	2000	2005
Latvia	9.0	4.5	4.1	197	237	199	291	220	292
Lithuania	11.4	7.8	5.7	393	417	622	540	481	706
Estonia	8.0	5.5	4.3	140	195	146	180	180	258
Poland	6.5	3.5	2.9	4660	5 689	5992	6692	5893	7696
EU-15	2.7	2.2	2.0	119434	116758	131857	135816	110031	109475
EU-25	2.8	2.3	2.0	128726	127162	143768	149452	121509	123318

Source: [EU… 2006; Europe… 2007].

Table 2 displays that in years 2002-2006 the number of people employed in EU agriculture was continuously decreasing. In the Baltic states this process was the fastest in Lithuania (6.2 percentage points), and the least changes were in Estonia (1.5 percentage point). In the Polish agricultural sector this part of employed population is still 3 times higher, but in the Latvian and the Lithuanian agriculture it exceeds the average EU values twice. In its turn in Estonia it was less than one percentage point lower than EU-27 average.

Table 2. Employment in agriculture, hunting, forestry and fishing in the Baltic states and Poland, 2002-2006

State	**Measure**	**Year**				
		2002	**2003**	**2004**	**2005**	**2006**
Latvia	1000 person	151	146	136	122	122
	% of total employment	15.3	14.6	13.3	11.8	11.2
Lithuania	1000 person	265	276	234	207	187
	% of total employment	18.6	18.7	16.3	14.0	12.4
Estonia	1000 person	38	37	32	32	32
	% of total employment	6.5	6.3	5.5	5.3	5.0
Poland	1000 person	2713	2485	2409	2452	2304
	% of total employment	19.6	18.2	17.6	17.4	15.8
EU-25	1000 person	10479	10163	9645	9660	9468
	% of total employment	5.5	5.3	5.0	4.9	4.7
EU-27	1000 person	14461	14013	12987	12869	12564
	% of total employment	7.1	6.8	6.3	6.1	5.9

Source: [Agriculture in the European... 2007].

Support for agriculture and rural development

Accession of the Baltic states and Poland to the EU similarly to other new member states has significantly changed the structure and scope of agricultural support. The direct payments became the most important element of agricultural policy with significant impacts on income of holdings [Kožar 2006]. Since the EU enlargement new member states have implemented the Single Area Payment Scheme. It is a transitional scheme of reformed policy where part of direct support funding became available for the first time without obligation to produce certain production [Salputra 2007].

Due to accession to the EU, the Latvian agricultural support achieved in 2006, comparing to 2002, grew by 5.5 times and reached EUR 308 million (Table 3). Altogether in 2002-2006 achieved the Latvian agricultural sector a support as big as EUR 931 million, the biggest part of which made the EAGGF Guarantee financing (48%), state subsidies (27%) and structural funds (14%).

Table 3. Received support for agriculture and rural development in Latvia in 2002-2006, EUR million

Indicator	Year					Total
	2002	2003	2004	2005	2006	
State subsidies	50.3	52.9	28.3	33.6	83.0	248.0
year 2002 = 100%	100	105%	56%	67%	165%	X
SAPARD	6.0	32.2	41.2	24.0	3.4	106.9
year 2002 = 100%	100	535%	684%	398%	57%	X
EAGGF Guarantee financing[3]	0.0	0.0	81.3	190.7	173.9	446.0
year 2002 = 100%	X	X	100	235%	214%	X
Structural funds	0.0	0.0	15.3	67.2	43.7	126.2
year 2002 = 100%	X	X	100	438%	285%	X
Others	0.0	0.0	0.0	0.0	3.9	3.9
TOTAL	**56.3**	**85.1**	**166.1**	**315.6**	**308.0**	**931.0**
year 2002 = 100%	100	151%	295%	561%	547%	X
Exchange rate (LVL / EUR)	0.581	0.645	0.6652	0.6962	0.6962	X

Source: authors' calculations based on study by Pilvere [2007].

In Estonia, unlike in Latvia, the amount of support in 2006, comparing to 2002, grew not so notably (namely 3.8 times) and reached EUR 141.7 million (Table 4). In the result in years 2002-2006 the total received support for Estonian agriculture and rural development made EUR 470.1 million, 52% of which made development aid, 44% direct support and 12% general support.

[3] Direct payments, complementary national direct payments, market measures, rural development plan measures.

Table 4. Received support for agriculture and rural development in Estonia, years 2002-2006, EUR million

Indicator	Year					Total
	2002	2003	2004	2005	2006	
I. Direct support	**21.1**	**16.8**	**47.9**	**50.9**	**68.8**	**205.5**
year 2002 = 100%	100%	80%	227%	242%	327%	X
1. Support for dairy and suckler cows	7.2	7.3	11.8	0.5	10.9	37.7
2. Support for cereal production	7.0	7.0	13.1	10.3	19.0	56.4
3. Other support [4]	6.8	2.5	1.7	12.6	4.2	27.8
4. Single area payment	0.0	0.0	21.2	27.6	34.7	83.5
II. Development aid	**14.1**	**28.3**	**72.1**	**63.7**	**65.9**	**244.0**
year 2002 = 100%	100%	201%	510%	451%	467%	X
1. Agri-enviromental aid	1.9	2.6	20.7	23.0	26.0	74.0
2. SAPARD (without fishery)	9.6	23.0	25.0	3.6	0.5	61.7
3. State development plan	0.0	0.0	10.9	23.3	17.3	51.5
4. Aid for less favored areas	0.0	0.0	7.5	8.0	7.2	22.7
5. Other support [5]	2.7	2.8	8.0	5.9	14.8	34.2
III. General support [6]	**2.0**	**2.2**	**3.0**	**6.4**	**7.0**	**20.6**
year 2002 = 100%	100%	109%	153%	318%	350%	X
TOTAL	**37.2**	**47.3**	**123.0**	**121.0**	**141.7**	**470.1**
year 2002 = 100%	100%	127%	331%	326%	381%	X
Exchange rate (EEK/EUR)	15.647	15.647	15.647	15.647	15.646	X

Source: authors' calculations based on information obtained from the Estonian Ministry of Agriculture.

The accession to the EU made a huge direct impact on the Lithuanian agricultural system and its dynamics. Net agricultural incomes increased about 80 % to EUR 304.5 million, but agricultural subsidies rose more than sevenfold in 2004 comparing with 2003 [Agro economic... 2005]. Planned EU support for the Lithuanian agriculture in terms of Rural Development Plan for year 2004 was EUR 147.3 million, then in 2005 it grew by 11% (to 164.1 million), but in 2006 by 20% (to 178.1 million). Thus in the period of 2004-2006 it reached EUR 489.5 million. In its turn EU planned to grant to Lithuania EUR 624.515 million altogether (Table 5) [Rural ...2006].

In common with the Baltic states, the accession of Poland to the EU definitely contributed to an increased support for agriculture and rural development. As compared to 2003 the expenditure on agriculture and rural development tripled in 2005. Within the same period of time, national funds increased by 74 %, whereas EU funds increased 12 times (Table 6).

[4] Support for cattle, ewes, certified seed production, potatoes, fruits, vegetables and berrie production, compensation for damages.
[5] Support for meeting standards, reconstructed semi-subsistence farms, afforestation of agricultural land and improvement works, interests, insurance, liming, excise, Natura 2000 areas)
[6] Research and training, information distribution, school milk, animal breeding, support for market development and arrangement, etc.

Table 5. Allocated financial resources for agriculture and rural development in Lithuania, years 2004-2006, EUR million

Indicator	Total public expenditure	EU contribution
SINGLE PROGRAMMING DOCUMENT	**321.171**	**135.015**
1. Investment in agricultural holdings	111.623	40.613
2. Agricultural markets	66.920	22.210
3. Development of rural areas	88.293	39.164
4. Other support	54.335	33.028
RURAL DEVELOPMENT PLAN	**611.875**	**489.500**
I. Environment and Less Favored Ares	279.274	223.419
1. Agri-environment	62.200	49.760
2. Less Favored Areas, areas with environmental restrictions	146.900	117.520
3. Meeting standards	70.174	56.139
II. Afforestation of agricultural land	26.792	21.434
III. Farm restructuring	160.175	128.140
IV. Other support	145.634	116.507
TOTAL	**933.046**	**624.515**

Source: authors' calculations based on ministerial document [Rural... 2006].

Table 6. Received support for agriculture and rural development in Poland, years 2003-2005, EUR million

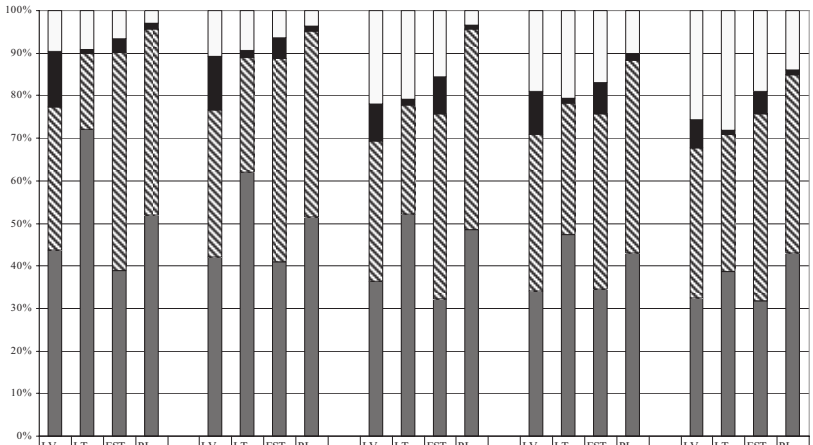
Indicators	Years			Total
	2003	2004	2005	
I. State budget	**995.2**	**1570.3**	**1734.4**	**4299.9**
year 2003 = 100%	100%	158%	174%	X
1. Agriculture and hunting	111.7	114.5	132.6	358.8
2. Fishing and fisheries	3.5	4.4	24.7	32.6
3. Rural development	439.7	1019.4	1191.0	2650.1
4. Agricultural markets	177.7	191.1	145.3	514.0
II. European Union funds	**159.6**	**463.7**	**1978.5**	**2601.7**
year 2003 = 100%	100%	291%	1240%	X
1. Phare	25.4	22.1	11.7	59.2
2. SAPARD	134.1	193.8	333.5	661.4
3. Structural funds	0.0	0.0	264.4	264.4
4. Common Agriculture and Fisheries	0.0	247.8	1368.9	1616.7
TOTAL	**1154.8**	**2034.0**	**3712.8**	**6901.6**
year 2003 = 100%	100%	176%	322%	X
Exchange rate (PLN / EUR)	4.3996	4.5268	4.023	X

Source: authors' calculations based on ministerial document [Agriculture… 2006].

National and EU funds for agricultural and rural support were EUR 8.6 million in 2006. Namely national budget funds for agriculture amounted to EUR 1.1 million, national

funds to supplement payments related to CAP implementation EUR 1.2 million, EU funds (excluding Transition Facility) for rural areas and agriculture EUR 2.5 million and budget funds for Agricultural Social Insurance fund (KRUS) EUR 3.8 million. In 2004-2006, the national and EU funds totaled EUR 23 million, and those excluding payments to farmers because of the national insurance amounted to EUR 12 million [Agriculture… 2007].

Performance of agricultural holdings



	2002				2003				2004				2005				2006			
	LV	LT	EST	PL	LV	LT	EST	PL	LV	LT	EST	PL	LV	LT	EST	PL	LV	LT	EST	PL
Production subsidies	2559	4179	3238	981	2803	1830	2785	1267	8322	4809	11633	660	8564	6907	12134	2303	12162	6885	16084	3644
Other output	3450	410	1562	467	3275	326	2073	322	3276	351	6523	190	4538	335	5323	354	3205	268	4518	310
Total output livestock & products	8971	8009	24817	14412	9047	5246	20801	14693	12478	5919	32280	9298	16718	10370	29778	10417	16709	7901	37249	10950
Total output crops & products	11598	32524	18941	17204	10969	12083	17857	17299	13739	12055	24145	9523	15352	15860	24892	9880	15451	9502	26888	11293

Fig. 1. Revenue structure of agricultural holdings in the Baltic states and Poland, 2002-2006, %
Source: authors' calculations based on data obtained from FADN liaison agencies in the Baltic states and Poland.

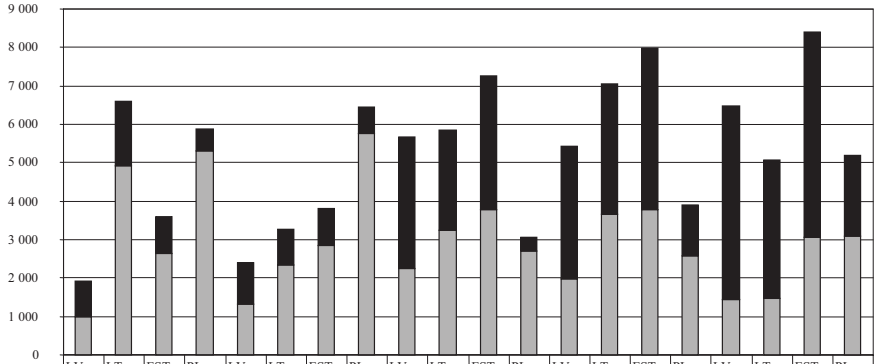
An analysis indicates (Figure 1) that structure of the revenue evidently varies as by years and by states. Still, due to the accession of the Baltic states and Poland to the EU, the situation has changed, because the specific weight of received subsidies grew up. If before the entry the subsidies to the Baltic states agricultural holdings made on the average 5-10%, to Polish agricultural holdings 3-4 % of their revenue, then, starting with year 2004, it has grown by 2-3 times. Lithuanian agricultural companies felt these positive changes least of all: if subsidies before year 2004 made for them on the average 10% of the revenue, then, after the entry, only a little bigger, namely 13-15%. In its turn the biggest specific weight of subsidies was observed in year 2006 for Lithuanian (28%) and Latvian (26 %) agricultural holdings. In Poland the specific weight of subsidies was 14 %.

Net value added (NVA) is one of the most essential performance indicators for farm holdings, which characterizes the value of a company's output produced with use of production resources. NVA is formed by total output (i. e. crop production and livestock products, other output) and total subsidies (excluding those to investments) amount, which is diminished by total specific costs and farming overheads, depreciation and production taxes. Taking into account that in formation of the agricultural NVA an essential part takes

form of the national and EU support payments, it is also reasonable to characterize the agricultural holding ability to generate the added value measured by the production NVA, whose calculation does not include the amount of the support achieved by the holding.

In 2002-2006 the proportion of NVA in the total revenue (i. e. total output and total subsidies, excluding those to investments) increased both for the Baltic states' and for the Polish agricultural holdings (Figure 2). The biggest proportion of NVA was in Lithuanian farms, where it reached the maximum 43-47% in 2004-2005. At the same time an analysis shows that in the formation of NVA production subsidies take bigger and bigger part. If in 2002 they made 10% of Polish, 25% of Lithuanian, 27% of Estonian and 48% of Latvian agricultural holdings NVA, then in 2006 it was respectively already 40%, 71%, 64% and 78%. Along with that the input of agricultural holdings production factors in total NVA formation decreased crucially.

FADN methodology grants to member states sufficient sweeping powers to run merges and regroupings of principal types of farming and defining types of farming. In the result the agricultural holdings specialization structure existing at the national level in Baltic states and inPoland differs much. This enables making a comparative analysis of only those types of farming which are identical in all (dairy) or at least in 3 states (field crops, granivores).



	2002				2003				2004				2005				2006			
Production subsidies	925	1685	974	576	1088	929	960	700	3415	2600	3490	378	3435	3369	4184	1320	5024	3624	5353	2086
Production NVA	999	4926	2630	5305	1 317	2341	2860	5759	2 263	3250	3766	2692	1 995	3669	3788	2594	1 447	1457	3057	3101
NVA / total income	19%	36%	25%	30%	23%	33%	25%	35%	36%	47%	32%	27%	30%	43%	32%	30%	33%	39%	30%	35%
Prod. subsidies / NVA	48%	25%	27%	10%	45%	28%	25%	11%	60%	44%	48%	12%	63%	48%	52%	34%	78%	71%	64%	40%

Fig. 2. NVA per 1 AWU[7] in agricultural holdings in the Baltic States and Poland (2002 – 2006, EUR)
Source: authors' calculations based on data obtained from FADN liaison agencies in the Baltic states and Poland

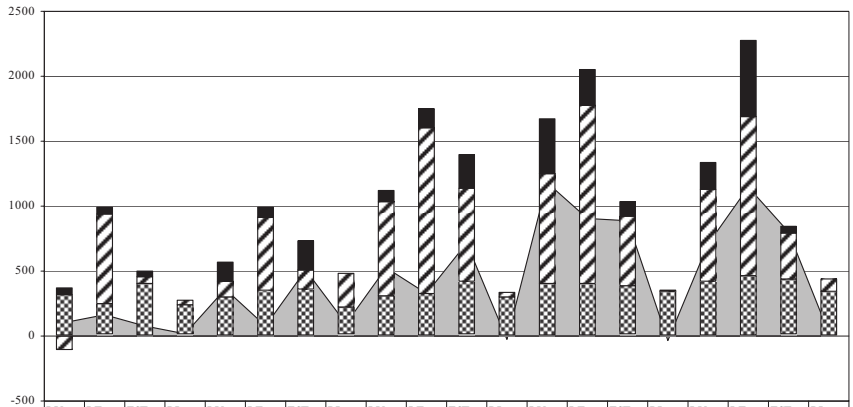
For dairy farms the trends of changes of NVA proportion in the total revenue in 2001-2006 in the Baltic states were very similar to the already mentioned ones in agriculture as a whole (Table 7). If in years 2002-2003 the biggest proportion occured in Polish farms (40-46%), starting with 2004 the leadership was taken by the Lithuanian farmers (45-49%). In its turn the biggest proportion of production subsidies in the NVA during all those years was observed exactly in Latvia. If in 2002 they constituted 51% of the NVA, in the year

[7] 1 average work unit (AWU) = 1840 hours of total labour input/year.

before the accession to the EU 40%, then in 2004 their share grew up to 57%, and in its turn in 2006 it reached already 73%. Another kind of extremity was observed in Poland (in 2002 it was 7 % and 38 % in 2006). Entry of Lithuania into the EU almost did not effect the proportion of subsidies achieved by dairy agricultural holdings in the NVA, staying at the level of year 2003, particularly at 34-37%. Only in 2006 it grew up to 47%.

Essential growth of the support after accession of new member states to the EU is especially well-seen on the example of field crops agricultural holdings (Table 8). In 2004, comparing to the pre-entry year 2003, Estonian agricultural holdings felt that more than others, their subsidies proportion in the NVA grew from 23% to 77%, i. e. by 54 % percentage points. Polish farmers felt the changes a bit later: in 2004 the subsidies share grew only by 6 percentage points to 19 % and only in 2005-2006 it reached the 43-50% level. At the same time NVA changes were not so abrupt and this shows that growth of subsidies did not cause the same fast increase of the NVA share in the total revenues. Thus, if in Poland the input of holdings' production factors in formation of NVA during the last years of the analyzed period made a half, then in Latvia and in Estonia only a negligible 10%, showing the low efficiency of this branch and its great dependence on support payments.

Farm investments have many sources of internal financing (depreciation, adjusted farm income, i. e. net farm income minus costs of unpaid labour input) and external financing (loans and subsidies to investments). The study shows that in 2002-2003 net investments (i. e. purchases of fixed assets minus their sales minus depreciation for the reporting period) of almost all agricultural holdings (excluding Polish farmers in 2004-2005) were positive (Figure 3).



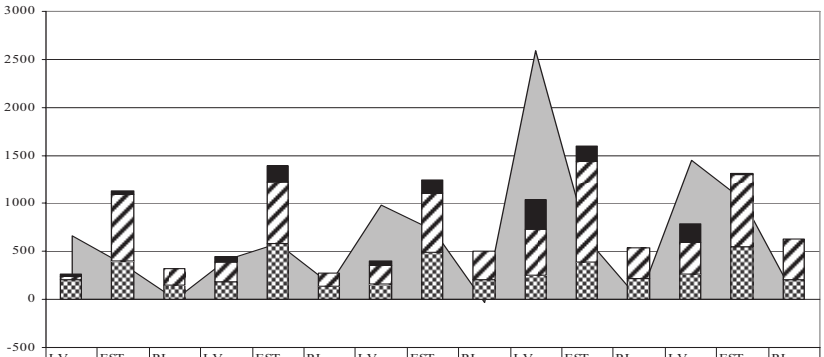
	2002				2003				2004				2005				2006			
	LV	LT	EST	PL	LV	LT	EST	PL	LV	LT	EST	PL	LV	LT	EST	PL	LV	LT	EST	PL
Net investment	104	164	74	15	366	76	509	92	530	325	718	-29	1177	906	891	-32	708	1149	800	29
Subsidies on investment	48	52	43	0	146	77	222	0	81	153	255	0	428	275	107	2	213	587	51	4
Adjusted farm income	-105	688	51	38	121	559	147	264	731	1274	718	39	838	1365	538	8	702	1229	349	95
Depreciation	312	233	395	224	297	350	349	202	298	321	407	290	397	401	374	336	414	457	427	333
Economic size	7,9	17	13	17	8,2	6	13	18	10,1	6	16,3	10	10,8	8	14	10	11,5	7	16,6	10

Fig. 3. Net investment and sources of internal financing in agricultural holdings in the Baltic States and Poland, 2002-2006, EUR per 1 economic size unit (ESU)
Source: authors' calculations based on data obtained from FADN liaison agencies in the Baltic states and Poland

This means that holdings could not only be equipped with fixed assets at previous level but also could make extra investments. Also, in the case of deficiency of subsidies to investments, the agricultural holdings (excluding Estonian farmers in 2003 and 2006) could finance net investments by means of depreciation and adjusted farm income. Especially fast growth of net investment was observed in Lithuania (179%) and in Latvia (122%) in 2005. In years 2005-2006 in Latvia by means of subsidies to investments were financed respectively 36% and 30%, in Lithuania 30% and 51%, but in Estonia only 12% and 6% of net investments. Average amount of subsidies to investments achieved by Polish agricultural holdings was extremely small.

Very similar situation was observed in the dairy sector. Though in 2005-2006 Latvian agricultural holdings' net investments made only 60-70% of the leading Lithuanian holdings' level, the data (Table 9) distinctly confirm the conclusion made by Gulbe [2007] in another research. Namely, Latvian dairy farmers have rapidly learnt to take advantage of the EU support mechanisms. Many farms have expanded and modernised their production facilities such as milking and cooling equipment, grain drying and storage capacity with the partial help of subsidies. Really, dairy farms' net investments more than twice exceed average values for Latvian agriculture (Figure 3). At the same time during the last years of the analyzed period the amount of subsidies on investment achieved by Polish farmers was 7 times less compared to Lithuania, and 4-5.5 times less than in Latvia.

Completely different trends characterized changes in net investments of granivores farms (Figure 4). If Estonian farmers felt an essential increase of subsidies already in 2003-2005 (they made up to $^1/_3$ of net investments), Latvian agricultural holdings witnessed their fast rise only in 2005. Since year 2002 they have been financing the investments by loans (share of subsidies in the net investments was 12-15%).



	LV	EST	PL	LV	EST	PL	LV	EST	PL	LV	EST	PL	LV	EST	PL
	2002			2003			2004			2005			2006		
Net investment	662	367	3	408	584	156	980	718	-31	2595	616	7	1448	1038	47
Subsidies on investment	27	36	0	61	177	0	41	143	0	305	164	0	189	8	1
Adjusted farm income	27	695	171	203	635	131	191	614	298	479	1049	325	333	760	424
Depreciation	211	398	155	187	585	141	163	488	202	253	386	214	262	546	207
Economic size	158	58	26	29	40	30	63	78	18	264	73	19	205	83	22

Fig. 4. Net investment and sources of internal financing in granivores agricultural holdings in the Baltic states and Poland, years 2002-2006, EUR per 1 economic size unit
Source: authors' calculations based on data obtained from FADN liaison agencies in the Baltic states and Poland

Especially actively external financing was used in 2002 (424 EUR per 1 ESU), in 2005 and 2006 (1863 EUR and 853 EUR per 1 ESU respectively). In its turn, the fact that Polish farmers did not receive any subsidies to investments, in a certain way may be explained by the Polish granivores holdings' small average economic size and their possible difficulties with elaborating reconstruction or modernization projects, and consequently with application for the appropriate subsidies.

Conclusions

1. After the accession to the EU the achieved by Latvia support for agriculture and rural development (EUR 308 million), comparing to year 2002, in 2006 grew 5.5 times, but in Estonia (EUR 141.7 million) 3.8 times. In Poland in 2005 the achieved support (EUR 3712.8 million), comparing to 2003, increased 3.2 times.

2. If before the accession to the EU the subsidies to the Baltic states agricultural holdings made on the average 5-10% and to Polish agricultural holdings 3-4 % of their revenue, then, starting with year 2004, it has grown 2-3 times. The biggest specific weight of subsidies was observed in year 2006 for Lithuanian (28%) and Latvian (26%) agricultural holdings. In Poland the specific weight of subsidies was 14 % of the revenue.

3. An increasingly bigger part in the NVA formation had production subsidies, thus rapidly decreases in it the share of the input of agricultural holdings production factors. In 2006 the proportion of subsidies in NVA, comparing to year 2002, grew from 10% to 40% in the Polish, from 25% to 71% in the Lithuanian, from 27% to 64% in the Estonian and from 48% to 78% in the Latvian agricultural holdings.

4. During the analyzed time period net investments of almost all agricultural holdings were positive, and the depreciation and the adjusted farm income were sufficient to provide renewal of fixed assets also in the case of deficit of subsidies to investments. Most actively subsidies to investments were used by Latvian and Lithuanian farmers. In 2005-2006 they were used to finance respectively 36% and 30% of net investments in Latvia, but in Lithuania 30% and 51% respectively. In Poland the achieved subsidies to investments were insignificant.

References

Agriculture and food economy in Poland. [2006]. Ministry of Agriculture and Rural Development, Warsaw.

Agriculture and food economy in Poland. [2007]. Ministry of Agriculture and Rural Development, Warsaw.

Agriculture in the European Union – statistical and economic information. [2007]. Retrieved from: : http://ec.europa.eu/agriculture/agrista/2007/table_en/index.htm.

Agro economic policy analysis of the new member states, the candidate states and the countries of the western Balkans. 6-monthly report 'Monitoring of agricultural policy, market and trade developments in Lithuania'. [2005]. Lithuanian Institute of Agrarian Economics, Vilna. Retrieved from: http://www.euroqualityfiles.net/cecap/Report%201/Section%201%20country%20report/CEECAP%20report%201%20section%201%20LITHUANIA.pdf.

EU integration seen through statistics. Key facts of 18 policy areas. [2006]. Eurostat, Luxembourg.

Europe in Figures – Eurostat yearbook 2006-07. [2007]. Eurostat, Luxembourg.

Gulbe I., Melece L., Hazners J., Csaba J. [2007]: Impact of Accession to the EU on Latvia's Food Sector. Changes in the Food Sector after Enlargement of the EU. Proceedings of international conference, no. 57 (1), Warsaw, pp. 226-243.

Kožar M., Kavčič S., Erjavec E. [2006]: Post-accession income situation of agricultural households in Slovenia under different direct payments policy options. *Journal of Central European Agriculture*, volume 7 no. 3, pp. 409-412. Retrieved from: http://www.agr.hr/jcea/issues/jcea7-3/pdf/jcea73-5.pdf

Pilvere I. [2007]: Atbalsta maksājumi Latvijā Kopējās lauksaimniecības politikas reformas nosacījumos. *Latvijas Lauksaimniecības universitātes Raksti*, no. 19 (314), pp. 3-15.

Rural Development Plan 2004-2006 Lithuania. [2006]. Ministry of Agriculture of the Republic of Lithuania, Vilna.

Salputra G., Miglavs A. [2007]: Different CAP Support Systems – Evaluation of the Impact on Supply of Agricultural Products. Economic Science for Rural Development. Proceedings of the international scientific conference, Jelgava, no. 14, pp. 67-74.

Table 7. NVA per 1 AWU in dairy agricultural holdings in the Baltic states and Poland, 2002-2006, EUR

	2002				2003				2004				2005				2006			
	LV	**LT**	**EST**	**PL**	**LV**	**LT**	**EST**	**PL**	**LV**	**LT**	**EST**	**PL**	**LV**	**LT**	**EST**	**PL**	**LV**	**LT**	**EST**	**PL**
A	1503	1154	1205	391	1115	1127	1139	1642	3726	2319	3426	371	3419	3031	4129	1211	4841	2863	4643	2016
B	1429	3775	2503	5493	1657	2179	2941	5593	2779	3921	5133	2474	2387	5386	4163	3253	1754	3226	3568	3278
C	27%	32%	26%	40%	28%	33%	22%	46%	41%	48%	37%	34%	34%	49%	34%	41%	35%	45%	32%	43%
D	51%	23%	32%	7%	40%	34%	28%	23%	57%	37%	40%	13%	59%	36%	50%	27%	73%	47%	57%	38%

A ─ production subsidies; **B ─** production NVA; **C ─** NVA / total income; **D ─** production subsidies / NVA
Source: authors' calculations based on data obtained from FADN liaison agencies in the Baltic states and Poland

Table 8. NVA per 1 AWU in crop agricultural holdings in the Baltic states and Poland, 2002-2006, EUR

	2002			2003			2004			2005			2006		
	LV	**EST**	**PL**	**LV**	**EST**	**PL**	**LV**	**EST**	**PL**	**LV**	**EST**	**PL**	**LV**	**EST**	**PL**
A	1300	769	1329	1914	979	1134	5534	4573	631	5316	5290	1719	7232	7706	2663
B	1477	2368	5448	1841	3214	7728	2704	1335	2761	862	3257	2253	655	762	2670
C	21%	29%	29%	25%	32%	36%	37%	30%	31%	28%	35%	32%	32%	33%	36%
D	47%	25%	20%	51%	23%	13%	67%	77%	19%	86%	62%	43%	92%	91%	50%

A ─ production subsidies; **B ─** production NVA; **C ─** NVA / total income; **D ─** production subsidies / NVA
Source: authors' calculations based on data obtained from FADN liaison agencies in the Baltic states and Poland

Table 9. Net investment and sources of internal financing per 1 economic size unit in dairying agricultural holdings in the Baltic States and Poland (2002 – 2006, EUR)

	2002				2003				2004				2005				2006			
	LV	**LT**	**EST**	**PL**	**LV**	**LT**	**EST**	**PL**	**LV**	**LT**	**EST**	**PL**	**LV**	**LT**	**EST**	**PL**	**LV**	**LT**	**EST**	**PL**
A	421	885	82	204	454	121	61	123	414	142	795	39	1235	1689	738	224	964	1587	1123	222
B	56	358	35	0	170	177	79	0	82	65	192	0	908	516	58	0	477	843	83	2
C	316	1250	58	26	308	746	-74	493	1409	1828	859	-58	1784	2775	511	152	1268	2227	377	306
D	280	402	327	196	296	417	282	185	315	378	357	282	473	518	332	322	476	521	446	349
E	8	9	21	13	6	4	24	14	7	4	29	8	7	5	22	8	8	5	22	8

A ─ net investments; **B ─** subsidies to investments; **C ─** adjusted farm income; **D** – depreciation; **E ─** economic size (in Economic Size Units)
Source: authors' calculations based on data obtained from FADN liaison agencies in the Baltic states and Poland

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State support of agricultural enterprises and its effectiveness[2]

Abstract. The problem of effective using of gated out budgetary funds in agrarian sector is discussed. An offer of development of a procedure which should consider potential productivity of each region and agricultural organization and promote a decrease of differences between enterprises and territories on a level of economic development is presented. Besides it is necessary to consider the future membership of Belarus in the World Trade Organization (WTO). Entering condition in this organization for the agrarian sector is a removal of budget assignments on financing exports and a limitation of level of the state support for agriculture.
Key words: effectiveness, state support, state subsidy, financial position, Belarus

Introduction

The agrarian sector and agriculture takes special place in economy of any country. Its role is caused for specific production conditions and final production such as foodstuffs. By virtue of high organic constitution of capital in agriculture subjects of industrial activity receive more a low income and can not compete with producers of other branches in markets. Besides dependence of yield and incomes of agricultural producers depends from environmental conditions and leads to instability of theirs position. Considering that food stuffs is the good and has flexible supply and demand the state satisfies basic needs of population and assumes functions on regulating of relations which develops on food market.

Known American economist D. Gelbert characterizing role of a state in macroeconomic regulating proportions of developing of production has wrote: 'State interfering in interests of agriculture … has essential significance for balanced development. If agriculture is free from state interfering development will be insufficient and possible dangerously low'.

Material and methods

We research and offer to develop such a procedure which will consider potential productivity of each region and agricultural organization and promote to decrease the differences between enterprises and territories on a level of economic development.

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[1] Email: milon81@bk.ru.

[2] This text due to many ununderstantable formulations has not been edited in full and is published for courtesy reasons.

Results of research

Significant experience of state influence on agriculture is saved up by the countries with the developed market economy. These countries protect their agrarian sectors by various trade barriers and also support agricultural producers with financing of new technologies and conduct conforming credit, tax and budgetary policy.

World experience shows that it is necessary to consider specificity of the concrete country when regulation of economy is used by the state.

In performs period in agriculture and economy of Belarus, as well as other countries of 'socialist camp' were administratively controlled limitations. Despite of big centralized investment, tax and other privileges farms have not been interested in effectiveness of production. Subjects of management were oriented on fulfillment of natural parameters State subsidies, credit facility. Prices on means of production were lower of world level and foodstuffs of population were essentially subsidized that stimulate its high level. Therefore putting of subsidies on material and technical resources for agrarian sector in performs period was inevitable.

In 90th years the state has sharply decreased financing support of agricultural organizations that has led to reductions of incomes level of majority of agricultural commodity producers. Entrance into market against a background of falling solvent demand of population has called increase in price of discrepancy between products of industry and agriculture.

Table 1. Economic characteristics of activity of agricultural organizations in Belarus

Parameter	Year							
	1990	2000	2001	2002	2003	2004	2005	2006
Number of agricultural organizations	2552	2414	2400	2338	2230	1978	1720	1644
In that unprofitable	8	1177	1639	1519	1501	269	1	14
Proportion of unprofitable, %	0.3	48.8	68.3	65.0	67.3	13.6	0.06	0.9
Average financial loss per unprofitable enterprise, million ruble	0.1	67.6	144.9	165.9	224.7	248.2	168.0	314.3
Number of people occupied in agriculture, thousand person	915	503.1	475.2	421.7	383.8	350.7	341.3	331
Monthly average wage, thousand ruble	247	35.7	75.8	108.3	132.7	193.1	275	295
Profit (+) or loss (-), billion ruble	3.5	45	-166	-114	-167	173.2	182.1	16.5
Level of profitability (unprofitability) of realized production, %	46,4	5	-9,3	-5,0	-6,2	4,7	3,6	0,3

*taking denomination into account.
Source: [Краткий… 2007].

Analysis of factors efficiency of functioning of agricultural organizations from 1990 year till 2003 year has shown low production efficiency, high level of debts and high

specific gravity of unprofitable enterprises (table 1). Realizing of necessity of rising of budget support of agricultural enterprises has induced to reconsideration of development line of agrarian policy. The branch has started to be actively invested.

Position of agriculture has improved in 2004 year. The level of profitableness of marketed products in analyzed year has constituted 4,7 % and quantity of unprofitable organizations has decreased up to 13, 6 % against 67, 3 % in 2003 year.

Today financing of agriculture is carried out according to the state program of rebuilt and development of countryside. According to this program it is planned to single out 69819,1 billion rubles for 2005-2010 years (Fig. 1).

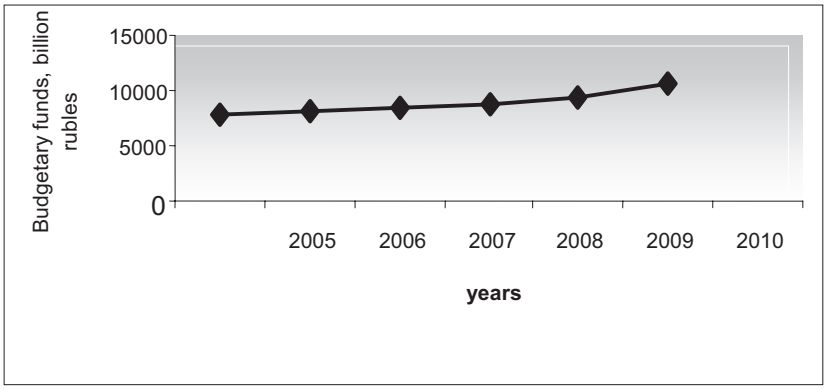

Fig. 1. Budgetary support for the Agrarian and Industrial Complex in years 2005-2010, billion ruble
Source: [Государственная… 2005].

Table 2. Distribution of the republican fund of producer's support for the agricultural and food produce and for the agrarian science

Direction of funds disposal	Sum awarded, million ruble
Payments of interests on loan according National bank of Belarus and securities	8500.0
Grants	1399431.1
Current transfers	50000.0
Capital expenses	390002.3
Giving of budget recourses. budget loans and payments of Government as grant for cancel of credits which have been given out by Belarussian banks	58200.0
Total sum	1906133.4

Source: [Национальный… 2006].

Money funds deposit to regions and agricultural organizations taking into account production volumes and realization of products. At the same time in the EU countries since 2005 subsidies arranged by other principle than it was earlier. The size of singled out subsidies depends not from quantitative factors but from quality of made production. So, farms must not break ecological norms, rules of animals keeping and quality standards

during production of food stuffs and legislation on labor protection. In other words main condition of receiving of farming subsidies in EU became observation of high standards and ecological compatibility of production.

The greatest specific weight in budget financing borrows means of republican fund of producers' support of agricultural production, foods and agrarian science. This fund is annually distributed among regions and agricultural organizations of Belarus. In 2006 year from given fund to regions has been single out 1906133.4 million rubles.

From table 2 is seen that more than 70% in structure of allocated funds borrow subsidies. There is a mistaken notion that the level of state support of agriculture is defined by volume of means which are gated out by state and that increasing of this sum will lead to improvement of position in agrarian sector. In practice shortening or increasing of expended means does not testify to real change of position of agricultural producers. So, despite of significant annual infusing of money resources financial position of the agricultural organizations has worsened during last years.

During period from 2004 year till 2006 year there was increasing of the sum of material losses counting on 1 unprofitable enterprise and decreasing of profit squeeze and as the result lowering of profitability of realized products to 0.3 % (Table 1).

Besides, the factor of financial autonomy of the enterprise has decreased on 5.1 per cent, the factor of financial dependence has increased on the corresponding size. According to the condition from 01.07.2006, presence of own turnaround means in agriculture has negative meaning. It means that there are debts of the last years in the balance of enterprise which exceed the presence of turnaround means in the analyzed year. Thus, the majority of the agricultural organizations of republic carried out the process of manufacture exclusively due to borrowed means.

In turn support of agriculture is carried out not only by means of direct financing, but also by means of a various sort of privileges.

The sum of tax privileges on the agricultural enterprises in 2006 has made over 50% from the sum of payments under the general order. Privileges have been given by 8 kinds of taxes, the greatest sum of privileges on payment of the VAT and the tax to the basic production assets of agricultural purpose.

Alongside with it, according to the Decree of President 'About some measures on financial improvement of the agricultural organizations and attraction of investments into an agricultural production, from March 19th, 2004, agricultural enterprises which have had the debts on payment of taxes and other obligatory payments in republican and local budgets, and also on gas, electric and thermal energy by January 1st, 2004, are given a delay of its repayment till January, 1st 2009. The sum of these delayed debts makes 672.7 billion ruble.

The analysis shows, that the irrational use of budgetary funds still takes place. So, practical data testify, that the enterprises making a lot of production on ruble of a commodity output, receive less compensatory payments from the budget.

And on the contrary, at the low volumes of realization, enterprises receive more, counting upon unit of a commodity output, from the budget. Thus farms making a lot of production also have higher level of profitability. It shows the expediency of intensity escalating of conducting an agricultural production, including due to budgetary funds.

The state supports in the equal sizes the manufacturers making agricultural production on the high-fertile soil (with estimation of 40 points and above), as well as those, who work on the worst lands (with an estimation of 23-25 points). However, according to the results

of 2005, the tendency of increase in the size of compensatory payments on unit of the area with growth of cadastral estimation agricultural lands is noted. In analyzed year the agricultural organizations with the best grounds (40 points and above) received 2 times more than compensatory payments on the unit of area, than an agricultural production with the worst grounds. It speaks about some changes in distribution of budgetary funds to the side of efficiency increases of their investments.

For last two years the state has accepted a number of measures to improve the agricultural organizations such as reorganization of many of them and transformation or sale of their property to the safe organizations and physical persons. Naturally, unprofitable agricultural enterprises require essential financial grants which can give them from the incomes highly profitable factories, combines, building and other organizations. This help in many cases happens rather essential and duly.

The research of distribution of the state support to the agriculture shows, that financing is carried out on a set of directions that leads to the dispersion of means and easing of the control over their use. Besides, the assistance given to rural commodity producers in many directions causes the necessity to develop numerous techniques for its distribution. The main thing that is put in a basis of a similar development is substantiation, to what groups of commodity producers and on manufacture of what production means should be allocated from the state budget.

Conclusion

Thus, carried out researches allow drawing following conclusions:

1. Functioning of a modern agriculture in foreign countries in many respects is defined by conditions of state financing (price and budgetary) of the given branch. The market elements can't keep a condition of existence of agriculture without carrying out of a purposeful state policy on redistribution of a significant part of the national income on maintenance and development of agriculture. In a return case the decline of manufacture and chaos in the food market, loss of food safety are possible.
2. For last years deterioration of a financial condition of the agricultural enterprises was outlined. The majority of the agricultural organizations of republic carry out process of manufacture exclusively due to the borrowed means.
3. The state supports mainly commodity producers of agricultural production and this help for last years has not decreased. However now there are no precise techniques of its distribution between the basic producers that reduces efficiency of the means spent for support.
4. The analysis of the means use of the centralized financial support shows, that irrational use of budgetary funds still takes place. The enterprises which make a lot of production on ruble of a commodity output, receive less than compensatory payments from the budget. And on the contrary, at the low volumes of realization, enterprises receive more counting upon a unit of a commodity output from the budget. Thus the facilities making a lot of production also have a higher level of profitability. It shows, that it is expedient to escalate the intensity of conducting of an agricultural production, even with the help of the budgetary funds.
5. The state financial support of agro industrial manufacture should encourage the most effective forms and kinds of manufacture, provide necessary incomes for steady

economic activities and the expanded reproduction to the agricultural commodity producers. It is required, that the order of the centralized financing of agrarian and industrial complex does not undergo so significant changes as it occurs now.

6. It is expedient to reduce channels (kinds) of an expenditure of the state support.

Besides it is necessary to consider the future membership of Belarus in the World Trade Organization (WTO). The main condition of occurrence in this organization for agrarian sphere is the refusal of budgetary appropriations on subsidizing of export and restriction of a level of the state support of agriculture. Therefore today rational use of the budgetary appropriations allocated to agriculture is actual. Increase of feedback from them causes necessity for development of the effective mechanism of the state support of branch which realization should be carried out on a legislative basis and extend on all the agricultural organizations which are having the right of reception.

Existing system of the state support of agriculture is not so effective and does not create stimulants for management of profitable production. In practice is prevailable compensational approach and cost-is-no-object approach to distribution of means. Farms which use recourses less effectively and receive big grants and does not promote commodity producers in increasing of production and reduction in costs. Financing without accounting conditions of managing inevitably spends budgetary funds, reduces their effectiveness. At the same time concentration of means of state support to economically strong agricultural organizations contradicts to aim of reconstruction of paying capacity of basic mass of farms. It is necessary to consider, that economically strong farms as a rule in the pre reform period had powerful financially - technical and social base and have saved qualified stuffs. They are faster than others adapted to market and have internal funds for development. Thus, the differentiation of resources should provide payback of additional costs on production in bad natural and economic conditions of managing on the one hand and stimulate development of agriculture in regions where is possible to receive products with the least costs on the other hand.

References

Воробьева А.А. [2005]: Проблемы субсидирования сельского хозяйства в РБ. [In:] Организационно-правовые аспекты реформирования АПК, vol. 1, Gorki, pp. 140-142.

Государственная программа возрождения и развития села на 2005-2010 гг. [2005]. Указ Президента Республики Беларусь от 25 марта 2005 года.

Краткий статистический сборник «РБ в цифрах», (стат. РБ). [2007]. Минстат Республики Беларусь, Minsk.

Назаренко В.И. [2006]: Формы и направления государственной поддержки сельского хозяйства на Западе. *Экономика сельскохозяйственных и перерабатывающих предприятий*, no. 3-5,.

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Шилкина Е.В. [2006]: Приведение государственной политики национального сельского хозяйства в соответствии с требованиями ВТО. [In:] Вехи пройденного пути: кафедры факультета, научная деятельность: к 10-летию факультета предпринимательства и управления. Белорусский государственный аграрный технический университет, Minsk, pp. 317-321.

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The impact of EU enlargement on the agricultural output and income in the member states

Abstract. The paper presents an analysis of the impact of the EU enlargement in 2004 on the agricultural output and incomes of the EU Member States. The main aim of the study is to test the significance of difference of reaction to enlargement in three distinct groups of members, namely the 'old' fifteen Member States, the 'new' ten Member States which accessed the EU on May 1st 2004, and the two 'newest' Member States, i.e. Romania and Bulgaria which accessed the EU on January 1st 2007. For the purpose of description of different countries behaviour a linear mixed model was applied.
Key words: EU enlargement, agricultural output, mixed linear model

Introduction

On May 1st 2004 Cyprus, the Czech Republic, Estonia, Hungary, Latvia, Lithuania, Malta, Poland, Slovakia and Slovenia joined the EU. On that day the ten new Member States joined a single market. As was anticipated, the flow of trade between the 'old' and the 'new' Members States has amplified [Analysis… 2002]. The EU funds became available for farmers in the new Members States which allowed a significant increase of investments in agriculture and a certain economic boom in the rural areas. There is a general consensus that the EU enlargement has a positive effect on the EU agriculture as a whole. Nevertheless, some adjustments of production and consumption had to take place in several countries of the EU-25 and not all of them for the better.

The aim of this paper is to study the impact of the EU enlargement on agriculture in three distinct groups of countries: the 'old' fifteen Member States (EU-15), the 'new' ten Member States (EU-10N) which accessed the EU on May 1st 2004, and the two 'newest' Member States, i.e. Romania and Bulgaria (EU-2N) which accessed the EU on January 1st 2007.

Due to constraints on the size of the paper, the study is limited to investigation of the influence of enlargement on two characteristics of agriculture, namely the *agricultural output* and the *agricultural income indicator A*.

Description of data

The data used in this analysis are available from Eurostat. According to an Eurostat guide [Manual… 2000] the *agricultural output* can be depicted as follows:

- sales (total, excluding trade in animals between agricultural holdings)
- change in stocks

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- self-produced fixed capital goods (plantations repeatedly yielding crops, productive animals)
- own final consumption (of agricultural products)
- processed by-products (of agricultural products between separable activities)
- internal consumption in individual activities, i.e. crop products used for animal feed (cereals, oilseeds, fodder crops, marketable or not, etc.)

The agricultural output is valued at basic prices, where the basic price is the price receivable by the producers from the purchaser for a unit of good or service produced as output plus any subsidy receivable on that unit as a consequence of its production or sale, minus any tax payable on that unit as a consequence of its production or sale.

Agricultural income indicator A is an index of the real income of factors in agriculture, per annual work unit[2]. This is one of the most important indicators for measurement of agricultural income and its trends. Indicator A corresponds to the real (deflated) net value added at factor cost in agriculture per total annual work unit. Net value added at factor cost is calculated by subtracting intermediate consumption, depreciation and other production costs from the value of agricultural output at basic prices (i.e. including subsidies on products and excluding taxes on products), and adding the value of other production subsidies. Indicator A is obtained by deflating this net value with the price index of gross domestic product at market prices and dividing by the volume of total labour in agriculture.

The values of agricultural output are expressed in million euro (from 01.01.1999) or million ECU (up to 31.12.1998), at constant prices (2000=100). As to the values of indicator A, year 2000 was chosen as a base year, so the indicator A for all countries in year 2000 is equal 100.

Due to a limited range of available data, this study is based on the data starting in year 1998 and ending in year 2007. For the same reason Cyprus was excluded and data from only twenty six countries were analysed.

Description of statistical model

As it was mentioned in the previous section the analysed data consisted, for each variable, of values applying to ten years and twenty six countries. As a result there are ten observations for each Member State, considering both variables individually. For the analysis of impact of the EU enlargement in year 2004 two explanatory variables were created: *AfterAcces* {0, 1}, a variable describing if an observation comes from a year before 2004 and *Group* {A, B, C}, a variable which takes value A for countries from EU-15, B for countries from EU-10N and C for Romania and Bulgaria. Model which could be applied for such data is presented below (1):

$$y_{ij} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \beta_3 x_{3ij} + \upsilon_i + \varepsilon_{ij} \quad (1)$$

where

[2] In order to take into account part-time and seasonal work, agricultural employment or changes therein are measured in annual work units (AWU's). One AWU corresponds to the input, measured in working time, of one person who is engaged in agricultural activities in an agricultural unit on a full-time basis over an entire year. A distinction is drawn between unpaid and paid AWUs, which together make up total AWUs.

y_{ij} is the value of the response variable[3] for the *j*th of n_i observations in the *i*th country,

x_{1ij} is the value of the explanatory variable *AfterAcces* for the *j*th observation in the *i*th country,

x_{2ij} is equal 1 if the value of the explanatory variable *Group* for the *j*th observation in the *i*th country is B and 0 otherwise ,

x_{3ij} is equal 1 if the value of the explanatory variable *Group* for the *j*th observation in the *i*th country is C and 0 otherwise,

$\beta_0, \beta_1, \beta_2, \beta_3$ are the regression coefficients, which are identical for all groups.

The parameter β_0 represents so called reference level which in this case applies to a situation when a country belongs to EU-15 and the observation comes from a year before 2004. There are two random variables in the model (1). First of them is υ_i and represents the random effect in *i*th country, the second one is ε_{ij} which represents the random error of *j*th observation from *i*th country. It assumed that both variables follow normal distribution, with expected value equal to 0 and variances σ_υ^2 and σ_ε^2 respectively. It is also assumed that υ_i for different values of *i* are independent, the same apply to ε_{ij} which are also independent for different values of *i* and *j*.

Hence if one of the regressors has a random character the model (1) belongs to the linear mixed models family [Demidenko 2004].

As it was mentioned in the introduction the aim of this paper is to study the impact of EU enlargement on agriculture in three groups of countries. In order to assess that three models were compared. Model (1), already presented, assumes that effect of the enlargement is the same in all three groups and that group effect is the same before and after the enlargement.

$$y_{ij} = \beta_0 + \beta_1 x_{1ij} + \beta_2 x_{2ij} + \beta_3 x_{3ij} + \beta_4 x_{1ij} x_{2ij} + \beta_5 x_{1ij} x_{3ij} + \upsilon_i + \varepsilon_{ij} \quad (2)$$

Model (2) allows differences in reaction by including interaction terms.

$$y_{ij} = \beta_0 + \upsilon_i + \varepsilon_{ij} \quad (3)$$

Model (3) contains only constant β_0 besides random variables and is equivalent to a lack of impact of the EU enlargement and also to a lack of differences between groups.

Model (1) can be treated as a special case of model (2) with restrictions on two parameters ($\beta_4 = \beta_5 = 0$), also model (3) can be treated as a special case of model (1) with restrictions on three parameters ($\beta_1 = \beta_2 = \beta_3 = 0$). This allows application of likelihood-ratio test for testing if the additional parameters are equal 0.

$$LRT = 2(LLF_1 - LLF_0) \quad (4)$$

[3] The agricultural output or the agricultural income indicator A.

where: LRT is a value of the test statistic, LLF_1 and LLF_0 are values of likelihood function logarithms calculated for appropriate models.

If the hypothesis is true the LRT statistics follows asymptotically the chi-square distribution with $p_1 - p_0$ degrees of freedom (DF), where p_1 and p_0 are numbers of parameters for respective models. The difference $p_1 - p_0$ is equal to the number of restrictions on parameters.

The likelihood-ratio test can be used for testing hypotheses about whole group of parameters at once and can be considered as a substitute for an analysis of variance test, when its assumptions are not fulfilled.

In the further part of the paper model (3) will be denoted as M_{A0}, model (1) as M_{A1} and model (2) as M_{A2}.

The calculations for all models were performed in R, an environment for statistical computing [R; A language… 2008] with help of the lme4 package [Bates 2007].

Results

For the assessment of changes in agricultural output three models were compared: M_{A0} containing only constant, M_{A1} containing main effects of factors and M_{A2} containing main effects and interaction of factors. To test the significance of added variables influence, likelihood-ratio test was used. p-values presented in Table 1 correspond with two hypotheses:

$$H_0 : \beta_1 = \beta_2 = \beta_3 = 0 \tag{5}$$

$$H_0 : \beta_4 = \beta_5 = 0 \tag{6}$$

While the hypothesis (5) says that both the effect of the enlargement and the effect of group membership are nonexistent the hypothesis (6) says only that effect of the enlargement is the same in all three groups and that group effect is the same before and after the enlargement.

Table 1. Results of testing influence of factors on agricultural output

model	Number of parameters	LLF	LRT	Chi^2 DF	p-value
M_{A0}	3	-2246.5			
M_{A1}	6	-2242.9	7.0929	3	0.0690.
M_{A2}	8	-2242.2	1.4690	2	0.4797

Source: own calculations.

Because the appropriate p-value is equal to 0.069 then hypothesis (5) that both main factors had no impact on agricultural output cannot be rejected on *0.05* significance level. The same applies to the hypothesis (6) where p-value is equal to 0.4797.

Such results are not really surprising. The reason for that is a very large variability of agricultural output between Members States, due, at least in some part, to differences in

size of the analysed countries. To overcome that problem, recalculation of the absolute values of agricultural output to indexes was applied. As a base year 2000 was chosen.

Table 2. Results of testing influence of factors on agricultural output indexes

model	Number of parameters	LLF	LRT	Chi^2 DF	p-value[4]
M_{A0}	3	-941.67			
M_{A1}	6	-921.05	41.224	3	5.86E-09
M_{A2}	8	-905.56	30.985	2	1.87E-07

Source: own calculations.

In Table 2 results of testing the same hypothesis as in Table 1 are presented, but this time instead of absolute values indexes are used as dependent variables and it is no longer a comparison of agricultural outputs but a comparison of changes in agricultural outputs.

In that case the results indicate that the effects of both factors are significant as well as is their interaction. This suggests that reaction of countries from different groups to the EU enlargement in 2004 differ.

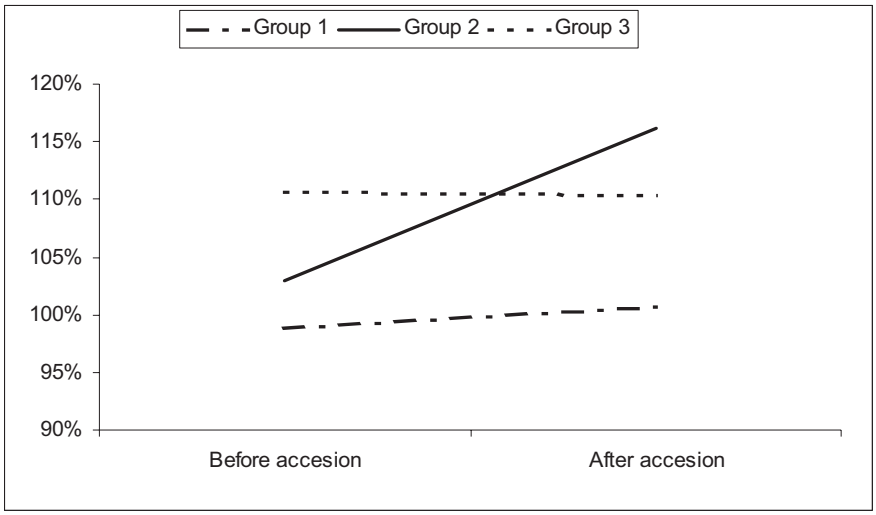

Fig. 1. Interactions between factors *Group* and *AfterAcces* for agricultural output indexes

Source: own calculations.

Fig. 1 illustrates the mentioned differences in the reactions of three distinct groups to the EU enlargement. It may be clearly seen that group 2 demonstrates a big leap in agricultural output while group 1 a very moderate increase and group 3 even a decrease.

[4] The p-value is the probability of obtaining a test statistic at least as extreme as the one that was actually observed, providing the null hypothesis is true; one rejects the null hypothesis if the p-value is smaller than or equal to the significance level.

The lines drawn on the picture can be understood as an indication of a relative direction only, this is a typical way for the presentation of interactions between categorical factors

Fitted estimates of model (2) coefficients and t-statistic values for the hypotheses of equality of an appropriate parameter to 0 are presented in Table 3. Due to big number of observations (260) as critical value for the t-statistic 0.95 quantile of the standard normal distribution is used i.e. 1.96.

Table 3. Results of testing influence of factors on agricultural output indexes

Factor	Parameter	Estimate	Std. Error	t-value
Intercept (reference level)	β_0	98.794	1.588	62.2
Group B	β_2	4.193	2.608	1.61
Group C	β_3	11.806	4.631	2.55
AfterAcces 1	β_1	1.816	1.265	1.44
Group B: AfterAcces 1	β_4	11.367	2.084	5.46
Group C: AfterAcces 1	β_5	-2.084	3.690	-0.56

Source: own calculations

The value of intercept shown in Table 3 and depicted as reference level is an average for countries from Group A (EU-15) before year 2004. The value of estimate for Group B is the difference between averages for EU-10N and EU-15. The same logic can be applied for the rest of factor levels.

What is worth mentioning is the fact that there is no evidence of significant changes in agricultural output (measured in indexes) after accession for any group but EU-10N. So one must conclude that the only countries which experienced effect of the EU enlargement in the year 2004 where the countries which actually accessed the EU in that year. On average, it was an increase of 14%, which is a sum of 1.816% due to the main effect of the EU enlargement common to all groups and 11.367% due to the specific effect of the EU enlargement in group B, comparing to the years before accession.

To test whether the impact of enlargement was significant to agricultural income expressed in values of indicator A, similar analyses were performed.

Table 4. Results of testing influence of factors on indicator A

model	Number of parameters	LLF	LRT	Chi^2 DF	p-value
M_{A0}	3	-1269.0			
M_{A1}	6	-1232.7	72.606	3	1.18E-15
M_{A2}	8	-1180.5	104.478	2	<2.20E-16

Source: own calculations.

As it is shown in Table 4 the effects of both factors and their interaction are significant. What is interesting, this time the effects are much stronger, which can be seen when comparing p-values from Table 4 with p-values from Table 2.

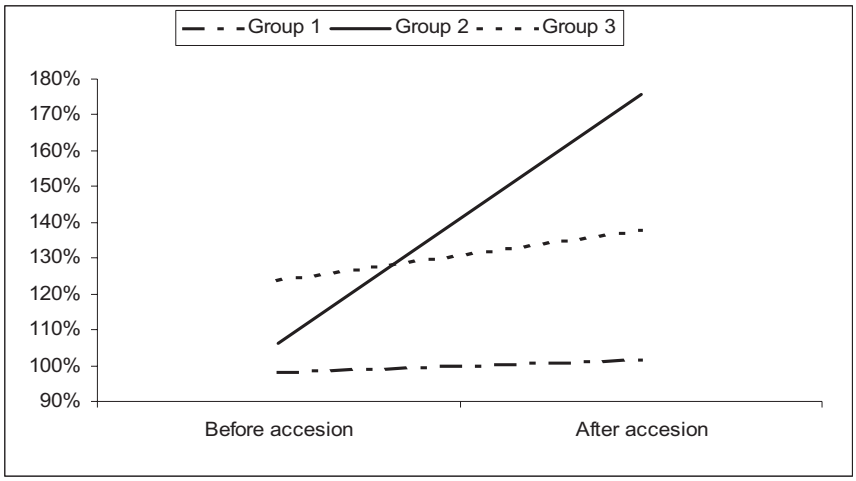

Fig. 2. Interactions between factors *Group* and *AfterAcces* for agricultural indicator A

Source: own calculations.

Fig. 2 shows, once again, that from the three groups only one, i.e. EU-10N displays a strong reaction. Such facts confirms that the increase of agricultural income, in terms of indicator A, cannot be explained by time variable and that the accession is the key factor.

Fitted estimates of model coefficients and t-statistic values are presented in Table 5.

Table 5. Results of testing influence of factors on indicator A

Factor	Parameter	Estimate	Std. Error	t-value
Intercept (reference level)	β_0	98.314	4.940	19.901
Group 2	β_2	7.792	8.067	0.966
Group 3	β_3	25.253	14.699	1.718
AfterAcces 1	β_1	3.088	3.587	0.861
Group 2: AfterAcces 1	β_4	66.361	5.857	11.330
Group 3: AfterAcces 1	β_5	10.981	10.861	1.011

Source: Own calculations.

The results presented in Table 5 agree with those in Table 3; again, there is no evidence of significant changes after accession for any group but EU-10N. However, this time the average for EU-10N is increased by almost seventy percent (3.088+66.361), comparing to the years before accession.

Conclusions

The impact of the EU enlargement on agricultural output and income measured by indicator A is similar as to direction but differ in strength. In both cases in the three groups of countries the only group which significantly profited from the enlargement are the new Member States which accessed the EU in the year 2004.

The difference between the gains in agricultural output and in indicator A, 14% and 70% accordingly, indicates that number of people working in agriculture is decreasing in EU-10N without loss to size of production.

References

Analysis of the Impact on Agricultural Markets and Incomes of EU Enlargement to the CEECs. [2002]. Report prepared by the Directorate General for Agriculture of the European Commission.

Bates D. [2007]: lme4: Linear mixed-effects models using S4 classes. R package version 0.99875-9.

Demidenko E. [2004]: Mixed Models, Theory and Applications. Wiley, Nowy Jork.

Eurostat, Statistical Office of the European Communities. [accessed 2008]. http:// ec.europa.eu/eurostat.

Manual on the Economic Accounts for Agriculture and Forestry EAA/EAF 97 (REV. 1.1). [2000].

R: A language and environment for statistical computing. [2008]. R Development Core Team. R Foundation for Statistical Computing, Vienna, Austria. ISBN 3-900051-07-0, [available at] URL http://www.R-project.org.

Regulation (Ec) No 138/2004 of the European Parliament and of the Council of 5 December 2003 on the economic accounts for agriculture in the Community. [2004].

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Cross-Compliance as a Lifelong Learning Process Stimulus

Abstract. The EU membership requires introduction of significant changes in the agricultural sector. Such changes will not be possible without investments in human capital. The aim of the paper is to make an attempt at presenting the coincidence of three factors conducive to the development of lifelong learning process in rural areas:
1) EU and Polish legislation concerning the cross-compliance rule enforcement;
2) EU financial support for human capital development in the EU second programming period;
3) new banking product connected with financing adult education (Individual Learning Accounts, ILA).
Key words: cross-compliance, lifelong learning, ILA, rural areas.

Introduction

There is a need in Poland to create a platform for debate and cooperation between the political decision makers, academia, industry and public opinion concerning the research priorities as well as the key social problems. Such an interdisciplinary approach to scientific research serves discovering coincidences. And coincidence explains why a set of given circumstances occurring together guarantees creating an effect of durable economic development. When technological progress coincides with four other processes, then the economy moves fast forward. Among these other processes the following can be included [Kołodko 2008]:

1) domination of criticisms and innovativeness over dogmatism in the sphere of culture and economy
2) economic knowledge and capability to organize the expansion of production and trade
3) political will of the authorities to introduce indispensable institutional reforms that would serve freeing people's energy, entrepreneurship and creativity
4) openness towards contacts with external environment that enables wider exchange not only of goods, but also information and culture.

The coincidence analysis is necessary while posing the question about the direction of the world's development. According to Kołodko, among a dozen of fundamental areas (Big Issues of the Future) that should be carefully observed, count the knowledge-based economy and society. From the utilitarian point of view, knowledge-based economy could be defined as such a configuration of factors of production, in which people who know more will increasingly contribute to the economic growth. Economies and societies will more and more effectively use knowledge for the benefit of their own development. Still it will be necessary to know how to sow, dig, hunt and so on. These will be however the activities of ever smaller group, whereas ever greater number of people will above all use

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knowledge as the key factor of production [Kołodko 2008]. Already Einstein stated that thinking had a great future. Recalling this thought in the era of knowledge-based economy (KBE), it is worthy using now this advantage of the human species in order to analyze the coincidence of factors conditioning the development of lifelong learning in Poland. The European Union membership requires restructuring of a lot of economic sectors, including agriculture. Therefore the analysis of coincidence of factors influencing lifelong learning development in rural areas would be of a special importance. This is a crucial point especially because the potential participants in lifelong learning in the countryside are to a great extent so called 'resigned minimalists'. They are individuals whose material living conditions are objectively difficult or average, and who limit their life aspirations and aims to a minimum, understood most of all as the willingness to safeguard the (difficult) situation, in which they are currently. They are minimalists searching stabilization and peace; their plans, formulated in a negative way (for the situation not to worsen), concern mostly matters of family. They do not own a lot, and they do not want much; they are focused on what they already have [Kapitał… 2006]. It is therefore worth looking at the results of coincidence analysis included in research reports from at least two important research projects concerning the visions of rural areas development:

1) National Foresight Program 'Poland 2020' (NFP 'Poland 2020'), that is accompanied by a slogan 'Future Starts Today'[2].
2) Agro-Info Program, a vision of countryside of 2025, realized by the Cooperation Fund on commission of the Office of the Committee for European Integration.

In the case of the National Foresight Program 'Poland 2020'[3], the following aims of the undertaking are of key importance:

1) to draft the vision of Poland's development until 2020
2) to determine, together with the main stakeholders, the priority research and developmental works directions that in the long term would contribute to the acceleration of the socio-economic development
3) making use of the research results in social practice, as well as creating preferential conditions for them in the process of assigning budget means
4) to demonstrate the meaning of scientific research for the economy's development, and the possibilities of absorbing the research results by the economy
5) adapting the Polish science policy to the requirements of the European Union.
6) shaping science and innovations policy towards the direction of knowledge-based economy [4].

[2] The foresight method is an important element of rational forecasting of possible ways of the development of the research and development sphere. It is used in most of the EU member states. Also in Poland, since December 2006, National Foresight Program has been realized that embraces three research areas: Poland's Sustainable Development, Information and Communication Technologies and Social Security.
[3] The program is realized by the Coordinating Consortium, selected through a competition, and including Institute of Fundamental Technological Research of the Polish Academy of Sciences (the Consortium Coordinator), Institute of Economic Sciences of the Polish Academy of Sciences, and Pentor Research International.
[4] Based on the issued information about the NFP 'Poland 2020'.

Whereas in the Agro-Info Program, the main justification for this type of analyzes should be the conclusion that in the perspective of several decades Polish agriculture will face[Klepacki 2005]:

1) a small agrarian revolution, concerning the agricultural land area: increase in the acreage of farms concomitant with a decrease in the agricultural area in general
2) quite a significant technical revolution, connected with the implementation of new, very precise machines, tools and systems of decision-making furtherance
3) a huge revolution in the field of knowledge, its usage and superceding of the material inputs.

Unfortunately, both programs do not devote enough attention to the issue of lifelong learning processes. This omission seems not understandable given the assumption that in the near future being a farmer will require very high and wide-ranging qualifications. The structure of knowledge indispensable for any farmer will be subject to a significant change. Knowledge of ecological and other non-production related (esthetic, cultural, social) aspects of farmer's activity will become an equally important component of such knowledge, contributing to the improvement of economic effectiveness of the activity [Wilkin 2005].

The aim of the paper is therefore to make an attempt at presenting the coincidence of three factors conducive to the development of lifelong learning processes in rural areas:

1) the EU and Polish laws concerning the cross-compliance rule enforcement
2) the EU financial support for human capital development in the EU second programming period
3) new banking product connected to the expenses of adult education (Individual Learning Accounts, ILA).

Cross-compliance as an instrument of Common Agricultural Policy

The reform of Common Agricultural Policy, accepted by the ministers of agriculture of the EU member states on June 26th, 2003 in Luxemburg, introduced, among other things, the detachment of the direct payments from the structure and the range of agricultural production[5]. This implies that most of the previous direct payments, specific for various production types, are substituted with a universal payment systems. Significant majority of payments will be directed to farms regardless of the production amount, whereas the payments will be conditioned by meeting a lot of norms concerning the environment protection and the welfare of animals. The set of such norms is referred to as the cross-compliance rule, that is to say, so called interdependence rule[6]. Minimum requirements addressed to the direct payments' beneficiary's farm will concern:

1) environmental protection against the pollution implied by activities on the farm

[5] Before a complex system of payments was in force, where the payments included, for example, some extra money attached to area according to a referential crop.

[6] In Poland, also other translations of this notion are used, like for example: the rule of cross-compatibility, the rule of mutual compatibility.

2) production of agricultural goods in a way non threatening people's and animal' health, nor the health of plants
3) ensuring the conditions for animals' welfare
4) exploiting the land in a way that would not worsen its quality.

The cross-compliance rule is regulated by numerous directives and regulations listed below.

A. Legal acts in force in the EU-15 since 01.01.2005 (applicable in Poland since 01.01.2009)

Environment

1) Council Directive 79/409/EEC of April 2nd,1979 on the conservation of wild birds (Official Journal L 103, 25.4.1979), article 3, paragraph 1, article 3, paragraph 2, point b; article 4, paragraphs 1,2,4,5, points a, b, d.
2) Council Directive 80/68/EEC of December 17th,1979 on the protection of groundwater against pollution caused by certain dangerous substances (OJ L 20, 26.1.1980), articles 4 and 5.
3) Council Directive 86/278/EEC of June 12th,1986 on the protection of the environment, and in particular of the soil, when sewage sludge is used in agriculture (OJ L 181, 4.7.1986), article 3.
4) Council Directive 91/676/EEC of December 12th,1991 concerning the protection of waters against pollution caused by nitrates from agricultural sources (OJ L 375, 31.12.1991), articles 4 and 5.
5) Council Directive 92/43/EEC of May 21st,1992 on the conservation of natural habitats and of wild fauna and flora (OJ L 206, 22.7.1992), article 6, and article 13, paragraph 1, point a.

Public and animal health, identification and registration of animals

6) Council Directive 92/102/EEC of November 27th,1992 on the identification and registration of animals (OJ L 355, 5.12.1992), articles 3, 4, 5.
7) Regulation (EC) no. 1760/2000 of the European Parliament and of the Council of July 17th,2000 establishing a system for the identification and registration of bovine animals and regarding the labeling of beef and beef products and repealing Regulation (EC) no. 820/97 (OJ L 204, 11.8.2000), articles 4 and 7.
8) Council Regulation (EC) no. 21/2004 of December 17th, 2003 establishing a system for the identification and registration of ovine and caprine animals and amending Regulation (EC) no. 1782/2003 and Directives 92/102/EEC and 64/432/EEC (OJ L 5, 9.1.2004), articles 3, 4, 5.

B. Legal acts in force in the EU-15 since 01.01.2006 (applicable in Poland since 01.01.2011)

9) Council Directive 91/414/EEC of July 15th,1991 concerning the placing of plant protection products on the market (OJ L 230,19.08.1991), article 3.
10) Council Directive 96/22/ EC of April 29th,1996 concerning the prohibition on the use in stockfarming of certain substances having a hormonal or thyrostatic action

and of β-agonists, and repealing Directives: 81/602/EEC, 88/146/EEC, as well as 88/299/EEC (OJ L 125, 23.5.1996), articles 3, 4, 5, 7.

11) Regulation (EC) no. 178/2002 of the European Parliament and of the Council of January 28th,2002 laying down the general principles and requirements of food law, establishing the European Food Safety Authority and laying down procedures in matters of food safety (OJ L 31, 1.2.2002), articles 14, 15; article 17, paragraph 1; articles 18, 19, 20.
12) Regulation (EC) no. 999/2001 of the European Parliament and of the Council of May 22nd, 2001 laying down rules for the prevention, control and eradication of certain transmissible spongiform encephalopathies (OJ L 147, 31.05.2001), articles 7, 11, 12, 13, 15.

Notification of diseases

13) Council Directive 85/511/EEC of November 18th,1985 introducing Community measures for the control of foot-and-mouth disease (OJ L 315, 26.11.1985), article 3.
14) Council Directive 92/119/EEC of December 17th,1992 introducing general Community measures for the control of certain animal diseases and specific measures relating to swine vesicular disease (OJ L 62, 15.03.1993) – article 3.
15) Council Directive 2000/75/EC of November 20th,2000 laying down specific provisions for the control and eradication of bluetongue (OJ L 327, 22.12.2000), article 3.

C. Legal acts in force in the EU-15 since 01.01.2007 (applicable in Poland since 01.01.2011)

Animal welfare

16) Council Directive 91/629/EEC of November 19th,1991 laying down minimum standards for the protection of calves (OJ L 340, 11.12.1991), articles 3 and 4.
17) Council Directive 91/630/EEC of 19 November 19th,1991 laying down minimum standards for the protection of pigs (OJ L 340, 11.12.1991), article 3 and article 4, paragraph 1.
18) Council Directive 98/58/EC of July 20th,1998 concerning the protection of animals kept for farming purposes (OJ L 221, 8.8.1998), article 4.

Meeting the cross-compliance requirements, according to the Council Rule no. 1698/2005, articles 36 and 52, will constitute a condition for receiving payments within the frame of the Rural Development Plan in the case of agri-environmental activities, farming in the mountainous areas and other agriculturally disadvantageous areas, areas of 'Nature 2000', as well as areas connected with the implementation of the Water Framework Directive, and aforestation of agricultural areas.

The farmer will have to keep the land in a good agricultural culture, according to the environment protection requirements. Minimal requirements in this respect will be established by the member states at the state or regional level, taking into account the national/regional climate and soil conditions, the level of soil exploitation, practices in the field of crop rotation, methods of farming, as well as the farms' structure. It is worth underlining that the requirements connected with the maintenance of land in good culture

and according to the environmental protection requirements should not be identified with the requirements of the usual good agricultural practice applied within the frame of the Council Rule 1257/1999, as well as requirements applied for the agri-environmental undertakings, in the case of which they are stricter than the usual good agricultural practice.

Not obeying the cross-compliance rule implies fees. These are various, according to the character of the misbehaviour and its consequences. They consist in decreasing the applicable direct payments, including the exclusion of the farmer from the payment system[7]. There are the following forms of sanction:

1) failure to obey the cross-compliance rule has the consequence of payment reduction by maximum 5%, and in the case of repeated failure by 15%
2) purposeful refusal to obey to the cross-compliance rule has the consequence of at least 20% reduction of payment, and in extreme case may lead to exclusion of the farmer from the payment scheme for one year or longer [Minimalne… 2007].

In Poland the cross-compliance rule will be applicable from the moment of moving from the Single Area Payment Scheme to the Single Payment Scheme in 2009[8].

Education of farmers in the field of cross-compliance

Polish farmers, as well as others from the EU, should be well prepared to obey the cross-compliance rules in their farms. The knowledge about the requirements of cross-compliance allows the farmer to assess, whether the currently applied solutions in the sphere of production, organization and farm management are in accordance with those requirements. The lack of adaptation can in many cases be a reason for discontinuing production.

Farmers can adapt the production in their farms to the requirements of cross-compliance on their own, basing on the available primary information sources (e.g. directives and rules published in official journals) as well as secondary sources (e.g. professional literature). Reading of legal acts however bears often many difficulties in the process of the included provisions interpretation. The legal acts in the field of cross-compliance are not only numerous, but they also describe relatively complex issues of farm management. Farmers' knowledge in this field may not be deep enough (see Table 1). On average, for 50% of the respondents to a recent survey being beneficiaries of direct payments, the consequences of non-complying to the cross-compliance rules are not obvious. This can lead in practice to losing the payments already awarded. Taking into consideration the research results, a clear conclusion comes out: agile and efficient counseling system for farmers is indispensable. The more so, because in the control system of direct payments applied in the EU, the level of

[7] The legal basis for this type of protective actions is article 51 of the Council Rule No 1698/2005 of September 20th, 2005 concerning the support of rural development by the European Agricultural Fund for Rural Areas Development (EARD) (OJ L 277/1 of 21.10.2005), as well as the provisions of Commission Rule No 1974/2006 of December 15th, 2006 establishing the detailed rules of implementation of the Council Rule no. 1698/2005 concerning the support of rural development by the European Agricultural Fund for Rural Areas Development (EARD) (OJ L 368/15 of 23.12.2006).

[8] This deadline is implied by provisions of the Council Rule no. 2012/2006.

knowledge and farmers' professional qualifications as equal to that of the beneficiaries from the EU-15 have been taken into account.

Table 1 The assessment of farmers' knowledge about the consequences of non-obeying the EU laws in the field of cross-compliance, %

Item	Directive range	d.s.	r.n.s.	r.n.s.	d.n.s.
1.	Applicable in the EU since 1.01.2007 'Welfare of animals' in the field of protection of:				
	1.1. calves	16.0	31.0	44.0	9.0
	1.2.pigs	13.0	37.0	41.0	9.0
	1.3. animals used for farming purposes	8.0	40.0	41.0	11.0
2.	Applicable in the EU since 1.01.2006 'Public, animal and plant health' in the field of:				
	2.1. placing of plant protection products in the market	19.0	60.0	17.0	4.0
	2.2. prohibition on the use of certain substances having a hormonal action	17.0	38.0	37.0	8.0
	2.3. 'Food Safety'	17.0	49.0	27.0	7.0
	2.4.'Prevention and control of certain diseases'	14.0	34.0	45.0	7.0
3.	Applicable in the EU since 1.01.2005 'Environment' in the field of protection of:				
	3.1. wild birds	8.0	26.0	49.0	17.0
	3.2. groundwater	8.0	33.0	44.0	15.0
	3.3. soil when sewage sludge used	9.0	31.0	46.0	14.0
	3.4. water against nitrates	12.0	35.0	44.0	9.0
	3.5. natural habitats	10.0	28.0	50.0	12.0

d.s. – decisively satisfactory, r.s. – rather satisfactory, r.n.s. – rather not satisfactory, d.n.s. – decisively not satisfactory.

Source: research in the frames of the grant of Minister of Science and Higher Education: The role of structural funds in the process of knowledge-based economy building (lifelong learning)[9].

The EU requirement to apply the cross-compliance rules is a perfect opportunity to make farmers active in the process of lifelong learning. Participation in trainings in the field of cross-compliance should be obligatory for every beneficiary of direct payments. Additionally such trainings should include, on the occasion of talking about cross-compliance, informing about the innovations in agriculture. The most suitable teaching method for the realization of this task is demonstration. Application of this method requires, among other things [Kujawiński 2007]:

- an adequate location of the place where the chosen technology should be applied
- ensuring comparability of the effects of applying demonstrated solutions with the effects of solutions used so far
- documenting the progress of work done (e.g. deadlines, modes of pursuing action) as

[9] Contract no. 0208/H03/2007/32.

well as the adequate esthetic maintenance of the location where the technology is introduced
- organizing periodical meetings of farmers in order to make them observe the important elements of the process of a complex technology introduction as well as its effects
- popularization (best if with the participation of an innovative farmer) of the effects of applying these solutions among other farmers.

The quality of trainings offered to the farmers will become a factor of how the rules of cross-compliance are applied in farms.

Individual Learning Accounts as an instrument of financing trainings in the field of cross-compliance

In order to make the system of farmers' counseling more effective, including counseling in the field of cross-compliance, financial resources were provisioned in the Rural Development Plan for years 2007-2013 that should enable farmers to use counseling services. Thanks to this support, a real market for counseling services should be launched, which should imply an increase in the quality of services offered. What raises doubts however, is the fact of keeping the old rules of EU funds spending in the second EU programming period. According to the current allocation formula EU resources supporting the process of human capital investment are directed to contracted projects. During the first EU programming period the project contracting demonstrated numerous disadvantages of this formula. Among the most important are [Kowalska 2007]:

1) lack of interest on the side of potential beneficiaries in the offer of projects proposed by some of the project-launching institutions
2) unequal distribution of resources 'consumption' among the supported beneficiaries
3) lack of financial participation in the training project costs by the beneficiary
4) disturbed balance between the supply and demand in the labour market .

Given the fact that during the official control of the direct payments beneficiaries also farmers' qualifications and the state of their professional knowledge will be verified, one could propose to allocate the resources directed to financing the lifelong learning directly to the beneficiary. The beneficiary would thus have more freedom in choosing the theme of the training, its place and time. Besides, this is an adequate timing for, together with granting financial self-reliance to the farmer, making him be used to participate in the costs of taking part in the lifelong learning process. All these functions could be performed by a new, under Polish conditions, instrument of supporting the financing of human capital investment, i.e. the Individual Learning Account (ILA). ILA is a preferential (supported from the state budget), saving account devoted to financing educational expenses. The pattern to follow could be the British ILA model, based on the idea of a three-level

investment in education, that is to say an investment by the learning person (adult) him/herself, the employer and the state[10] [Kowalska 2007, 2008b].

When adapting the British ILA model to the conditions of Polish rural development, the first recipients of this offer should be those who dispose of farms smaller than five hectares, that is to say those who are at the highest risk of losing profits as a result of the agricultural sector modernization. ILA for farmers would be supplied from the state budget (with the support of the EU structural funds) and the account holder's own financial input. Financial input by the farmer would be a condition for receiving the state budget money. The function of the account's operator would be assigned to a bank, for example, a cooperative bank [Kowalska 2008a]. The ILA administrators (the client desks) could become, for instance, Lifelong Learning Centers or Centers for Vocational Training.

Implementation of ILA would also create a chance to gain an added value from the EU 2007-2013 programming period in Poland. The focus is on reviving the real interest of the rural areas' residents in bearing costs of the lifelong education. The modernization of Polish agricultural sector is a perfect occasion to create among the residents of villages an attitude appreciating the value of lifelong learning [Kowalska 2006]. This will be implied by a very favorable combination of legal circumstances. Firstly, farmers are already conversant with the basic rules of individual banking. This knowledge comes from, at least, the necessity to open an account in order to receive the EU direct payments. Secondly, farmers can feel more motivated towards education when they are aware of the possibility of losing the direct payments or their decrease as a result of not obeying to the EU rules (cross-compliance principle).

Conclusions

The aim of developing the lifelong learning processes in rural areas requires an interdisciplinary research approach to investment in human capital. Of such interdisciplinary character is the field of new political economics. This is because political economics deals with the social rights of production and with the ways the goods are delivered to the recipients, that is to say consumers, i.e. people who with the help of these goods meet their individual or common needs [Lange 1975]. The possible renaissance of political economics will extend the researchers' capability of noticing coincidences. KBE

[10] In the case of pilot programs realized in the years 2000-2001 the public financial incentives in United Kingdom directed to support educational investment by private individuals embraced:
1) state financial input at the level of £150 in the first year of the account's functioning, warranted by a small own input (£25) by the account's holder (the subsidy was provisioned for the first million of accounts)
2) 20% tuition discount for costs not exceeding £ 500 yearly
3) 80% tuition discount in case of priority learning programs that develop information technology skills
4) additional income for employees receiving financial support from their employers (resources sent to the account), free of taxes and social insurence contributions
5) employers' payments to the learning accounts, alike other trainig costs the employer bears, deductible from taxed revenue of the entreprise.

requires new instruments of adults' education. ILA could beome an attempt at introducing good financial practices in this field in Poland.

References

Kapitał ludzki i zasoby społeczne wsi. Ludzie – społeczność lokalna – edukacja. [2006]. K. Szafraniec (red.). Instytut Rozwoju Wsi i Rolnictwa Polskiej Akademii Nauk, Warszawa.

Klepacki B. [2005]: Tendencje zmian w ekonomicznej i społecznej strukturze wsi. [W:] Polska wieś 2025. Wizja rozwoju. J. Wilkin (red.). Fundusz Współpracy, Warszawa.

Kołodko G. [2008]: Wędrujący świat. Prószyński i S-ka, Warszawa.

Kowalska I. [2006]: Finansowe instrumenty wspierania sektora edukacji w erze gospodarki opartej na wiedzy. [W:] Edukacja wobec wyzwań i zadań współczesności i przyszłości. Strategie rozwoju. J. Szempruch (red.). Wydawnictwo Uniwersytetu Rzeszowskiego, Rzeszów.

Kowalska I. [2007]: Edukacyjne konta osobiste instrumentem rozwoju pozarolniczych funkcji wsi. [W:] Turystyka w rozwoju obszarów wiejskich. I. Sikorska-Wolak (red.). Wydawnictwo SGGW, Warszawa.

Kowalska I. [2008a]: Bank Services for Structural Funds on the Example of Individual Learning Accounts. *Ekonomika i organizacja gospodarki żywnościowej* nr 65

Kowalska I. [2008b]: Alternative Form of European Social Fund Resources Allocation for Financing Lifelong Learning. [W:] Studies and Proceedings. Polish Associaton for Knowledge Management. Nr 15.

Kujawiński W. [2007]: Pomoc rolnikom w dostosowywaniu gospodarstw do wymogów wzajemnej zgodności. Zalecenia metodyczne. Centrum Doradztwa Rolniczego w Brwinowie oddział w Poznaniu, Poznań.

Lange O. [1975]: Ekonomia polityczna. Dzieła, tom 3. PWE, Warszawa.

Minimalne wymagania wzajemnej zgodności (cross-compliance) dla gospodarstw rolnych objętych systemem dopłat bezpośrednich oraz płatnościami w ramach zrównoważonego gospodarowania na gruntach rolnych i leśnych. Przewodnik dla doradców. [2007]. Z. Krzyżanowska, H. Skórnicka, E. Matuszak, J. Lesisz, M. Bielawskie (red.). CDR, Poznań.

Wilkin J. [2005]: Lepszy świat – polska wieś za 25 lat. [W:] Polska wieś 2025. Wizja rozwoju. J. Wilkin (red.). Fundusz Współpracy, Warszawa.

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The present and future aspects of the Common Agricultural Policy; the Polish position

Abstract. The paper deals with the future of the EU Common Agricultural Policy. The New Financial Perspective (2007-2013) is being discussed. The paper is supplemented by analysis of the impact of the 2003 reform on the most important markets. Final part of the paper deals with a presentation of Poland's position with regard to the future of CAP.
Key words: agriculture, Common Agricultural Policy, Financial Perspective

Introduction

The agreement reached by the EU-15 Ministers of Agriculture in Luxembourg (on 26 June 2003) and the EU Council Proposals of 22 April 2004 gave shape to Common Agricultural Policy (CAP) for years 2007-2013. The fundamental element of the new CAP implemented since 2004 is to separate direct payments from the structure and size of agricultural production, so called decoupling. Decoupling means replacing the existing specific direct payments to particular types (branches) of agricultural production with a system of uniform payment independent of production (Single Payment Scheme). Poland supported the assumptions of the CAP reform.

Other essential elements of the reform include the following:

- a decrease of the amount of direct payments for very large holdings with the purpose to allocate the financial means thus obtained to the enhancement of measures for the benefit of the rural areas (modulation)
- a financial discipline mechanism which will prevent CAP budget expenditure to overshoot the limits adopted by the EU Council at the Berlin summit in 2002
- linkage of the Single Payment Scheme (SPS) with payments specific to the defined directions of production with the obligation to meet specific standards and requirements by the holding (*cross-compliance*)
- introduction of an agricultural advisory system, with an aim to provide aid to agricultural producers in implementation of cross-compliance
- further reduction of the intervention prices in the dairy market in return for higher direct payments (in Poland – Single Area Payment Scheme)
- abandonment of intervention in the rye market
- abolishment of the quota system in the tobacco market
- increase of significance (scope and level of support) of rural development.

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Context of the consecutive Common Agricultural Policy reforms

From the point of view of the New Financial Perspective (NFP) 2007-2013 [Financial... 2006] the Common Agricultural Policy may be defined as stable. A constant level of expenditure in consecutive years until 2013 has been planned (financial discipline mechanism and the expenditures are predictable in the medium term perspective (October 2002 and December 2005 agreements on the financial perspective for the period 2007-2013), whereas their relative share in the EU budget is decreasing. The expenditure under CAP, rural development included, now amounts to 40% of the EU budget (as compared to 65% in 1990). In 2013 this expenditure will amount to 35%.

However, discussions associated with the NFP (2007-2013) negotiations as well as a possible change of political environment in particular EU Member States by 2013, imply that the next financial perspective (beyond 2013) involves a considerable risk of the EU agricultural budget reduction.

The alarming syndromes include the following: (i) reduction of the budget for rural development by about 20% as compared to the Commission proposal and (ii) voluntary modulation, i.e shifting of up to 20% of the budget from the 1st Pillar (direct payments) to the 2nd Pillar under the allocation of respective Member States, i.e. without the Community redistribution mechanism, so that the risk of Community policy re-nationalization with respect to agriculture and rural areas exists.

In the Section 2 of the New Financial Perspective *Management and maintenance of natural resources* (agriculture, rural development, fisheries and New Financial Instrument for the environment) an amount of EUR 293 105 million was agreed for the commitments for 2007-2013.

Table 1. Funds for the commitments under Section 2 'Management and maintenance of natural resources' of the NFP, 2004 prices, EUR million

Expenditure	Year							
	2007	2008	2009	2010	2011	2012	2013	2007-13
Commitments	54 972	54 308	53 652	53 021	52 386	51 761	51 145	371 244
including: Agriculture (1st Pillar) – market support and direct payments	43 120	42 697	42 279	41 864	41 453	41 047	40 645	293 105

Source: [Financial... 2006].

In mid-March 2006 the European Commission presented the ultimate amounts of funds for commitments, including those under Section 2 of the NFP, which were the basis for reaching agreement with the European Parliament and the EU Council (for the so called Interinstitutional Agreement).

The commitments to CAP 1st Pillar for 2007-2013 also include EUR 7.978 billion allocated to market support and direct payments in Bulgaria and Romania.

Allocation for the new instrument of rural development (composed mainly of the amounts shifted from the funds intended for the support of the 'Convergence' objective regional component and of the amounts paid now under the Guarantee Section of the European Agricultural Guidance and Guarantee Fund) will amount to EUR 69.75 billion

before modulation, out of which EUR 41.23 billion is now paid under EAGGF Guarantee Section. The Commission will allocate the total rural development expenditure, including the amounts shifted from EAGGF, and will ensure that at least EUR 33.10 billion is allocated to EU-10, Bulgaria and Romania. Out of the remaining EUR 36.74 billion, the amount of EUR 18.91 billion will be allocated to the EU-15 according to a schedule suggested by the Commission and agreed by the Council in accordance with the Regulation 1698 of 2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) adopted on 20 September 2005. The remaining EUR 4.07 billion will be allocated to Austria (EUR 1.35 billion), Finland (EUR 0.46 billion), Ireland (EUR 0.50 billion), Italy (EUR 0.5 billion), Luxembourg (EUR 20 million), France (EUR 0.1 billion), Sweden (EUR 0.82 billion) and Portugal (EUR 0.32 billion), where the latter is not subject to co-financing obligation because of the special difficulties of Portuguese agriculture referred to in the EU Council Conclusions drawn from the Commission Report on Portuguese Agriculture.

Table 2 - Section 2 of the New Financial Perspective for 2007-2013 'Management and maintenance of natural resources', EUR million

Allocation	Year								Total 2007-2013	Difference 2013 vs. 2006
	2006	2007	2008	2009	2010	2011	2012	2013		
Market support and direct payments (Pillar 1)	43 735	43 120	42 697	42 279	41 864	41 453	41 047	40 645	293 105	-7%
Rural development (2nd Pillar)	10 544	10 710	10 447	10 185	9 955	9 717	9 483	9 253	69 750	-12%
European Fisheries Fund	630	539	544	551	551	553	554	556	3 849	-12%
Other Fisheries	272	321	325	328	329	331	332	333	2 300	23%
Life+ (environment)	199	220	234	248	259	271	283	296	1 811	49%
Other	31	61	61	61	61	61	61	61	429	96%
Total Section 2	55 411	54 972	54 308	53 652	53 021	52 386	51 761	51 145	371 244	-8%

Note: All figures are in terms of 2004 prices, annual deflator of 2% was applied.

Source: [Financial... 2006].

Allocation for the new instrument of fisheries (composed mainly of the amounts shifted from the funds intended for support of the regional component of convergence, regional competitiveness and employment objectives) will amount to EUR 3.8 billion.

In negotiations of the Interinstitutional Agreement the European Parliament sought an increase of the EU budget by EUR 12 billion to finance the policies of high community added value (education, research, Trans-European Networks and border cooperation), whereas in opinion of the Presidency the amount is completely unreal. In opinion of the Council the expenditure under NPF could be increased only by about EUR 1.5 billion.

During the reconciliation meetings of the Council and the Parliament on April 4th 2006 an agreement was reached on the New Financial Perspective 2007-2013. In opinion of the Parliament and the EU Council the agreement takes into account the political requirements that are faced by the European Union and the necessity to achieve greater flexibility of budgetary measures.

Future of the Common Agricultural Policy in the context of Polish agriculture

Covering the agricultural markets by the Common Agricultural Policy (CAP) has resulted in a significant change of price relations in agriculture. Procurement prices of animal origin products increased significantly, especially in cattle and milk sectors, whereas procurement prices of cereals decreased. The decrease of prices of cereals has had a positive impact on the pig and poultry sectors. Lower revenue of farms concentrating on crop production on account of lower prices of cereals have been compensated by the direct payments scheme. The fluctuating prices and price relations were reflected directly by the results of foreign trade in the Polish agri-food products illustrated, among other things, by a significant increase in export of dairy products as well as poultry, beef and fruit and vegetables preserves.

- **Cereals market**

The years 2004/2005 and 2005/2006 were characterised by a rich harvest. The intervention system played significant part in the light of the excess of domestic supply over demand. Under this system Agricultural Market Agency bought in about 1 600 thousand tons of cereals for PLN 696 million. Problems with access to the EU support mechanisms for Community cereals export were noted at that time because of higher cost of transport to the target markets as compared to exports by other Member States. Poland intensely sought to take into account this factor when putting forward tenders for EU export subsidies in the European Commission and EU Council forums.

It should be taken into account that the last statements of the European Commission representatives suggest that the Community regulation of this market may undergo another reform. The criticism of the current intervention system emphasises the surpluses of cereals collected in certain EU regions, e.g. in Hungary and Poland. The possibility of further reduction of the intervention prices, and even further restriction of the scope of intervention, is suggested. Possible abandonment of export subsidies will be also considered.

- **Sugar market**

Including the sugar market into the common market organization improved the financial standing of the sector in the first two years of EU membership. At that time Polish governmental agencies purchased about 200 thousand tonnes of sugar from sugar producers under the title of intervention purchases for the amount of PLN 534 million and paid PLN 315 million of export refunds for nearly 270 thousand tonnes of sugar. At that time Poland actively participated in the debate on reform of this market, sought to maintain the previous

production (quota) level and to avoid deterioration of the national sugar beet growers' and processors' situation. The final European compromise could not be supported by Poland, yet it considered a number of Polish arguments, such as extension of the reform over time, maintenance of the intervention mechanism in the reform implementation period and lower price reduction. The Polish sugar beet growers will obtain compensation for reduction of the minimum price in the form of direct payments in the same amount as all other EU Member States.

Despite a hard criticism of the sugar market reform in Poland it might be that the limitation of sugar production in Poland will not occur, or it will, but to a very small extent. Certainly, Poland may produce sugar beet relatively cheaply, and its processing may be continued under new price conditions after a necessary restructuring. The National Sugar Company has much to do in this respect and faces a necessity to close down the least effective plants.

- **Fruit and vegetable market**

This EU market is characterized by a relatively low price support and a low protection against external competition. Support is provided mainly through agricultural producers organizations. During the first two years of the EU membership, the soft fruit sector was subject to an increasing competition of cheap imports from third countries. As a result of worse weather conditions in 2005 the fruit and vegetable production decreased and the prices generally improved. With the existing Community procedures, Poland has triggered the initiation of anti-dumping proceedings with respect to frozen strawberries import from China and submitted demands aimed at a stronger support of the soft fruit sector (payments for fruit directed to processing) and a more intensive support to producer groups.

Poland has actively participated in the ongoing debate on a reform of the fruit and vegetables market since its beginning in 2004. The debate gathered pace in last months of 2006. In the course of negotiations, Poland calls for increasing and streamlined support for producers' groups and organizations and for coverage of soft fruit intended for processing with direct payments. Poland is in a difficult situation as the largest producer of this kind of fruit, the country may face problems with obtaining adequate support. Whether or not this demand will be satisfied will also depend on the result of the present WTO round negotiations, which may considerably restrict the possibility of using this kind of payments in the future.

The efforts in this sector also focus on the relationships between producers and the processing companies. In this respect, it is necessary to disseminate solutions which will facilitate predictability of purchases and prices that farmers obtain for example under cultivation contracts. Success of these efforts depends to a large extent on the attitude of market participants because the possibilities of legislative solutions are highly limited in this respect.

- **Milk market**

In the first two years of the Polish EU membership the level of milk supply to processing plants exceeded the wholesale quota provided for in the Accession Treaty, i.e. 8.5 million tonnes. The strong position of dairy producers in the European market in terms of competitiveness contributed to an increase in production. In December 2005, in order to

ensure further development of the sector, Poland submitted a report entitled 'Restructuring of the situation of Polish dairy sector in 2000-2005' to the European Commission. At the same time Poland submitted a request to be granted a so-called restructuring reserve amounting to 416,126 tonnes. Positive evaluation of this report by the Commission became a basis for approval granted to a draft Commission Regulation on the release of the special restructuring reserve by EU Member States on May 11th 2006 at the meeting of the Management Committee for Milk and Milk Products. The possibility of launching this reserve as of April 1st 2006 resulted from the provisions of Council Regulation (EC) no 1788/2003 of September 29th 2003 establishing a levy in the milk and milk products sector.

Having regard to the expected overrun of the national reference quantity for wholesale suppliers in the marketing year 2005/2006, in January 2006 Poland undertook at the EU forum actions concerning the possibility of introducing a conversion of the unallocated national reserve for direct suppliers into reference quantities for wholesale supplies at the national level. Poland requested for a conversion of 100 thousand tonnes. Acceptance of this request would allowed to decrease the estimated overrun of the reference quantity in the quota year 2005/2006 to about 200 thousand tonnes. Additionally, a request for earlier launch of the restructuring reserve (as early as the quota year 2005/2006) was submitted.

In the long-term Poland, like other EU Member States, will face the dilemma whether or not to support preserving the system of milk production quotas after 2014/15. Evaluation of this issue will have to take into account a highly restrictive nature of the milk quota in Poland, as well as the fall in intervention prices of dairy products following the decisions already taken (Agenda 2000 and Luxemburg 2003) and rather optimistic forecasts of prices in the world market.

- **Meat market**

Reduction of the cereals prices (the main component of the feeding stuffs) favoured production of pigs and poultry. In both sectors the first two years of the EU membership brought a gradual increase in production which largely translated itself into increased exports (especially in the case of poultry). An increase in the pork production has caused a significant decrease in prices since September 2005. By the end of 2005, and particularly in the first months of 2006, the national demand for poultry decreased by about 20% because of the avian influenza among wild birds in some EU Member States, and in February 2006 also in Poland. A fall in prices and a reduction of turnover led to a crisis in the poultry sector, therefore Poland, like other Member States, called for providing this sector with support under CAP.

The crisis in the poultry market caused by the avian influenza, as well as occasional market slumps resulting from other problems falling within the scope of veterinary science and food safety, are indicative for a need to develop new instruments to prevent and alleviate the effects of such situations in the agricultural sector. Poland actively participates in the discussion initiated by the European Commission at the EU forum about the so-called crisis management. We supported this direction also by the common memorandum of the 12 EU New Member States, including Bulgaria and Romania.

Poland's position with regard to the future of the Common Agricultural Policy

During the last 15 years the Common Agricultural Policy (CAP) changed radically in response to pressures from the European society and its evolving economy. The 2003/2004 reforms marked a new phase in this process, introducing decoupled direct payments via the Single Payment Scheme (SPS) and the Single Area Payment Scheme (SAPS) in most sectors of the first pillar of CAP. Furthermore, the CAP increasingly contributes to heading off the risks of environmental degradation and to delivering many of the public goods that our societies expect. Producer support is now dependent on respecting standards relating to the environment, food safety and quality as well as the animal welfare. These issues are being addressed in the so called 'Health Check' of CAP, that is a review of the current policy which also responds to the new challenges for modern European agriculture.

Poland, in line with other EU Member States, prepared its position with regard to the basic issues of 'Health Check'. Poland agrees with the statements contained in the document of October 18, 2007, which presents the Common Agricultural Policy as a modern policy of the present, and taking account of the future conditions. Health Check of the Common Agricultural Policy will enable proper correction of its instruments, as well as a debate on the new challenges that CAP faces. It needs to be stressed that it is of key importance to Poland that the Common Agricultural Policy maintains its Community nature, while providing equal competition conditions in the enlarged European Union.

The present position directly formulates solutions which are the most beneficial to Poland by referring to the proposed evolution of the Common Agricultural Policy, while leaving the door open to further, more detailed work on specific instruments or to a change in the position depending on the progress and developments of the debate and other Member States' proposals.

Poland also believes that Health Check of the Common Agricultural Policy will enable an analysis of effectiveness of the European Union instruments for agricultural markets regulation, as well as an identification of challenges the Community faces in the field of Common Agricultural Policy.

There are three Polish priorities, stressed in our position .

- **Direct payments and cross-compliance**

Poland supports unification of direct payment rates within the entire EU.

The target direct payment scheme in the new Member States should take into account the lessons learnt in the scope of SAPS and SPS implementation. The target payment scheme should give the new Member States a possibility to choose not to introduce the complex mechanism of payment eligibility. However, it is necessary to provide a mechanism to enable transfer of payments along with a transfer of the holding (land) to the successor.

All Member States should have an equal opportunity to direct support in order to solve specific problems in the respective sectors (and regions), that is both the solutions provided for in Article 69 of Council Regulation 1782/2003 and a partial "coupling'.

Poland aims at obtaining a consent for extending the Single Area Payment Scheme application until 2013, that is until a simplification of the Single Payment Scheme (SPS) applied in the 17 EU Member States takes place.

Implementation of **cross-compliance** standards in Poland and other new Member States should be continued over time so as to enable the Member States to prepare their

control and sanction systems properly. Poland holds that implementation of the last area of requirements, Animal Welfare, should take place starting from 2013.

Poland supports the process of simplification of the cross-compliance requirements and will take active part in it.

The scope of requirements should be clear and comprehensible for farmers, and be based on verifiable and measurable criteria which cannot be assessed using subjective measures. According to Poland, efforts should be made to reduce the list of requirements without affecting the objective.

The process of meeting the requirements of Good Agricultural and Environmental Conditions (GAEC) (Annex IV to Council Regulation 1782/2003) should be adapted to the conditions of particular countries/regions and should be optional, which in particular applies to the requirements regarding crop rotation, permanent grasslands maintenance and minimum stocking density.

- **Support and promotion of renewable energy sources**

It could be achieved by utilisation of agricultural, industrial, communal by-products and waste.

Payments for energy crops need to be continued. There is a need to direct the aid to perennial energy crops on poor soils for the purposes of electric power production, production of biogas and **biofuel**, including the second-generation fuels. It will provide a possibility to limit competitiveness of the bioenergy sector vs. the products intended for food.

- **Support and stabilization of markets (safety net) and crisis management**

In Poland's opinion the years to come will involve increased price and production risks. Therefore we hold that maintaining the current market support system as part of the Community agricultural markets organisation is necessary to ensure an effective **safety net**.

In Poland's opinion it is necessary to consider an extension of the **milk production quota system** beyond 2015, as there are currently no grounds to claim that the system will not be effective and efficient from the point of view of the long-term CAP objectives.

In the context of *soft-landing* (securing some sort of satisfactory solution for milk producers, once milk quotas are lifted) there is a need to consider the scenarios of a milk quota increase by a value exceeding 2% (5% for instance). In Poland's opinion, the level of milk quotas should be increased as to ensure a smooth transition to the new situation for the largest possible number of holdings; and the funds possibly economised under the Common Market Organisation (savings on export subsidies and market intervention) should be used for the purposes of adjustment and modernisation as well as risk management in this sector.

Poland claims that the current system of intervention in the feed cereals market should be maintained. It is also necessary to modify the rules of granting support in the form of refunds on export of cereals, transportation costs including, to ensure equal level of the safety net within the whole Community.

Poland is in favour of retaining coupled support in several smaller sectors, such as **potato starch, flax, and hemp**. It is recommended to maintain coupled support in these sectors, since there is a risk of total production elimination, which would reduce the EU

agricultural production biodiversity and could have a negative economic and social impact on the regions where such production is located.

Poland is ready to cooperate in the preparation of the new community CAP-financed instrument for **crisis management**. What should be considered in particular is the instrument for co-financing the agricultural income insurance against fall in prices, damages resulting from bad weather conditions, plant and animal diseases.

Summing up, Polish priorities are: simple direct payments system, accompanied by simplified cross-compliance, support for bioenergy, and safety net for agricultural markets.

Meeting those, as well as other common priorities and values shall enable to reshape the CAP to the benefit of the whole united Europe, and to establish a sound policy fit for the 21st century.

Literature

Burkiewicz B., Grochowska R., Hardt Ł. [2007]: Przyszłość polityki rolnej a przegląd budżetu Unii Europejskiej.. UKIE, Departament Analiz i Strategii, Warsaw.

Commission Report on Portuguese Agriculture. [2003]. EU doc.10859/03.

Czyżewski A., Henisz-Matuszczak A. [2006]: Rolnictwo Unii Europejskiej i Polski. Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań.

EU tables final budget plans for 2007-2013. [2006]. European Parliament, 22 March.

Financial perspective: agreement on the figures postponed. [2005]. Mimeo. [and earlier studies of the Department on NFP 2007-2013].

Financial perspective 2007-2013 . [2006]. (EU doc. 1951, 19 December 2005). *AgraNet*, 17 March.

Health Check. [2007]. EU Commission Dokument, October 18.

Izdebski J., Szewczyk M. [2006]: Wspólna Polityka Rolna-szansą polskiego rolnictwa. Wyd. KUL, Lublin.

Łysoń P. Rowiński J. [2006]: Program rozwoju obszarów wiejskich w latach 2007-2013. Wyd. IERiGŻ, Warszawa.

Wilkin J., Błąd M., Klepacka M. [2006]: Polska strategia w procesie kształtowania polityki UE wobec obszarów wiejskich i rolnictwa. Wyd. Instytut Rozwoju Wsi i Rolnictwa PAN, Warszawa.

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Rural houses heating costs

Abstract. Average full (including capital, operation and maintenance costs) annual heating costs in a standard family house with 180 m^2 of floor surface are compared for various heating systems under the Polish economic conditions. The compared heating technologies comprise water to water and ground loop heat pumps with both vertical and horizontal loops, a liquid gas combustion furnace, an earth gas combustion furnace, a coal combustion furnace, a straw combustion furnace, a wood combustion furnace and an electric stove. A sensitivity analysis with regard to the interest rate and the value of owner's work did not change the general conclusion that in most cases heat pumps were the cheapest, while oil and coal burning furnaces or an electric boiler the most expensive solutions. The cost of own labour was decisive for the appraisal of labour intensive systems.

Key words: house heating, annual cost, heat pump, electric boiler, coal burning furnace, oil fuelled boiler, straw burning furnace, wood burning furnace, liquid gas fuelled boiler, earth gas fuelled boiler

Introduction

Non-renewable sources of energy are being gradually depleted, and at a growing rate. Burning fossil fuels adds, according to widely shared opinions, to a climate change for warmer by adding carbon dioxide and other greenhouse gases to the atmosphere and in this way making it less permeable for the infrared eradiation of waste energy dissipated in the air into the outer space. Poland, thanks to its abundant deposits of coal and brown coal, appears as a particularly lavishing user of traditional non-renewable energy sources.

A switch to the use of alternative sources of energy is observed therefore on a global, and in many places also a local scale, including our country. As the most local scale the family house heating systems might be envisaged.

House heating plays an important role in the total energy consumption. Its distribution between various uses in Europe in 2000 was as follows: industry 28%, transportation 31%, in- and out-buildings and other constructions services 41%. In the household energy consumption in Poland 8% of this total was used by electric appliances, 31% by family cars, 8% by hot water heating and 53% by house heating [Dreger 2005].

In a recent study Manteuffel Szoege and Olesik [2008] compared full annual costs borne by an owner of a family house of 180 m^2 of floor surface for heating the house when using different energy sources. The study was limited to the energy supply cost and excluding the costs of warmth propagation inside the house, whose technology usually does not depend on the type of heat source, though some propagation systems are very often combined with a specific type of energy source.

The energy sources investigated were especially suited for country houses which can not be, because of the cost, connected to a communal central heating system. In the last years, however, local earth gas networks have become popular in the country and many rural houses can use earth gas as the energy carrier.

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In this study annual heating costs of this variant have been compared to some other solutions examined before.

Using various sources of thermal energy and different technologies of their utilization is connected with various costs. Eleven different energy sources for heating purposes, more or less popular in Poland, have been compared in this respect, applying the mid 2008 price level. Inflation is not very high in the last years in Poland, though it has grown recently and for the year ending July 2008 the CPI (Consumer Price Index) is estimated at 104.3%[2].

Most of the costs, estimated originally by using end of 2006 prices, have been updated using a CPI for the period of July 2008 to December 2007 multiplied by a CPI for the period of December 2007 to December 2006 [Ceny… 2008]. This product value amounted to 1.0691. The energy sources prices correspond to the mid 2008 level, the same applies to the earth gas system investment operation and maintenance costs.

The compared energy sources were: heat pump type water to water, heat pump using brine as media and equipped with a horizontal ground loop, heat pump using brine as media and equipped with a vertical ground loop, gasified wood fuelled boiler, straw bales fuelled boiler, wood pellets fuelled boiler equipped with a feeding screw, liquid gas fuelled condensation boiler, low temperature oil fuelled boiler, upper combustion coal fuelled boiler, electric boiler and earth gas fuelled boiler. Direct solar energy heating was not included in investigation as inadequate for all year heating under Polish weather conditions.

In each case a specific representative for the given type of heating system has been investigated. For the water to water heat pump it was the Stiebel Eltron WPF model powered 7.4 kW, for the heat pumps with both horizontal and vertical ground loops it was the Stiebel Eltron WPC model powered 7.9 kW, for the furnace burning gasified wood it was the Atmos DC18S model powered 18 kW, for the straw burning furnace it was the Metalerg Biowat S4 model powered 25 kW, for the pellets burning furnace the Eko-Vimar Orlean model powered 25 kW, for the liquid gas burner the Saunier Duval Thermaclassic model powered 23.6 kW, for the oil burner the Ferroli GTU 1203RS\V130 model powered 21 kW, for the coal burning furnace the Kotły Żywiec Vigas model 25 powered 25 kW, for the electric boiler the ACV E-TECH S160 model powered 21.6 kW, for the earth gas burning boiler Buderus UD54 with water heater F120/3, connector and temperature gauge AS16. The last solution requires also connecting the house installation with the local earth gas network.

The cost data have been collected from advertisement leaflets, literature [Laskowski 2006, 2007 and 2008; Małkowska 2006] and by interviewing the heating installations dealers. The valuation of own labour input in various cases has been obtained by surveying 50 house owners in the suburbs of Lodz city in Poland [Olesik 2007].

Annual heating costs

- **Energy source costs**

The energy consumption estimated for the investigated systems, as well as the energy prices and costs, are displayed in Table 1. Besides the energy purchase cost in some cases

[2] The CPI growth accelerated in the last months of 2007. In October the CPI was 102.2% for the previous 12 months while in November it grew to 103.6% annually and in 2008 as above [Money... 2007].

the fuel delivery costs must have been added, estimated for 2006 at 200 PLN per year. In the case of a gas burning device the cost of leasing a gas tank was 600 PLN per year[3]. For 2008 these costs have been updated by multiplying by the above mentioned inflation index, equal to CPI for the period between December 2006 and July 2008.

Table 1. Annual fuel or energy consumption and cost, PLN/year

Energy source	Unit	Consumption unit/year	Price, PLN/unit	Energy cost PLN/year	Additional cost PLN/year	Total cost PLN/year
electricity for a heat pump	kWh	2700	0,492	1329	200	1529
wood	m^3	22	150	3300	214	3514
straw	kg	9087	0,096	874	214	1088
pellets	tonne	4,5	850	3825	214	4039
liquid gas	l	2340	2,5	5850	641	6491
fuel oil	l	1603	3,43	5498	0	5498
coal	tonne	4,14	480	1987	214	2201
electricity for an electric boiler	kWh	11077	0,4924	5454	200	5654
earth gas	m^3	2500	1,561	3903	150	4053

Table 2. Life expectancy for energy supplying installations, investment and depreciation cost

Type of installation	Investment cost, PLN	Life span, year	Depreciation PLN/year
heat pump, type water-water	22345	35	638
heat pump, horizontal ground loop	20468	35	585
heat pump, vertical ground loop	31518	35	901
gasified wood fuelled boiler	4035	25	115
straw bales fuelled boiler	16043	25	458
pellets fuelled boiler with feeding screw	12829	25	367
liquid gas fuelled condensation boiler	3849	25	110
low temperature oil fuelled boiler	9510	30	272
upper combustion coal fuelled boiler	2293	15	66
electric boiler	10333	25	295
earth gas fuelled boiler	16370	15 and 50	576

- **Capital costs**

The value of investment outlays in various cases is displayed in Table 2. Annual capital costs have been calculated in the form of annuity (equal annual equivalent, EAE) corresponding to these outlays and are quoted in Table 3. The depreciation cost, for the sake of comparison, is inserted in Table 2, although not used in further calculations. Instead of it the EAE has been calculated by using the standard formula (1)

[3] Prevailing exchange rate in the end of 2006 was about 4 PLN/€, in the beginning of 2008 it was about 3.5 PLN/€.

$$EAE = CV * \frac{R*(1+R)^t}{(1+R)^t - 1} \qquad (1)$$

where CV stands for the capital value of installation, t for its life span and R for the interest rate, in decimals (not in percentages).

Several different values of the interest rate have been tried in a sensitivity analysis. Since the owners usually employ their own capital for financing the investment, the interest rate determining the opportunity cost of this capital has been set equal, as it is commonly being done in such cases, to the deposit rate in a bank. This rate has been reduced by 20% of income tax imposed on the deposit interest in Poland and then transformed to its real value, which meant eliminating the inflation factor. The standard formula for this operation is

$$R_{real} = \frac{1+R_{nom}}{1+R_{inf}} - 1 \qquad (2)$$

where R_{real}, R_{nom} and R_{infl} stand respectively for the real interest rate, the nominal rate and the inflation rate, the last set equal to the last year's CPI – 1. In this case an inflation rate for consumer goods for period January-July 2008 in relation to the period January-July 2007 has been employed, equal to 4.3%.

The average real deposit rate in the 20 biggest banks operating in Poland turned to be, as it frequently happens, negative and equal to -0.825%. Therefore a long-term regular deposit rate in a better paying bank was used, which meant practically zero real rate after tax (0.096%), and a special premium rate, which gave a real rate after tax of 1.438% [Getin... 2008]. The last two possibilities are usually available to better informed, though not professional, potential investors and therefore may be taken for a basis of the opportunity cost estimation. In three cases financing the investment from a bank credit has been assumed. An average rate in the 20 biggest banks applicable to a credit for house purchase (meaning usually mortgage credit) gave a real rate of 2.78% and that for a consumer credit gave a real rate of 9.204% [Ceny… 2008]. The consumer credit in the particular bank used for the deposit rate estimation had a real cost of 12.052%[4]. The last two rates denote a very high cost of capital which in reality may be applied only to a short initial period when the credit is still pending. Normally no private person lives permanently on borrowed capital. The moderate rates are more appropriate then.

- **Operation and maintenance costs**

Own labour costs

Various heating systems require different inputs of owner's own labour. This labour has its opportunity cost, otherwise defined as a disutility of effort. A standard procedure for its estimation consists of taking it as equal to the hourly earnings of the agent, on the grounds that he must at least value his effort at this level because otherwise he would not make it.

[4] Probably a sign of an economic recession from the times of two years ago, when both deposit and credit rates were about 2 percent points higher.

Table 3. Heating installations annual capital cost, PLN/year

Type of installation	Equal annual equivalent of capital value, interest rate =				
	-0,00096	0.01438	0,0278	0.09204	0.1205
heat pump, type water-water	627	817	1007	2156	2744
heat pump, horizontal ground loop	575	748	922	1975	2514
heat pump, vertical ground loop	885	1152	1420	3040	3871
gasified wood fuelled boiler	159	193	226	418	516
straw bales fuelled boiler	634	769	899	1660	2053
pellets fuelled boiler with feeding screw	507	615	719	1328	1642
liquid gas fuelled condensation boiler	152	184	216	398	492
low temperature oil fuelled boiler	312	393	472	942	1185
upper combustion coal fuelled boiler	152	171	189	288	338
electric boiler	408	495	579	1069	1322
earth gas fuelled boiler	668	808	947	1767	2176

Table 4. Operation times, minutes

Type of installation	Time per operation	Operation time per day	annually	Preparation & closing time, annually	Total time annually
heat pump, type water-water	0	0	0	0	0
heat pump, horizontal ground loop	0	0	0	0	0
heat pump, vertical ground loop	0	0	0	0	0
gasified wood fuelled boiler	5	5	915	1830	2745
straw bales fuelled boiler	10	30	5490	5490	10980
pellets fuelled boiler with feeding screw	20	5	915	458	1373
liquid gas fuelled condensation boiler	0	0	0	0	0
low temperature oil fuelled boiler	0	0	0	0	0
upper combustion coal fuelled boiler: loading	5				
light up	20				
deashing	20	34.9	6379	6483	12862
electric boiler	0	0	0	0	0
earth gas fuelled boiler	0	0	0	0	0

By surveying suburban inhabitants of Łódź city in central Poland was in 2006 an average valuation of 1 hour of own work estimated at 12 PLN, and the responses varied between 8 PLN and 15 PLN [Olesik 2007]. All these three values have been used in a sensitivity analysis multiplied by consumer iflation index for the period elapsed since the survey. Also 13.46 PLN/hour was used, which is a net correspondent to the 2951.36 PLN/month of an average gross salary in Poland in the second quarter of 2008 [Komunikat... 2008]. On a higher side a net equivalent of a university professor remuneration for one overtime teaching hour of 42.67 PLN and, still much higher, an hourly net equivalent of gross salary earned by a member of the state Council of Monetary Policy equal to 232.17 PLN/hour have been used.

Times necessary for operating and servicing the installations cover various activities. The most frequent is loading fuel to the furnace[5]. To the actual working time also the time needed for preparation and closing the operation, like for washing and changing clothes has been added. Then was it supplemented with the time necessary for contracting and reception of fuel deliveries. Also was it assumed that on the average 2 hours of owner's time was spent per 1 repair or inspection of the installations for contracting the repairman, supervision and making payments.

Table 5. Time spent for servicing and operation, minutes per year

Type of installation	Time for fuel supply reception	Time for managing repairs	Time for operation	Total time for operation & maintenance
heat pump, type water-water	0	12	0	12
heat pump, horizontal ground loop	0	12	0	12
heat pump, vertical ground loop	0	12	0	12
gasified wood fuelled boiler	90	180	2745	3015
straw bales fuelled boiler	90	180	10980	11250
pellets fuelled boiler with feeding screw	90	180	1373	1643
liquid gas fuelled condensation boiler	90	180	0	270
low temperature oil fuelled boiler	90	152	0	242
upper combustion coal fuelled boiler	90	264	12862	13216
electric boiler	0	24	0	24
earth gas fuelled boiler	20	144	0	164

Table 6. Own labour opportunity cost, PLN/year

Type of installation	Cost PLN/hour					
	8.55	13.46	12.83	16.04	42.67	232.17
heat pump, type water-water	2	3	3	3	9	46
heat pump, horizontal ground loop	2	3	3	3	9	46
heat pump, vertical ground loop	2	3	3	3	9	46
gasified wood fuelled boiler	430	677	645	806	2144	11667
straw bales fuelled boiler	1604	2524	2406	3007	8001	43532
pellets fuelled boiler with feeding screw	234	369	351	439	1168	6356
liquid gas fuelled condensation boiler	38	61	58	72	192	1045
low temperature oil fuelled boiler	34	54	52	65	172	936
upper combustion coal fuelled boiler	1884	2966	2826	3532	9399	51140
electric boiler	3	5	5	6	17	93
earth gas fuelled boiler	23	37	35	44	117	635

Estimates of operation times are shown in Table 4, of other times and the totals in table 5 and the costs of the owner's labour input in Table 6.

[5] In most of cost calculations this is the only own working time input counted in, if any.

Table 7. Annual servicing costs

Type of installation	Frequency interval, year			Unit cost, PLN/case			Annual cost, PLN/year			
	Over-haul or repairs	Inspect-ion & clean-ing	Spare parts replace-ment	Over-haul or repair	Inspect-ion & clean-ing	Spare parts replace-ment	Over-haul or repairs	Inspect-ion & clean-ing	Spare parts replace-ment	Total main-tenance
heat pump, type water-water	10	0	0	2138	0	0	214	0	0	214
heat pump, horizontal ground loop	10	0	0	2138	0	0	214	0	0	214
heat pump, vertical ground loop	10	0	0	2138	0	0	214	0	0	214
gasified wood fuelled boiler	2	1	0	214	160	0	107	160	0	267
straw bales fuelled boiler	2	1	0	214	160	0	107	160	0	267
pellets fuelled boiler with feeding screw	2	1	0	214	160	0	107	160	0	267
liquid gas fuelled condensation boiler	5	1	0	802	267	0	160	267	0	428
low temperature oil fuelled boiler	5	5	15	160	374	1604	32	75	107	214
upper combustion coal fuelled boiler	2	1	0	214	160	0	107	160	0	267
electric boiler	5	0	0	321	0	0	64	0	0	64
earth gas fuelled boiler	5	1	1	300	200	200	60	200	200	460

Table 8. Costs in the basic case, interest rate 1.438%, own labour cost equal to 12.83 PLN/hour, PLN/year

Type of installation	Capital costs (EAA)	Fuel/ energy	Own labour, operation & servicing	Servicing	Total O&M costs	Total costs
heat pump, type water-water	817	1529	3	214	1745	2562
heat pump, horizontal ground loop	748	1529	3	214	1745	2494
heat pump, vertical ground loop	1152	1529	3	214	1745	2898
gasified wood fuelled boiler	193	3514	645	267	4426	4619
straw bales fuelled boiler	769	1088	2406	267	3761	4530
pellets fuelled boiler with feeding screw	615	4039	351	267	4657	5272
liquid gas fuelled condensation boiler	184	6491	58	428	6977	7161
low temperature oil fuelled boiler	393	5498	52	214	5764	6156
upper combustion coal fuelled boiler	171	2201	2826	267	5294	5465
electric boiler	495	5654	5	64	5723	6218
earth gas fuelled boiler	808	4053	35	460	4548	5356

Installation servicing costs

These costs are equivalent to the average annual expenditure on inspection, routine spare parts replacements, repairs and overhauls of the installations. Their estimates, based on their frequency and unit cost information acquired from the branch dealers, are shown in Table 7.

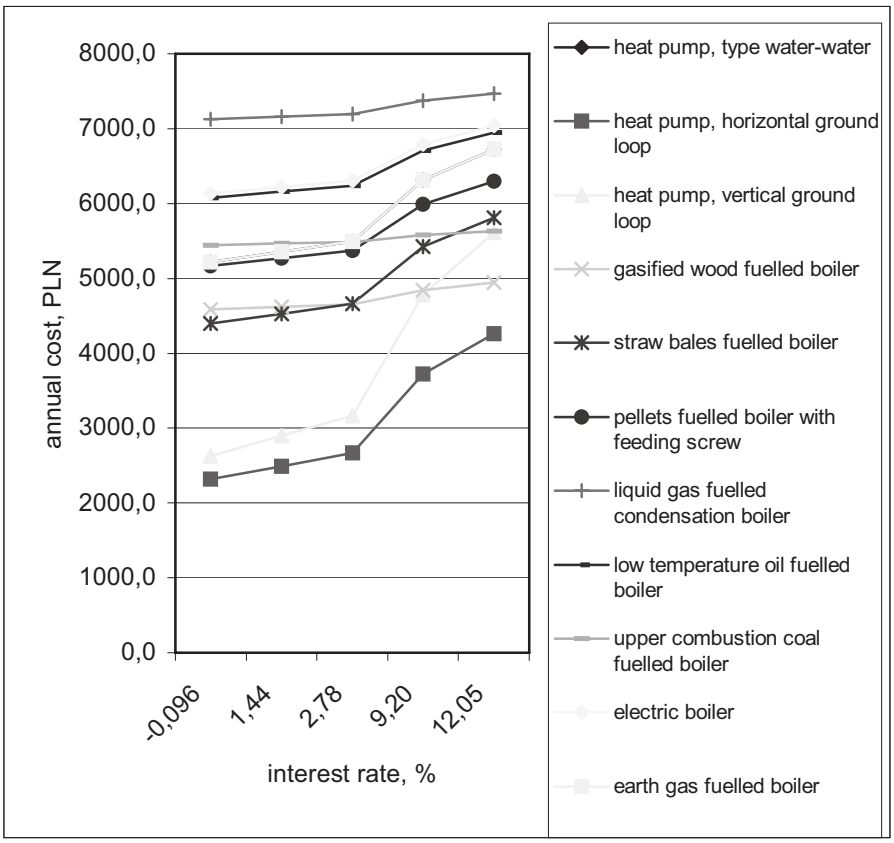

Fig. 1. Annual house heating costs depending on the cost of capital, own labour cost set at 12.83 PLN/hour[6]

- **Total annual costs**

Total costs in the basic case envisaging the most common interest rate and the average labour cost are shown in Table 8.

Showing the calculations for the other cases would take too much space, therefore the results are synthesized, also not for all variants, in Figures 1 and 2.

Numerically the most probable variants are compared in Tables 9 and 10.

[6]Unfortunately some of the lines cover each other and are hardly visible, e.g. that for the heat water-water pump and the earth gas boiler..

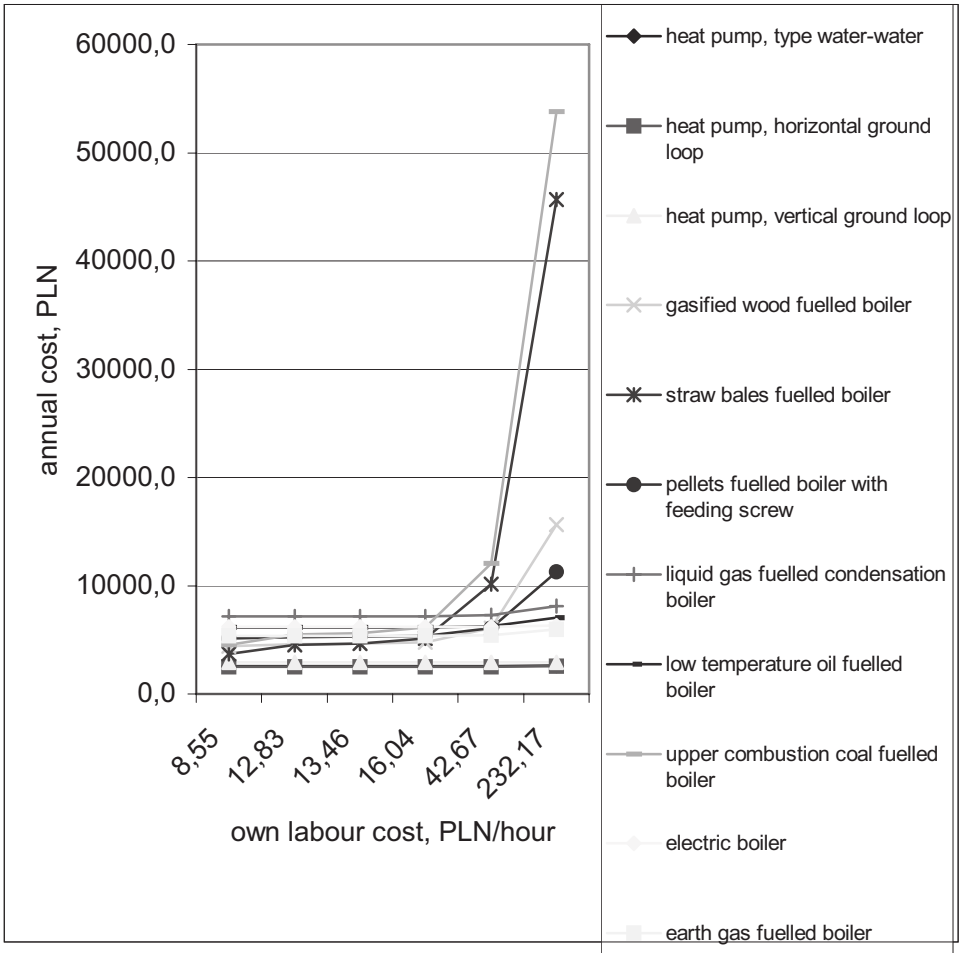

Fig. 2. Annual house heating costs depending on the own labour valuation, interest rate on capital set at 1.44%[7]

Conclusions

The costs, and therefore the choice of heating system, depend to a large extent on the amount of work required for the operation and maintenance of the system. The valuation of labour input varies significantly depending on the affluence of the owner and, probably, his fitness.

Operation and maintenance costs are by far much more important than the capital costs of the installations (e.g. Table 8). In the labour intensive solutions the labour costs play a significant role even in the case of their low valuation.

The graphic analysis (Fig. 1 and Fig. 2) has given a certain insight into the possible preferences of owners of different affluence. These preferences stay relatively constant for lower income (low own labour valuation) owners, but for those having higher or high incomes some labour intensive solutions become clearly unacceptable. For poorer owners (who need to use consumer credit for financing the investment, Fig.1) the capital intensive solutions (like heat pumps) become comparable to, or even dearer than, some of the less capital consuming solutions, otherwise much more expensive.

[7] Unfortunately some of the lines cover each other and are hardly visible, e.g. those for heat pumps.

The heat pumps seem to stand apart from the other solutions in most of the cases and represent the lowest cost alternative. Only if financed by a very expensive consumer credit combined with a mediocre or low own labour valuation they can be, with respect to costs, placed close to the other systems. This outcome can be appraised positively also from the environmental point of view, since these pumps use relatively small amounts of dirty energy produced from non-renewable resources (electricity). Unfortunately the devices using exclusively the renewable sources, like straw or wood burning furnaces, become much cost inefficient, in particular for the more affluent owners who value high their labour (Table 10).

Table 9. Annual total cost relations, the cheapest solution set equal to 100%, own labour valued at 12.83 PLN/hour, variation of interest rate, %

Type of installation	Interest rate, %				
	-0.10	1.44	2.78	9.20	12.05
heat pump, type water-water	102	110	119	168	193
heat pump, horizontal ground loop	100	107	115	160	184
heat pump, vertical ground loop	113	125	136	206	242
gasified wood fuelled boiler	198	199	200	209	213
straw bales fuelled boiler	189	195	201	234	251
pellets fuelled boiler with feeding screw	223	227	232	258	271
liquid gas fuelled condensation boiler	307	309	310	318	322
low temperature oil fuelled boiler	262	265	269	289	299
upper combustion coal fuelled boiler	235	236	236	241	243
electric boiler	264	268	272	293	304
earth gas fuelled boiler	225	231	237	272	290

Table 10. Annual total cost relations, the cheapest solution set equal to 100%, interest rate set at 1.44%, variation of own labour value, %

Type of installation	Hourly cost of own labour, PLN/hour					
	8.55	12.83	13.46	16.04	42.67	232.17
heat pump, type water-water	103	103	103	103	103	105
heat pump, horizontal ground loop	100	100	100	100	100	102
heat pump, vertical ground loop	116	116	116	116	116	118
gasified wood fuelled boiler	177	185	187	192	245	627
straw bales fuelled boiler	150	182	186	206	406	1831
pellets fuelled boiler with feeding screw	207	211	212	215	244	452
liquid gas fuelled condensation boiler	286	287	287	288	293	327
low temperature oil fuelled boiler	246	247	247	247	252	282
upper combustion coal fuelled boiler	181	219	225	248	483	2157
electric boiler	249	249	249	249	250	253
earth gas fuelled boiler	214	215	215	215	218	239

The investigated heating systems might be divided, because of the type of energy source used and its renewability, into sustainable[8] (wood, straw and pellets burning), non-sustainable (gas, oil or coal burning or electrically heated) and partially sustainable (heat pumps using electricity for pump propulsion). Out of these three groups the partially sustainable solutions are the cheapest in all cases, while in general the sustainable ones can compete with unsustainable solutions only in the case of a relatively low own labour valuation, i.e. in poorer households (Table 9 and 10). However these relations look different in different cases and can not be simply generalized.

The now most popular heating system using earth gas stays under the 2008 price conditions and with an average labour and capital valuation in the range of medium cost solutions, though some other variants using renewable energy sources look cheaper. Therefore its popularity seems reasonable, providing the heat pumps are excluded. Heat pumps are still a novelty combined with a high initial investment cost and therefore they do not arise a confidence among country inhabitants. The fast growing gas price will probably reverse this attitude in the near future. The choice of the earth gas as an energy source may also indicate that the own labour valuation in the rural areas is higher than the tentative 12.83 PLN/hour and therefore discourages implementation of the renewable, labour intensive but sustainable solutions. .

References

Ceny w gspodarce narodowej. Grudzień 2006. [2006]. Główny Urząd Statystyczny. Warsaw.

Ceny w gspodarce narodowej. Lipiec 2008. [2008]. Główny Urząd Statystyczny. Warsaw.

Dreger M. [2005]. Efektywność energetyczna budynków. *Przegląd budowlany*, no. 9, pp. 47-53.

Getin Bank. [2008]. [Available at:] www.depozyty.getinbank.pl/oprocentowanie.html. [Accessed: August 2008].

Komunikat Prezesa Głównego Urzędu Statystycznego z dnia 11 sierpnia 2008 r. w sprawie przeciętnego wynagrodzenia w drugim kwartale 2008 r. [2008]. [Available at :] www.stat.gov.pl/gus. [Accessed: August 2008].

Laskowski P. [2006]: W czym palić? *Murator*, no. 9, pp. 178-189.

Laskowski P. [2007A]: Jaki kocioł wybrać?, *Murator*, no. 1, pp. 132-138.

Laskowski P. [2007B]: Ogrzewanie na gaz płynny, olej czy prąd?, *Murator*, no. 8, pp. 101-107.

Laskowski P. [2008]: Ile za ciepło?, *Murator*, no. 10, pp. 132-138.

Małkowska I. [2006]: Kocioł na miarę. *Budujemy dom*, no. 7-8, pp. 78-111.

Manteuffel Szoege H., Olesik L. [2008]: Technology Dependent House Heating Costs. [In:] Towards a holistic approach based on science and humanity. 6th Biennial International Wokshop. Advances in Energy Studies. H. Schnitzer, S. Ulgiati, S. Braunegg (eds.). Graz University of Technology. Graz, pp. 206-213.

Money.pl. Portal finansowy. [2007]. [Available at:] www.money.pl/gospodarka/inflacjabezrobocie/. [Accessed September 2008].

Olesik L. [2007]: Porównanie systemów ogrzewania wykorzystujących odnawialne i nieodnawialne nośniki energii. Master's thesis in the Faculty of Economic Sciences, Warsaw University of Life Sciences.

Pisarski M. [1996]: Energooszczędność i estetyka w budownictwie wiejskim. [In:] Ochrona i zrównoważony rozwój środowiska wiejskiego. Warsaw Agricultural University Press, Warsaw.

[8] Their sustainability appears a little dubious if the life cycle of fuels is taken into consideration. For their acquisition and distribution usually quite considerable amounts of unsustainable energy resources are being used.

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Role of extension service in implementation of agricultural and environmental programmes in Podkarpacie region

Abstract. Importance of extension ervices in the realization of agricultural and environmental undertakings in Podkarpacie region is assessed. Results obtained from the study indicate that farmers in Podkarpacie are actively searching funds for and participating in agricultural and environmental programmes. Agricultural and environment advisors play important role in that process, mainly by organizing training workshops, as well as by preparing respective applications and agricultural and environmental plans.
Key words: advisory, agricultural and environmental programmes, EU Common Agriculture Policy (CAP)

Introduction

Along with social factors, natural and cultural assets belong to those values, for which the rural areas deserve supporting. Thanks to them the villages are worthy alternatives to cities and towns as places for rest, preservation of culture and tradition, and sources of ecological safety. Ecological agriculture, run in a natural manner and essentially without using chemicals, as well as integrated agriculture applying the principles of good agricultural practice, require both direct financial support and information activities [Wilkin et alieni 2005].

Agricultural and environmental programme is ranked among the most important activities in favour of multifunctional and sustainable development of agricultural areas and its launching is obligatory in all EU member countries. This programme is the most important instrument of financial support within the EU Common Agriculture Policy (CAP), consisting in granting financial assistance to farmers who meet the basic environment protection standards and apply pro-ecological production methods [Kociszewski 2006]. Agricultural and environmental activities enable effective integration of environment protection with the agri-economic development in such manner as to minimize any negative effects of agriculture and maximize its positive impact. Advisory services, related to a rational utilization of financial support available from the EU, have a significant role to play in this situation, by communicating correct information and supporting development of agriculture and rural areas, while observing the principles of environment protection. In this context, this study aims at assessing the advisory function in the realization of agricultural and environmental programmes in Podkarpacie region[2]. A questionnaire survey was carried out in the first quarter of 2007 on a sample of 300 farmers

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[2] The study was conducted within a research project 'Role of local institution in transformation of small-farm agriculture (after joining the EU)' financed by the Ministry of Science and Higher Education (MNiSW) as own grant no. N114 009 31/2320, realized by the Economic Policy and Agribusiness Institute, Department of Economy, University of Rzeszów. It's realization started in 2006.

from the Podkarpackie province. It was designed, among others, to find out the farmers' opinions and their assessment of the possibilities of availing an access to agricultural and environmental programmes in the region where small, semi-subsistence and economically week farms dominate. The province has merely 1.5% of farms with arable area larger than 15 hectare, whereas the country average of proportion of farms larger than 15 hectare is 10.9%. Farms were selected by quota sampling, with due account taken of the agricultural structure. The research sample structure included a representative sample of farms not receiving direct EU subsidies [N=51], considered economically non viable, i.e. most often not running any agricultural production, or, if any, usually intended for satisfying just own needs, as well as a representative sample of farms which did apply for direct EU subsidies in 2005 [N=249], thus being 'viable' in the sense of conducting agricultural activity. On the basis of the arable land area possessed by farms receiving direct EU subsidies 3 layers were identified, i.e. farms with arable land area from 1.01 do 4.99 hectare [N= 112], from 5 to 9.99 hectare [N=86] and those with 10 hectare and more [N=51]. Opinions of farmers concerning their participation in agricultural and environmental programmes, as obtained from the survey, have been complemented with information obtained in the Podkarpacki Agricultural Extension Service Centre (PODR, in Boguchwała), as well as from the Agency for Restructuring and Modernization of Agriculture (ARMA) in Rzeszów. Moreover, direct interviews with agricultural and environmental advisors employed by the PODR were done.

Characteristics of agricultural and environmental programme as one of the activities of the Rural Development Plan (RDP)

The Common Agricultural Policy of the EU devotes more and more place to the environment protection. One of the financial instruments used by CAP is the Agricultural and Environmental Programme, included in the Rural Development Plan (RDP). It's tasks include, among others, a propagation of good agricultural practice, supporting development of organic agriculture, preserving of areas with a high natural value under risk of degradation, a protection of soils and waters, preserving of genetic stock of the local breeds of farm animals.

The EU funds are one of the basic sources for financing environmental investments in Poland. In the period of 2004-2006 the value of EU funds allotted to the environmental protection in Poland reached approximately 2500 million euro. In the financial perspective for years 2007-2013 the value of the EU funds to be allotted to the environmental protection in Poland will amount to 6000 million PLN [Karpińska 2007]. As mentioned, agricultural and environmental programmes which are continued in the RDP 2007-2013 are most important for the EU countries. The realization of the agricultural and environmental programme should contribute to the sustainable development of rural regions and to the preservation of biodiversity in these areas. The main assumption of the programme is to promote the agricultural production that is run with methods meeting requirements of the natural environment protection. The objective of this activity is to improve the state of natural environment in rural regions, in particular to restore their full value or preserve the state of valuable habitats that are used in agriculture and sustain the biodiversity in rural areas, promote sustainable farming system, sustainable utilization of soil and protection of waters, protection of threatened local races of farm animals and local varieties of cultivated plants.

The agricultural and environmental packages within the framework of the for years 2007-2013 are the following.

- Package 1. *Sustainable agriculture*: consists in rational utilization of natural resources, in order to reduce negative effects of agriculture on the environment.
- Package 2. *Organic agriculture*: covers farms which switch to organic production and organic farms with certificates.
- Package 3. *Extensive durable grassland:* consists in reducing fertilization, number and dates of mowings or intensity of pasturing/grazing.
- Package 4. *Protection of threatened species of birds and natural habitats beyond the Natura 2000 areas:* consists in reducing fertilization, intensity of pasturing /grazing on permanent grassland areas beyond those covered by Natura 2000.
- Package 5. *Protection of threatened species of birds and natural habitats in the Natura 2000 area.*
- Package 6. *Preserving threatened genetic resources of plants in agriculture:* enables protection and perfecting local or traditional varieties of cultivated plants.
- Package 7. *Preserving threatened genetic resources of animals in agriculture:* aims at protection of particularly precious breeds of farm animals.
- Package 8. *Protection of soils and waters*.
- Package 9. *Buffer zones:* consist in maintaining the existing buffer zones and baulks between arable fields, in order to reduce contamination of water and soil erosion.

A beneficiary may apply for agricultural and environmental payments when he is a farmer and he commits himself to realizing of an agricultural and environmental programme for a period of minimum 5 years, in accordance with a plan of agricultural and environmental activities, as well as to observing fundamental requirements resulting from the accepted package on the area of his entire farm.

Agricultural and environmental programmes in Podkarpacie region

Support for agricultural and environmental undertakings and improved wellbeing of animals enjoyed much interest all over the country (as many as 72 thousand of applications were submitted) and contributed to improving the environment and landscape of rural areas in Poland. From the information by the Agency for Restructuring and Modernization of Agriculture (ARMA) the Lubelskie province recorded the largest number of 11084 filed and considered applications for activity # 4 for an amount of 74,569,794.5 PLN, whereas the Śląskie province, with 1295 applications for an amount of 12,293,569.9 PLN, showed the lowest interest. Podkarpacie region was ranked in the seventh place in the country with 4351 applications for 46,489,960.2 PLN.

The surveyed farmers from Podkarpackie province were quite actively seeking the EU support. 178 person (i.e. 59.3% of the total surveyed) declared that they availed themselves of the funding available within individual programmes during the period of 2002-2006. Nearly 4% of the surveyed farmers applied for support within the SAPARD programme, approximately 92% of them applied for financial support for their farms within the RDP, including the majority applying for support for agricultural activity in areas with unfavourable conditions (31.7%). Nearly every 10th of the surveyed farmers applied for funds available within the Sector Operating Programme (SOP), financing mainly new investments in farms. More than 21% of the surveyed farmers applied for support for

agricultural and environmental undertakings and wellbeing of animals and they were the same farmers who applied also for direct payments.

According to Zegar [2007] farmers having larger farms and more economic leverage or strength, as expressed by ESU, acquire more EU support than the owners of smaller farms. It is confirmed by the results of author's own research, obtained in Podkarpacie region (Fig. 1).

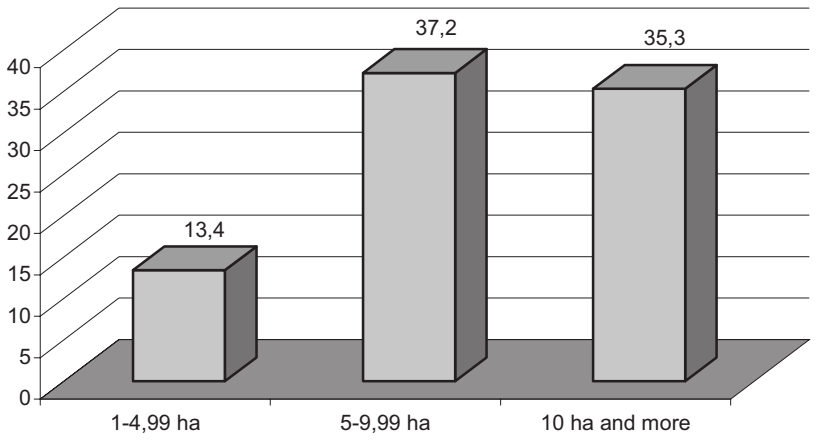


Fig. 1. Participation in the agricultural and environmental programmes by surveyed farmers over 2004-2006, by farm acreage groups, %

Source: own study.

However, in Podkarpacie, farmers having arable land area from 5 do 10 hectare were most actively applying for support of their farms in the realization of agricultural and environmental programmes. Furthermore, it should be noted that the group of farmers not receiving direct payments [N=51] did not apply for support of any agricultural and environmental undertakings.

The question that seemed interesting was how is the acquiring of financial support for realization of agricultural and environmental programmes related to the economic size of farms. Therefore, the surveyed population of farms was subdivided (Fig. 2) into economic classes (by Economic Size Units, ESU) [Polish… 2006].

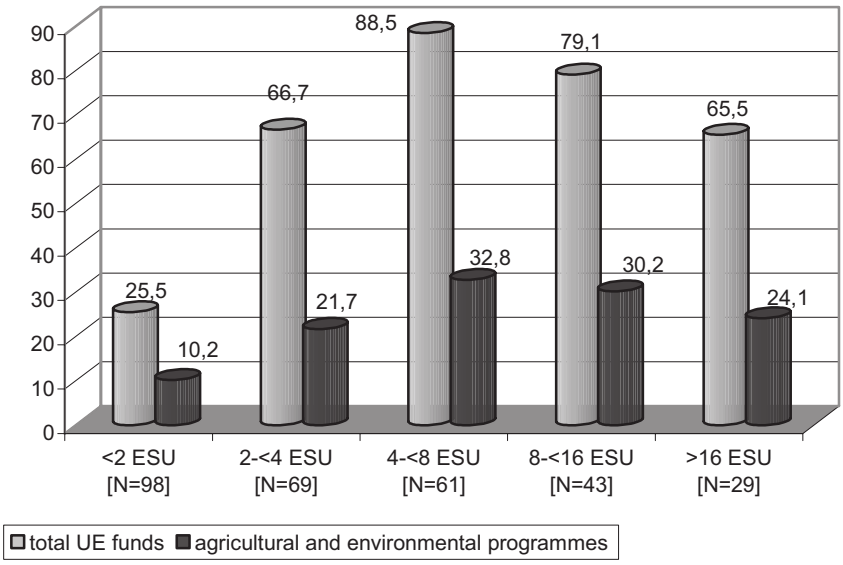


Fig. 2. Percentage of farmers availing themselves of the agricultural and environmental programmes, depending on their farm ESU

Source: own study.

It was found that farmers with higher economic strength (ESU) undertake a broader range of projects realizing agricultural and environmental programmes. However, farmers owning farms of economic strength between 4 and 8 ESU appear to be most active in this field. Also, this group of farmers took advantage of the EU funds available over 2002-2006, i.e. SAPARD, RDP and SPO, at the highest level.

Importance of advisory services for the realization of agricultural and environmental programmes

Extension services are very useful in villages and, after Poland has joined the EU, the expectations concerning their range and quality became much broadened. Broad access to information has a significant effect on making decisions in farm management and in seeking the EU funding. Information is provided to farmers mainly by the employees of the ODR agency of agricultural advisory services. ODRs have well developed organizational structure at local level. Therefore, through their extension officers, they offer farmers help in making correct decisions but, primarily, they provide help in preparing applications. Generally, as confirmed by the research by Miś [2007], the advisors' level of knowledge determines the amounts acquired within the framework of individual EU programmes.

Activities of the ODR agricultural advisory centre in the area of Podkarpackie province (PODR in Boguchwała) consist mainly of help provided to farmers in the realization of agricultural and environmental programmes, through advisory activities by

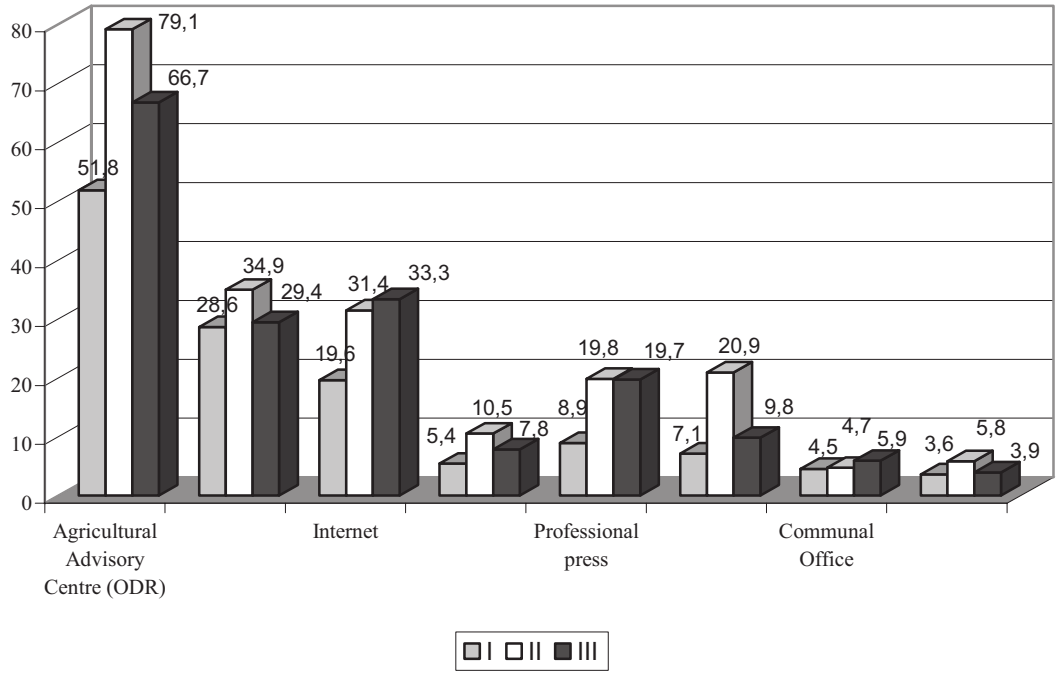
employees trained specifically for this. The agricultural and environmental advisors must complete suitable training organized by the Centrum Doradztwa Rolniczego *(Agricultural Advisory Centre)* in Brwinów and obtain an appropriate certificate. They help farmers through[3]:

- organizing courses in applying the principles of realizing individual packages, formal requirements, informing on the height/level of financial support, etc.
- preparing of an agricultural and environmental plan and other plans, e.g. fertilization plan which is necessary in the case of package S0l, sustainable agriculture
- preparing applications for payments
- assistance to farmers in gathering the obligatory enclosures
- assistance in systematic keeping logs of farming activities and of basic data on animals, including records of agri-technical activities, information on treatments with plant protection chemicals, animal grazing, etc.
- recording of any changes in agricultural and environmental plan
- providing farmers with information about the need of collecting and keeping necessary documents, e.g. the current certificate of a spraying machine, etc.
- in case of realizing the package S02 (organic agriculture) assistance to farmers in preparing filings to a certifying agency and to the Provincial Inspectorate of Commercial Quality of Agricultural Produce and Foods, application for payments and suitable enclosures
- informing farmers of any new EU and national regulations,
- organizing trainings and advising in agricultural and environmental programmes realized within the framework of the RDP programme for 2007-2013.

All the above indicates that advisory institutions provide swift and correct information and consulting and play important role in the field of EU funding absorption by farmers. During author's own research farmers were asked about the basic source of information about funds available in individual RDP activities over the period of 2004-2006, in particular those related to support for agricultural and environmental undertakings. In the farmers' opinions the ODR agricultural extension service centres were the most important channel of information, followed by the media, i.e. press and TV (Fig. 3).

Moreover, the study covered a question whether the farmers used an institutional help when applying for EU funding. As many as 175 farmers, i.e. 58.3% of the total number surveyed, answered with an affirmative 'yes'. The surveyed farmers admitted help by ODRs (56.1% of them), mainly in filling in the application forms and preparing the agricultural and environmental plans. Other institutions, mentioned by farmers as those providing service in their application for EU funding, were ARMA *(Agency for Restructuring and Modernization of Agriculture)*, Forest Inspectorate, Communal Offices and Agricultural Chambers.

[3] Prepared on the basis of interview with agricultural and environmental advisors from ODRs in Podkarpacie region.



* I – farm with arable land area of 1-4,99 hectare, II – 5-9,99 hectare, III – 10 hectare and more

Fig. 3. Sources of information on funds available within the framework of RDP activity 4 'Support for agricultural and environmental undertakings'

Source: own study.

Conclusions

In summary, we conclude that, as Polish agriculture became an element of the agricultural sector in the EU member states, it acquired access to many support mechanisms that result from the EU Common Agriculture Policy (CAP). The survey has shown that farmers in Podkarpacie with farm size between 5 and 10 hectare of arable land area and farm economic size between 4 and 8 ESU proved to be most effective in the range of agricultural and environmental undertakings in order to raise the competitiveness of their farms. Thanks to trainings and direct advisory services by employees of Agricultural Advisory Centres in the Podkarpackie province farmers did not experienced major problems in filling their application forms.

References

Karpińska J. [2007]: Polish Agriculture and Food Economy within the EU. *Problemy Rolnictwa Światowego*, vol. XVII, pp. 342, *(in Polish)*.

Kociszewski K. [2006]: Agricultural and environmental programmes in Poland – current situation and perspectives. [In:] Wieś i rolnictwo w procesie zmian. Problemy funkcjonowania i rozwoju rolnictwa, (Rural areas and agriculture in change process. Problems of agriculture functioning and development*)*. Sokołowska S. (ed.). Opole University Publishing House, Opole, pp. 174, *(in Polish)*.

Miś T. [2007]: Absorption of EU funds by farmers in a small farm region. [In:] National and Regional Economics VIII. Technical University of Košice, Faculty of Economics, University of Economics in Bratislava, Slovak Section of ERSA, Institute of Regional and Community Development, Novy Smokovec – The High Tatras Slovak Republic, pp. 726-733.

Polish Farm Accountancy Data Network (FADN). Standard results achieved by farms taking part in Polish FADN in 2004. [2006]. IERiGŻ Warsaw, pp. 18, *(in Polish)*.

Wilkin J., Budzich-Szukała U., Saloni J. [2005]: Vision of Polish rural development – common and differentiating elements. Attempt at synthesis. *Wieś Jutra (Rural Poland of Tomorrow)*, no. 10(87), pp. 21-25, *(in Polish).*

Zegar J. S. [2007]: The issue of self-supply farms in Poland, *Wieś i Rolnictwo*, no. 1 (134), pp. 33−57, *(in Polish)*.

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Development of the Single Area Payments Scheme in the Visegrad Countries

Abstract. One of the most important date for the Visegrad Countries[2] was year 2004, because of the accession to the EU. The four countries have to apply the Common Agricultural Policy (CAP) which provides facilities for the farmers in form of direct payment, market measures, agricultural and rural development programs. The analyses of the direct payments development in the Visegrad Countries are necessary for the further CAP reform.
Key words: SAPS, CNDP, Visegrad Group Countries

Introduction

The subsidies system of agriculture was modified after the EU accession. The four examined countries chose the single area payment scheme, which could be complemented by the national budget. The Visegrad Group has different agricultural structure and diverse policy measures will have a different effect on agriculture of the four countries. If we take into account the SAPS payments in 2004 in Hungary and in Poland, then most of the beneficiaries were small holdings, contrary to Slovakia and Czech Republic where the medium size and bigger farms are more relevant. These more or less reflect the agricultural structure. The payment system which was chosen by the Visegrad countries will be presented and the structure of payments in the four countries analyzed. The real questions are the following:

- are there any effects of the payment system on the agrarian structure?
- are there any connections between the payments and this structure?

The analyses of the direct payment development in the Visegrad Countries are necessary to the further CAP reform.

Implementation of the Common Agricultural Policies in the Visegrad Countries

After the accession in 2004 the 10 new members have to apply the acquis communautaire. The same situation was referred also to the regulations of the Common Agricultural Policies.

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[2] The Visegrad Group or Visegrad Four means four Central European Countries (CEC): Czech Republic, Republic of Hungary, Republic of Poland and Republic of Slovakia. That is a non officinal name of them. In the beginning it was called Visegrad Three, but after the disintegration of the former Czechoslovakia in 1993 it became Visegrad Four. On 15th of February, 1991 the three presidents signed a declaration that the three countries (nowadays four countries) will help each other in the way of European integration.

The new member states (NMS) had two possibilities of applying the direct payment scheme:

- standard system which has been used by the old members;
- Single Area Payment Scheme (SAPS) which could be used only by the new members.

Visegrad Countries implemented SAPS, which provides farmers a subsidy based on their farm area and a per-hectare entitlement calculated on a national basis. The only requirement is that the land be maintained in good agricultural condition. The amount is calculated by the total amount of direct payment funds available for a given member state in the calendar year, divided by the utilized agricultural area of the member state. The definition of 'utilized agricultural area (UAA)' is the total area taken up by arable land, permanent grassland, permanent crops and kitchen gardens which have been maintained in good agricultural condition as of June 30, 2003, whether or not in production at that date. The minimum size of a parcel is 0.3 hectare, but new members can decide to set it at a higher level, but not higher than 1 hectare. There is no set-aside requirement for SAPS, but production quotas which apply to sectors such as dairy and sugar, must be respected. The European Commission has already set the aid amounts for each of the new member states for 2004, taking into account the phasing-in of aid and the various direct payment programs that would be available for those countries. The SAPS means the same per hectare of eligible area payment for each farmer. There is a possibility to complement the payments from the EU with the Complementary National Direct Payments (CNDP). These are also known as 'topping-up; top-up' payments. The CNDP's are part of the compromise reached with NMS to offset the impact of the 10 year phase-in period for direct payments.

The 30% CNDP is only a possibility for the new member states. The measure is chosen by the countries. The situation of the national budget, goals of the government determinate the value of the available own resources. Czech Republic, Slovakia and Poland did not take advantage of the opportunity to give maximum financial aid for theirs agricultural sector.

The top up was set as 30% in 2004 in Czech Republic, but that decreased to 28,4% in 2005 and it was also less than 30% in 2006. The national direct payment was paid to farmers according to the area of arable crops, hops, cotton and number of ruminants [Agricultural... 2007].

In Poland CNDP was paid like SAPS except for starch potatoes and tobacco. Five different sectors were shaped to pay direct payment [Agricultural... 2007].

The payment system in Poland was modified in the first three years, therefore the farmers in Poland received 36%, 39% and 42% of the EU-15 level of direct payments per hectare between 2004 and 2006, instead of 25%, 30% and 35%. It does not mean higher share or more payment from the EU. It is just a result of redistribution between the structural fund and the European Agricultural Guidance and Guarantee Fund. The subsidies by that fund were reduced. The national top up in 2004 was 21.6%, in 2005 was 22.8% and in 2006 it reached only 24.4% because of the modification of the payments [Bakács&Wisniewski 2004].

The national complementary payment in Hungary meant 105 million euro in 2005. That figure increased three times and reached 340 million euro. Hungarian farmers could receive 'top up' for arable land, beef meet, sheep, goat and milk. The measures of it have reached 30% till now [Agricultural... 2007].

In Slovakia farmers received 'top up' according to the area of arable land, hops, tobacco and number of suckler cow, sheep and goat. The payments from national budget were less then 30% from 2005. It reached only 24% in 2005 and 19% in 2006, therefore farmers received only 54% of EU-15 payment (SAPS and top up) instead of 60% and 65% [Agricultural... 2007].

Development of the direct payments in the Visegrad Countries

Data used come from the European Commission. The data show us the situation of 25 member states in 2005.

The direct payment system was determined by the Accession Treaty which was signed in Copenhagen in the end of 2003. The Treaty includes information on the base area, reference yields and quotas for all of the new member states. SAPS and 'top up' were calculated according to those data. The diverse data resulted in different payment levels. Table 3 shows the level of single area payment scheme in the four examined countries.

Table 1. SAPS payments in Visegrad Countries, euro/hectare

Year	Czech Republic	Hungary	Poland	Slovakia
2004	57.3	70.2	44.5	43.8
2005	71.42	86.21	57.42	54.13
2006	89.49	102.3	69.57	65.8

Source: [Iván 2005], [Agricultural... 2007], [Bori 2007].

We can see that the Hungarian direct payment was the highest during the examined three years. SAPS was 70 euro in 2004, it increased to 102 until 2006. The lowest value was linked to Slovakia with 43.8 euro payment, which reached 65.8 euro in 2006. All of the subsidies were calculated according to the size of base area and all of the claims based on actual entitled area.

If the size of the actual entitled area was higher than the size of the basic area, the level of payments had to be reduced proportionately. In Hungary the actual entitled area exceeded in size the base area by some 12% and in Czech Republic there were 2% more actual entitled areas than the base area, therefore per hectare payments were reduced in those two countries.

Table 2. Number and average area of applications in the Visegrad Countries

Country	Number of applications	Average area per application, hectare
Czech Republic	18 759	188.1
Hungary	210 000	23.1
Poland	1 400 180	9.8
Slovakia	12 399	146.3

Source: [Pilvere 2005].

In Poland and Slovakia there was 7% less entitlement area than basic area. It resulted in an increased subsidy per hectare, but the farmers did not take advantage of the whole

payments. SAPS was complemented by the national ‘top up’. It could reach maximum 30%, but in Slovakia and Czech Republic the CNDP have been less than 30% from 2005.

In Hungary there were 210 thousand beneficiaries in 2004. They applied from 30% of the total number of holdings. The average size of them was 23 hectare. In Poland more than 50% of the 2.5 million farmers (1.4 million) received SAPS. The farms had less than 10 hectare in average. The number of beneficiaries was lower in Slovakia and Czech Republic, but the size of farms was higher. In the Czech Republic 18 759 farmers out of the total of 42 thousand holdings received subsidies from the EU. In Slovakia 18% of the registered holdings, i.e. 12 400 farmers, got a direct payment this source.

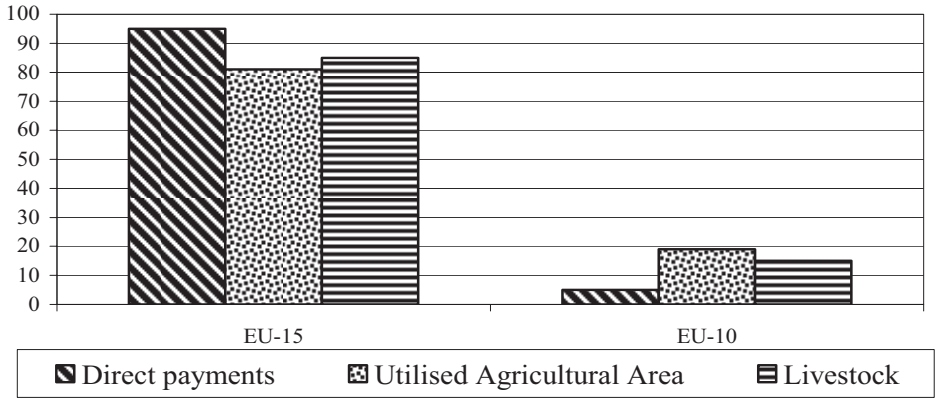

Fig. 1. Distribution of Direct Payments, Utilised Agriculture Area and Livestock between EU-15 and the new member states, 2005 Financial Year and 2003 Farm Structure Survey, EU-25=100%

Source: [Report... 2007, p. 4].

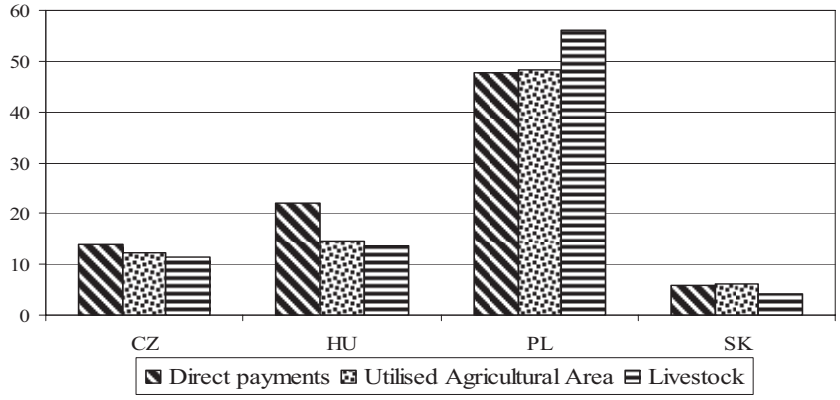

Fig. 2. Distribution of Direct Payments, Utilized Agricultural Area and Livestock Heads in the Visegrad Countries, EU-10=100%

Source: [Report... 2007, p. 4].

The first graph shows us the distribution of the direct payments, utilized agricultural area and livestock heads between EU-15 and the new member states. High discrepancy could be recognized between the two groups.

The old member states received higher share of payments than they entitlement according to UAA and livestock. We have to take into account the effect of phasing in system. 81% of the total UAA and 85% of the total livestock heads belonged to the old members and they received about 95% of the direct payments.

The ten new members had 15% of the livestock heads and 19% of the agricultural area, but they got only 5% of the direct subsidies. The fourth graph shows the situation of the Visegrad Countries.

In the Czech Republic and Hungary the proportion of payments was higher than the share of UAA and livestock. The highest discrepancy was in Hungary (6%, fig.2.).

We can keep track of the distribution of direct payments in the four examined countries by the payment categories. In Poland most of the direct payments were received by the farmers in the lowest category. Holdings with less than 1 250 euro subsidies got about 60% of the total aid (704 million euro). The shares of the other categories were about 10%.

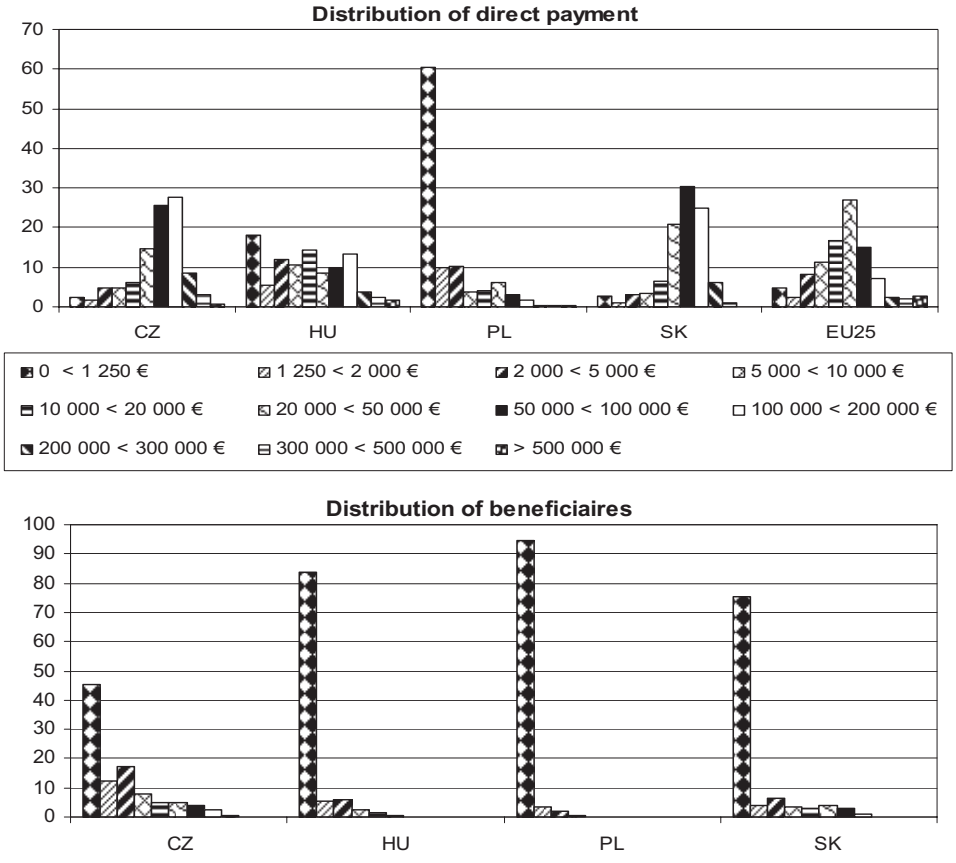

Fig. 3. Distribution of payments and beneficiaries in Visegrad Countries, %

Source: [Report... 2007].

The distribution of payments in Slovakia and the Czech Republic were different than in Poland. The highest share was awarded to farmers with 20-200 thousand euro of aid. In the Czech Republic this category of farmers got 68% and in Slovakia 76% of the total sum of subsidies. In Hungary the distribution of payments was relatively homogeneous. Farmers

in the first category got 18% of the SAPS, and the holdings belonging to the other categories got about 10% per category.

The distribution of beneficiaries is more homogenous. The highest proportion of the payments went to the holdings with less than 1 250 euro subsidies per year. In EU-25 about 62% of the beneficiaries were in this smallest support group. In Poland that figure was 94%, in Hungary 83%, in Slovakia 75%. In the Czech Republic only 45% of the entitled holdings received less than 1 250 euro payment. While in Hungary and Poland categories beyond 1250 euro include just few farmers, in the Czech Republic each category between 1 250 and 100 000 euro represent 5-10% of beneficiaries.

Taking into account figures from the two parts of the third graph we can see that 60% of the subsidies were received by 90% of the beneficiaries in Poland. In contrast with the situation of Poland in Slovakia and the Czech Republic 10-15% of the entitled farmers got 70% of SAPS. The distribution of payments is nearly the same in the Czech Republic and Slovakia as in the EU-25 in general. The distributions of payments and beneficiaries more or less reflect the agrarian structure of the Visegrad Countries.

In the Czech Republic 18 690 farmers received 213 million direct payments, in Poland nearly 1.4 million entitled holdings got 704 million subsidies, in Hungary 316 million euros were received by 203 400 beneficiaries and in Slovakia 12 340 farmers got 82 million euro in payments. According these figures we can say that the Czech farmers received the highest average subsidies among the four examined countries (Table 3).

Table 3. Average payments in the different categories, euro

Category	CZ	HU	PL	SK	EU-25
0 - 1 250 EUR	577	337	325	242	366
1 250 - 2 000 EUR	1 586	1 555	1 540	1 593	1 587
2 000 - 5 000 EUR	3 154	3 103	2 873	3 224	3 242
5 000 - 10 000 EUR	6 976	6 971	6 794	7 158	7 084
10 000 – 20 000 EUR	14 012	14 640	14 194	14 542	14 173
20 000 – 50 000 EUR	33 007	31 109	30 096	34 002	30 533
50 000 - 100 000 EUR	71 279	72 763	67 844	70 172	67 089
100 000 - 200 000 EUR	134 464	138 633	145 000	137 767	132 586
200 000 - 300 000 EUR	231 638	239 420	241 500	247 600	238 813
300 000 - 500 000 EUR	322 000	355 350	0	0	379 984
500 000 EUR <	0	581 200	0	0	879 509
Average	11 397	1 555	508	6 709	4 679

Source: [Indicative... 2007].

The farmers in the EU-25 got on average 4 679 euro in direct payments per farm. The level of Czech average subsidies reached 11 397 euro, which was more than two times bigger than the average payments in the EU-25. That figure was 1 500 euros in Hungary and it was only 500 euros in Poland.

The benefits of the countries and the differences between them are not as clear when we analyze the figures in each category. In most of categories the Czech figures were the highest, but the Slovak farmers got higher payments in categories between 2 000 and

10 000 euros. The peak average direct payment in category between 100-200 thousand euro was in Poland. In the upper categories Hungarian farmers received higher average subsidies.

Even the modulation does not play any role for the new members until they will receive 100% of the full direct payment. In the European Union about 84% of the direct payments went to those exceeding 5 000 euros, it concerned 18% of the beneficiaries. The modulation played very high role in the old member states.

In the Czech Republic the share of subsidies beyond 5 000 euro reached the 91%, and it concerned one-fourth of the beneficiaries. In Slovakia 14% of the entitled farmers received more than 5 000 euro in direct payments and that meant some 93% of the total sum of the aid. According to the data in Table 4 we can say that the modulation would have had effect in Slovakia and Czech Republic, if it had been applied already. In Poland only 20% of the subsidies exceeded 5 000 euro, which was received by 0.5% of the beneficiaries, so 99.5% of the farmers got less than 5 000 euros payments. The modulation is not going to play as high role as in the Czech Republic and Slovakia.

Table 4. Distribution of payments beyond and below 5000 euro in the Visegrad Countries, %

Category	CZ	HU	PL	SK	EU25
			Payments		
Below 5000 EUR	8.83	35.72	80.26	6.65	15.37
Beyond 5000 EUR	91.17	64.27	19.72	93.35	84.63
			Beneficiaries		
Below 5000 EUR	75.22	95.32	99.44	85.41	81.45
Beyond 5000 EUR	24.78	4.68	0.55	14.59	18.53

Source: [Indicative... 2007].

We have to take into account that the level of the direct payments in 2005 in the new member states was only 30% of the full payment, so the modulation after full implementation should play a higher role in Czech Republic, Slovakia and Hungary. The effect of it might be higher than in the old member states.

Conclusion

The Single Area Payment Scheme was chosen by the Visegrad Countries. The SAPS could be complemented by national payments, but that is only a possibility. Different base areas, yields and quotas result in different levels of payment. In Poland and Slovakia less area was entitled to any subsidy than was the basic area. That means farmers got the maximum agreed level of payments on the contrary to the situation in Hungary and the Czech Republic; where the level of payments were decreased because of the overclaim. But that situation did not mean higher payment per hectare. The four examined countries use SAPS and CNDP for different titles which result in different per hectare payments. Only 5% of the total direct payments in the EU was received by the new members. Poland got 45% of the new members' direct payments. Hungarian farmers received 21%, Czech holdings 15% and farmers in Slovakia got only 5% of the new members' direct payments.

In Hungary and the Czech Republic the share of direct payments were higher than the share of utilized agricultural area, and livestock heads in the new member states. The highest per hectare payment was received by Hungarian farmers. But the highest amount of payments per farm was paid in the Czech Republic and Slovakia because of the higher size of holdings. The distribution of direct payments more or less reflects the agricultural structure in the Visegrad Countries. In Slovakia and the Czech Republic the farms with more than 1 250 euro per year subsidies relatively more numerous than in Hungary and Poland. It means the size of holdings (natural size and economic size) were higher in the Czech Republic and Slovakia. It is expected that only holdings beyond one ESU got any direct payments in contrast to Poland and Hungary, where farms below one ESU received direct payments as well. According to the data from European Commission we can say that the future effect of modulation could be very high in the Czech Republic, Slovakia and Hungary. That effect is going to be harder because of the result of the phasing-in system.

In author's opinion the payment system (SAPS) influences the production system. After the EU accession the proportion of the animal husbandry has dropped because of subsiding system which prefers the crop production and because of the high level of animal welfare requirements. If the subsidies system prefers plant growing most of the holdings will stop the keeping animals and will switch to the crop production. Most of the farmers will produce only such plants which could receive any subsidies.

In general we can say that all of the entitled farmers get higher subsidies nowadays than before accession, which increases their possibilities. However holdings outside of the payments system are increasing their disadvantage continuously.

References

Agra-focus. Special supplement on EU enlargement. An Agricultural Perspective 2004. [2004]. Bonn.

Agricultural policies in OECD countries: Monitoring and evaluation 2007. [2007]. OECD.

Bakács A., Wisniewski A. [2004]: Lengyelország és az Európai Unió 2007–2013-as költségvetése, MTA Világgazdasági Kutatóintézet, Kihívások, 179. sz., Budapest.

Bori T. [2007]: A SAPS és Top-Up kifizetések szabályrendszerének háttere, az SPS rendszerre történő átmenet lehetőségei és változatai, Budapest, 31.01.-01.02. 2007.

Indicative figures on the distribution of aid, by size-class of aid, received in the context of direct aid paid to the producers according to Council Regulation (EC) NO 1259/1999 and Council Regulation (EC) NO 1782/2003 (Financial Year 2005). Annex 1. [2007]. European Commission.

Iván J. [2005]: CAP: Direct Support Schemes, Partial implementation and optional exclusions. Screening with Turkey and Croatia, 5-8-Dec-2005.

Pilvere I. [2005]: Experience of EU Financial Support for Direct Payments in New Member States, 2005, Riga.

Report on the distribution of direct aids to the producers (Financial Year 2005). Annex 2. [2007]. European Commission

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Efficiency of reconstruction and construction of dairy farms

Abstract. Production of milk is economically inefficient in many agricultural enterprises in Belarus. It is connected with the fact that buildings, constructions and the equipment has become outdated. Therefore it is necessary to construct new dairy farms. We shall consider the experience of calculation of efficiency of construction of a dairy farm in the Grodno region.
Key words: efficiency, reconstruction, business-plan

Introduction

Traditional ways of milk production have already for a long time proved their inefficiency in our country. Agriculture requires innovations. There is no necessity to invent something now. The dairy farms of industrial type abroad operate on the basis of intensive technologies. They have good management experience of this process as well. Financial resources in possession of Byelorussian dairy and cattle breeding farms are obviously not sufficient. Many agricultural enterprises hope to get bank credit for the purpose of their modernization. There are some other problems in this sector. A business-plan of the investment project is necessary to get a bank credit. This business-plan must have been examined in corresponding state control organs. One of the indispensable conditions of crediting is the presence of own financial means for realization of the project. It should be at least 70% of its value. Banks finance only 30% of the cost of investment project to avoid risks. The maximum term of the credit money return is five years. It is difficult to achieve good results and to pay off the debts in such a short term. The government only partially compensates the credit interest (it is 50% of the rate of the refinancing established by the National Bank). Is it necessary to search the means for reconstruction and construction of dairy farms? When the spent means will return? We shall consider an experience of calculation of efficiency of construction of a dairy farm in the Grodno region.

Basically in the calculations of a business-plan of an investment project a methodology approved by the Ministry of Economics of Belarus should be applied. Project budgeting documentation has been used during calculations of the business-plan i our case study. This documentation defines the production capacity of farm and the costs of construction, installations and adjusting of buildings and equipment. We have taken advantage of the experience in business-planning of leading economists in the country

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when calculating the separate sections of the plan as well [Дегтяревич 2006; Правила... 2006; Соколовская 2006-2007]

Research results

The Ministry of Economics adopted on the 31.08.2005 the act no. 158 'About the statement and the rules of development of business-plans of investment projects'. Many economists remark that rules are certainly detailed enough. However some calculations demand specification and further explanation. It regards the calculation of production program and volumes of realization of production in the agricultural enterprises, the account of rates of taxation and the calculation of economic efficiency as well as project sensitivity to a variation in parameters. Problems often arise about the defining the time horizon of calculations. Our experience from calculating a business-plan for construction of a dairy farm in 'Protasovschina' has pointed out to these problems more precisely and it has allowed us to find the ways of their solution.

Calculations of a business-plan assume processing a plenty of different information, which is logically interconnected. For this reason automation of calculations is required. There are some automatized systems of business-planning: the computer model COMFAR, the automatized system of planning and examination of investment projects Project Expert, the methodical complex 'Alt-Invest'. Nowadays new systems are developed on the basis of widely used program '1C Accounts department'. However these programs can not consider the specific features of agricultural enterprises and the system of their taxation. We used potentialities of a standard program 'MS Excel' in our calculations. It has allowed to adopt calculations of a business-plan for an agricultural organization. The program allows to coordinate calculations together and to consider many variants of calculation and sensitivity of the project.

According to the ministerial rules, the horizon of calculation is equaled to the term of return of the capital invested plus one year. Experience shows that investments in agriculture pay back much slowlier than it occurs in industry or in the sphere of services. Therefore the time of recovery of outlays exceeds term of return of borrowed capital sometimes considerably. That is why a problem with the determination of calculations horizon appears. To determine this term roughly we need at least one year revenue and expenses data of farm business project realization. For example:

- volume of milk produced is 4800 tons a year
- revenue of farm business is 2880 million rubles
- provisional expenses are 1780 million rubles for milk production (according to our calculations)
- total profit will make up to 1100 million rubles a year.

So if general investment expenses are 14000 million rubles, they will be paid back almost in 13 years (14000/1100=12.72). Thus, the horizon of calculation should be established as at least 14 years. Certainly, it can appear that the horizon of calculation is less or more than this provisional figure. But there will be no necessity for carrying out of additional calculations as we have already cautiously put in a longer period into the program.

The bussiness-plan was provided for construction of a dairy farm in village Kamenka of Schuchin region in 2008-2009. Existing production is using traditional technology for the agricultural farm enterprises. It functions inefficiently and therefore it needs modernization: construction of a new farm, installation of new equipment, introduction of modern technology. Purchases are planned of domestic and imported equipment for milk production. There is an agreement signed with manufacturers of the equipment. There is a technical design and project budget documentation. 600 cows will be kept on the farm. Annual produced milk volume will reach 4800 tons and slaughter cattle weight production will bep 146.59 tons. The general investment expenses will make up 17056.691 million rubles. Source of financing is a soft loan from a Byelorussian bank and farm owners' equity capital (3000 million rubles and 14056.691 million rubles respectively). Credit resources will be used for a purchase of the milk processing equipment modernization and construction of industrial premises. The grace period for capital repayment is 18 months. Credit line on demand was opened on January 2008. The interest rates will be paid according to a schedule, at a rate equal to 0.5 of the National Bank rate of refinancing + 3 %. The state participation assumes an indemnification of a part of interest rate equal to 0.5 of the mentioned rate of refinancing.

Table 1. Summary parameters of the project

Indicator	Value
Cost of the investment project, thousand ruble	17056691
Total need for investments, thousand ruble	14006054
Sources of financing of the project, thousand rubles	
- Own means, thousand ruble	9000000
- Extra borrowed means, thousand ruble	3000000
State participation, thousand ruble	480994
Share of own capital in volume of investments, %	68.8
Year of attainment of the designed capacity	2010
Proceeds from production sales, million ruble	20982
Proceeds from production sales net of VAT, million ruble	19933
Average number of working personnel, person	178
Number of modernized workplaces	27
Proceeds from production sales net of VAT per one employee, thousand ruble	111984
Indices of efficiency of the project:	
Dynamic time of recovery of outlay of investments, years	6.01
Dynamic time of recovery of outlay of the state support, years	1.00
The pure discounted income, thousand ruble	1245125
Internal norm of profitableness, %	13.28
Index of profitability	1.20
Level of break-even, %	15.80
Factor of repayment of debts	3.4
Factor of current liquidity	0.70
Factor of security own current assets	-0.21
Profitability of sales, %	60.01
Profitability of production, %	111.31

Sours: own calculation

The milking machine 'Parallel 2x16' is delivered by 'WESTFALIA' company (Germany) with all necessary equipment. Construction of the farm and its modernization will allow for increasing the milk production from 2341 tons in 2006 up to 4800 tons in 2010. The enterprise will receive profit of nearly 1.0 billion rubles in 2009. This figure increases up to 1.8 billion ruble in the next years. Accruing result will make up 9 755.9 million rubles in 2014. Efficiency indices are simple and discounted. They are the following: a time of recovery of outlays on the project (pay-back period), the pure discounted income (net present value), an index of profitability, internal norm of profitableness (internal rate of return).

It is necessary to calculate a net cash-flow of current operation and investment flows and from financial activities. It is necessary to calculate differences between inflows and outflows of money resources in the whole enterprise and in the project. Then it is necessary to discount them. We shall receive the pure discounted income as a result. In the ministerial rules it is required to calculate a recipient of the project in view of activity of the organization as a whole, but as many authors remark it is senseless and we should agree with it. Such calculation can lead to a situation when the recipient can be received either a long time interval or too short interval. That deforms results.

Efficiency of the project has been proved on the basis of the received data.

Calculation of the sensitivity of project performance to the parameters variability is the last what it would be desirable to mention. The matter is that rules require finding of critical values of parameters. It is understood as a lot of parameters. We consider that such calculations are unreasonable. The purpose is to take advantage of the opportunity of reassessment and entering of updated parameters into the business-plan. It is much more expedient to define how much indices of efficiency of the project will change if an initial value of a parameter changes by 1 %.

The presented investment project should be considered as effective. It is sparse in production expenses and leads to an increase of profitability.

Conclusions

Thus, the calculations allow for the following conclusions:

- the existing methodology of business-planning demands improvement
- the existing technology of milk production has become outdated;
- buildings, constructions and the equipment have worn out; They are not suitable for further use and therefore it is necessary to construct new dairy farms
- significant financial assets are necessary to construction of a new dairy farm; their sources are bank credits and enterprise own means acquired from current activity
- both volume of milk production and its efficiency will increase as a result of the project
- the investment project is effective and therefore investing in development of dairy farms makes sense.

References

Дегтяревич И.И. [2006]: Бизнес-планирование в АПК – МН.: УМЦ.

Правила по разработке бизнес-планов инвестиционных проектов. [2006]. *Экономика. Финансы. Управление* no. 6., pp. 142-176.

Соколовская Е.А. [2006-2007] Расчеты и таблицы, необходимые для составления бизнес-плана инвестиционного проекта в соответствии с действующим законодательством. *Планово-экономический отдел* no. 11-3.

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Distribution of EU and National Funds Supporting Agriculture and Rural Development: Empirical Insights from Mazovia Region

Abstract. This paper addresses the question of distribution of support from the EU budget and the national budget to agricultural holders in Mazovia region in comparison with Poland as a whole. In the first main section, the characteristics of the agricultural sector in the region, using main sectoral indicators, is presented. The second section illustrates the agricultural and rural support under the Rural Development Program and the Sectoral Operational Program "Restructuring and modernization of agriculture and rural development" provided to Mazovian beneficiaries with reference to this support at whole country level.
Empirical analyses are based on Eurostat statistics as well as on data obtained from the Agency for Restructuring and Modernization of Agriculture and the Ministry of Agriculture and Rural Development. Results of the study show that the Mazovian province, which is a region that can be placed in front of agricultural development, was awarded over the period 2004-2007 a relatively high level of support and ranked first or second among all 16 provinces according to selected measures.
Key words: funds**,** agriculture, rural, distribution, Poland, Mazovia

Introduction

The Common Agricultural Policy (CAP) of the European Union (EU) has sought to address a wide range of goals. One of them is to support incomes of farmers and the whole rural population. However, an essential question arises as to the balance of support awarded to the well-of regions as compared with the less well-of regions in the country.

The redistributive consequences of the CAP have regained a strong interest in recent years since this policy is increasingly seen in the context of economic and social cohesion[2] of the regions [Anders et al. 2007]. Investigation of the regional or territorial impact of the CAP has been made among others by Sotte [The regional... 1995], Laurent and Bowler [CAP... 1997], Shucksmith and others [2005] and Dax [2005].

According to a European Commission study [Study... 2001] CAP tends to reallocate income from high- to low-income regions within the EU and, thus, contributes to convergence. The opposite was observed by Shucksmith and others [2005], who carried out empirical analyses over the period 1990 to 2000 at the NUTS-3[3] level covering the EU-15 and neighboring and candidate states. They found that in general the CAP works against the objectives of economic and social cohesion, and that Pillar 2 (rural development measures) benefits rather richer regions with lower unemployment rates and high population growth. It is worth to stress that mentioned studies were based upon the instruments of the CAP

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[2] In 2000-2006 five EU funds contributed to the cohesion policy, i.e. European Regional Development Fund (ERDF), European Social Fund (ESF), Cohesion Fund, European Agricultural Guidance and Guarantee Fund (EAGGF)with its Guidance Section and Financial Instrument for Fisheries Guidance (FIFG).

[3] Nomenclature of Territorial Units for Statistics.

applied before its change in 2003 and that the introduction of the Single Payment Schemes probably influenced the interregional allocation of farm support in the EU.

Mazovia, situated around the capital town of Warsaw, is the largest of Poland's 16 administrative regions or provinces (called voivodeships) both in terms of area (11.4% of the country's total territory) and population (13.1% of Poland's overall population). It is also the wealthiest Polish province and economically strongest NUTS-2 region[4] in Poland, generating over 20% of the country's total GDP.

In this context it seems reasonable to compare the region's share in the national structure of agricultural holdings and the region's share in the EU support allocated to agriculture and rural development in Poland.

Objectives, data and methodology

The main aim of this work has been to present the European funds directed to agriculture and rural development in the Mazovia region and to assess whether there was a correlation between the agricultural endowment and the support level in the region. In the first step main indicators describing the agricultural sector in the region were compared with those for whole Poland. Furthermore, the distribution of EU support from the Common Agricultural Policy was presented.

Two main data sources were used. Agricultural statistics were obtained from the Regio Eurostat database and refer to NUTS-2 level. Certain data on funds were supplied by the Agency for Restructuring and Modernization of Agriculture (ARMA) and the Ministry of Agriculture and Rural Development (MARD).

Agricultural sector in the Mazovia region against the all-Polish background

A substantial part of the province has an agricultural character. The south-western and the central part of the region are areas with dynamically developing vegetable and fruit production. The north-eastern part specializes in dairy farming, while the production of potatoes dominates in the north-western part of the province.

Table 1 covers the main characteristics of the structure of agricultural holdings in Poland and the Mazovian province in 2005.

It can be seen from Table 1 that of 2476.5 thousand of agricultural holdings in Poland in 2005 12.7% were located in Mazovian province. They represented 13.2% of the Polish agricultural land. In Poland prevails almost universal owner-occupancy of land, but the percentage of agricultural area farmed by owner (88.4%) was in the region higher compared to Poland's average (78.4%). Consequently, the share of rented or partly rented farm area was relatively lower.

[4] Poland has 16 voivodeships (regions) that correspond to the EU NUTS-2 level.

Table 1. Structure of agricultural holdings population in Poland and in the Mazovian province in 2005

Main indicators	Poland	Mazovia	Mazovian share in Polish total, %
Total number of holdings	2476470	314180	12.69
Total agricultural area (hectares) of which:	14754880	1952310	13.23
owner farmed	11560820	1726620	14.94
%	78.35	88.44	
tenant farmed	2979020	199340	6.69
%	20.19	10.21	
share farmed or in other modes of tenure	215040	26350	12.25
%	1.46	1.35	
Total standard gross margin[1] (ESU)	8264550	1211190	14.66
Number of holdings in less favored areas	1026960	171840	16.73
of total number of holdings, %	41.47	54.69	
Agricultural area in less favored areas	7422470	1236310	16.66
of total agricultural area, %	50.31	63.33	
Number of holdings with agricultural land			
less than 5 hectares	1750860	184110	10.52
%	70.70	58.60	
5 to 10 hectares	370200	70870	19.14
%	14.95	22.56	
10 to 20 hectares	237940	44030	18.50
%	9.61	14.01	
20 to 30 hectares	62860	9790	15.57
%	2.54	3.12	
30 to 50 hectares	33920	4200	12.38
%	1.37	1.34	
>=50 hectares	20700	1180	5.70
%	0.84	0.38	
Number of holdings with size of			
less than 2 ESU	1718800	183010	10.65
%	69.41	58.25	
2 to 4 ESU	291740	48970	16.79
%	11.78	15.59	
4 to 8 ESU	228600	41980	18.36
%	9.23	13.36	
8 to 16 ESU	147830	26860	18.17
%	5.97	8.55	
16 to 40 ESU	72850	11350	15.58
%	2.94	3.61	
40 to 100 ESU	12830	1680	13.09
%	0.11	0.10	
100 ESU and over	3820	340	8.90
%	0.15	0.11	

Notes: [1] A European Size Unit (ESU) is a measure of the economic size of a farm business based on the gross margin imputed from standard coefficients for each commodity produced in the farm. 1 ESU is equal to 1200 euro of Standard Gross Margin.
Source: own calculations based on Eurostat "General and regional statistics"

In Poland, including the Mazovian province, small farms (up to 5 hectares) dominate in the agrarian structure, but in Mazovia farm fragmentation is less severe, since small units account for barely 56.7%, while in Poland as a whole for 70.7% of all holdings. On the other hand, larger farm units (≥ 30 ha) represent 1.7% of all farms in the in the region, and 2.2% in the whole country. Small (in terms of the economic size) farms' proportion in the total number of farms is lower in the Mazovian province than in Poland as a whole. Holdings having a size less than 4 ESU accounted for 73.8% in the Mazovian province and for 81.2% in Poland.

Table 2. Labour force in agricultural holdings in Poland and in the Mazovian province in 2005

Main indicators	Poland	Mazovia	Mazovian share in Polish total, %
Total labour force in AWU[1]	2273590	333380	14.66
of which family labor force in AWU	2146720	315430	14.69
%	94.42	94.62	
Labour force excluding non-family labour force employed on a non-regular basis (persons)	5111470	656660	12.85
Labour force excluding non-family labour force employed on a non-regular basis (AWU)	2207110	318680	14.44
Total family labour force (person), of which	5044310	653050	12.95
full-time employed	693890	127500	18.37
%	13.76	19.52	
Holders being a natural person	2472830	313970	12.70
of which			
age < 35 years	313350	45730	14.59
%	12.67	14.57	
age 35 to 44 years	549210	74400	13.55
%	22.21	23.70	
age 45 to 54 years	763050	103220	13.53
%	30.86	32.88	
age 55 to 64 years	425270	49060	11.54
%	17.20	15.63	
age 65 years and over	421950	41570	9.85
%	17.06	13.24	
Holders being a natural person			
male	1670690	232610	13.92
%	67.56	74.09	
female	802140	81360	10.14
%	32.44	25.91	

Notes: [1] The annual work unit (AWU) corresponds to the work performed by one person fully employed in farm (1800 hours a year).
Source: own calculations based on Eurostat "General and regional statistics"

The rural population of Mazovia counts about 1,814 thousand people or 35.8% of the region's total, or 12.3% of the total rural population in Poland. The general characteristics of farm population in the Mazovian province as compared to the whole country is presented in Table 2.

In 2005, out of the total Poland's farm labour force as well as the family labour force, both expressed in Annual Work Units, almost 14.7% was employed in Mazovia. 333.4

thousand AWU employed in farms in the region are equivalent to 17.1 AWU per 100 hectares of agricultural land, being a somewhat higher labour input indicator than the Poland's average (15.4 AWU/ha). As much as 19.5% of farm family members in the Mazovian province regarded working in their own farms as full-time employment, while in whole Poland this percentage was on average 13.8%. Those proportions indicate at a labour intensive type of farming but also at an agrarian overpopulation as a serious problem facing the region.

Holders being a natural person (individual farmers) accounted for 99.93% of all agricultural holdings in Mazovia and for 99.85% in Poland. Mazovia has a more favorable age structure of individual farmers in relation to the whole country's structure. As much as 28.9% of individual farm holders in the region, compared to 34.3% in Poland as a whole, were aged 55 years and over. A little more than every eight farm holder in the Mazovian province was 65 years old or older. Only 14.6% of Mazovian and 12.7% of Polish farm holders were less than 35 years old. In spite of this, the fact that almost 14.6% of all young farm holders in Poland operate in the Mazovian province can be an optimistic sign for the future of agriculture in the region, especially in view of a demographers' report saying that the average age of the Mazovian residents is above the national average.

As concerns the gender structure of individual farm holders, both in the whole Poland and in Mazovia, the share of male holders is by far greater. Women account for almost 26% of individual farm holders in the region, whereas in Poland the share of female holders is on average 32.4%.

Agricultural and rural support in Mazovia region and in Poland

Table 3 presents data on direct payments being a major form of EU funding in agriculture and an instrument of income support for farmers granted to them proportionally to the agricultural land. Farmers were paid those payments for the first time in 2004 after the accession of Poland to the European Union.

The number of applications submitted by claimants in Poland raised from 1.4 million in 2004 to 1.47 million in 2006, i.e. by 5%, whereas in Mazovia from 207.85 thousand to 222.4 thousand, i.e. by 7% respectively.

Over the period 2004-2006 Mazovian farm holders received on average 13.3% of the total value of payments under the Single Area Payment Scheme (SAPS) in Poland, which are fully financed from the EU budget and allocated to farmers irrespective of their farms' production. Mazovian proportion of total supplementary area payments paid under the Complementary National Direct Payments (CNDP) scheme, financed generally from the national budget[5] and granted on the basis of area farmed with specified crops, varied according to the type of payment. In the case of payments for other crops in 2006 this percentage was 12.9% while in the case of payments for hops only 0.7%. However, in 2007 Mazovia accounted for 16.8% of the total amount of so called animal payments. With regard to the total area payments per 1 claim over the period 2004-2006, in Mazovia they on average were smaller than in Poland, representing about 87% of the national value per 1 claim.

[5] Hops growers in 2007 received direct payments in two parts: SAPS rate fully decoupled, and CNDP coupled payments.

Agricultural producers in the Mazovian province in 2006 submitted 133.8 thousand applications for payment of the less favoured area support, which constitutes ca. 18.7% of the total number of LFA applications in Poland (Table 3). This results from the fact that in Mazovia 63% of agricultural land is located in the less favoured areas, compared to only 50% in Poland. As a consequence, over the period between 2004 and 2006, the level of LFA payment per hectare of agricultural land in the Mazovian province was on average 11% higher than in the whole of Poland.

With former Guidance Section of the European Agricultural Guidance and Guarantee Fund and with present European Agricultural Fund for Rural Development (EAFRD) the EU has been financing, in a context of shared management between the member states and the Community, rural development programs implemented in member states. These funds are distributed through programs run by national governments.

The Rural Development Program (RDP) was launched in Poland by the Agency for Restructuring and Modernization of Agriculture (ARMA) on 2 August 2004. It was designed to support a diversified development of rural areas and to improve the agricultural holdings' economic condition. Particular aid measures adopted for implementation under the Polish RDP 2004-2006 took into account social, economic and environmental (ecological) aspects of the development in coherence with structural programs, including the Sectoral Operational Program (SOP) "Restructuring and modernization of agriculture and rural development" implemented with the aid of structural funds. This SOP constituted one of the main instruments for structural transformation in agriculture during the first post-accession period, i.e. over the years 2004-2006 [Agriculture... 2007].

The implementing institution for the majority of measures and the final distributor of all the measures under the SOP "Restructuring and Modernization of the Food Sector and Rural Development 2004-2006" was the ARMA.

Table 4 presents the distribution of rural development support in Poland and in Mazovia over the period 2004-2007, excluding the support for the LFA financed in the framework of the RDP and direct payments financed in the framework of the mentioned SOP which were presented earlier. As numbers in Table 4 show, Mazovia is by far the highest-ranking region among all sixteen provinces in Poland with respect to absorption of funds assigned for implementation of such measures as early retirement, start-up assistance for young farmers, improving the processing and marketing of agricultural products as well as the development and improvement of infrastructure related to agriculture.

Mazovia also tended to capture a relatively high share of programmed expenditure for two RDP measures: 'Adjusting agricultural holdings to EU standards' (almost 20% of Poland's total) and 'Support for semi-subsistence farms' (16% respectively), occupying the second position among all provinces in both cases. It is worth mentioning here that the distribution of financial resources between 16 provinces within SOP measures such as investments in agricultural holdings, supporting young farmers and development and improvement of infrastructure related to agriculture was made in relation to the economic size of agricultural holdings in each province, with farms of size larger than 4 ESU being prioritized [for details see Uchwała... 2004].

Table 3. Direct payments to farmers and payments to Less Favorite Areas in Poland and in the Mazovian province in 2004-2007

Type of payments	*2004 campaign*			*2005 campaign*			*2006 campaign*			*2007 campaign*		
	Poland	Mazovia	Share in Polish total, %	Poland	Mazovia	Share in Polish total, %	Poland	Mazovia	Share in Polish total, %	Poland	Mazovia	Share in Polish total, %
Area payments[1]												
Number of applications submitted	1400370	207851	14.84	1486189	223 849	15.06	1471745	222413	15.11	n.a.	n.a.	n.a.
Number of payments disbursed	1381355	205325	14.86	1460188	219829	15.05	1446680	218192	15.08	n.a.	n.a.	n.a.
Total amount, million PLN, of which:	x6341.17	824.97	13.01	6688.34	882.63	13.20	7779.90	1022.81	13.15	2211.11	297.60	13.46
Single Area Payment Scheme	2852.91	377.60	13.24	3158.67	423.82	13.42	3871.20	517.67	13.37	1210.99	166.17	13.72
Complementary National Direct Payments												
- other cops	3485.97	447.35	12.83	3527.70	458.81	13.01	3906.57	505.14	12.93	754.76	90.40	11.98
- hops	2.28	0.02	0.76	1.97	0.01	0.41	2.14	0.01	0.40	0.70	0.00	0.00
- permanent pastures (‘animal payment’)[2]										244.67	41.03	16.77
Area payments per 1 claim, PLN	4590.54	4017.87	87.52	4580.46	4015.08	87.66	5377.76	4687.66	87.17	n.a.	n.a.	n.a.
Support for agricultural activity in less favored areas												
Total amount, million PLN	1144.67	209.60	18.31	1267.55	234.99	18.54	1283.94	236.79	18.44	n.a.	n.a.	n.a.
Number of applications submitted	628762	113709	18.08	706365	131201	18.57	717601	133 797	18.65	754 993	143682	19.03
Arable land, hectare	6439309	1055982	16.40	7057659	1179349	16.71	7191774	1204266	16.75	7438127	1265354	17.01
Amount per 1 hectare, PLN	177.76	198.49	111.66	179.60	199.26	110.95	178.53	196.63	110.14	n.a.	n.a.	n.a.

Notes: [1] Data for 2007 as of 31 December 2007; [2] Animal payment was introduced in 2007; Symbols used in the table: PLN – Polish Zloty, n.a. – not available.
Source: own calculations based on publications [Sprawozdanie ... 2008] and [ARiMR... 2007]

Table 4. Progress in implementation of the Rural Development Program 2004-2006 and the SOP "Restructuring and Modernization of Food Sector" in Poland and in the Mazovian province, as of 31 December 2007

Policy measure	Number of beneficiaries and payments made	Poland	Mazovia	Region's share in Polish total, %	Region's rank among all provinces
Rural Development Program					
Early retirement	number of decisions[1/]	54014	9459	17.51	1
	amount, million PLN	84.61	14.83	17.53	1
Support for semi-subsistence farms	number of decisions	157456	25280	16.06	2
	amount, million PLN	1 313.86	212.10	16.14	2
Support for agri-environmental undertakings and animal welfare	number of decisions	116260	10297	8.86	3
	amount, million PLN	810.76	54.45	6.72	6
Aforestation of agricultural land	number of decisions	363.25	56.92	15.67	2
Adjustment of agricultural holdings to EU standards	amount, million PLN	71398	13564	19.00	2
	number of decisions	2 274.58	454.45	19.98	2
Support for agricultural producer groups	amount, million PLN	100	3	3.00	10
	number of decisions	22.12	0.80	3.61	9
SOP "Restructuring and Modernization of Food Sector"[2]					
Investments in agricultural holdings	number of finished projects	20989	3502	16.68	1
	number of payments	23944	4013	16.76	1
	amount, million PLN	2 013.54	296.98	14.75	2
	of which EU funds	1 094.69	160.65	14.68	2
	%	54.37	54.09		
Setting-up of young farmers	number of finished projects	14151	2348	16.59	1
	number of payments	14151	2348	16.59	1
	amount, million PLN	707.55	117.40	16.59	1
	of which EU funds	530.66	88.05	16.59	1
	%	75.00	75.00		
Improving the processing and marketing of agricultural products	number of finished projects	836	106	12.68	2
	number of payments	900	112	12.44	2
	amount, million PLN	982.89	163.19	16.60	1
	of which EU funds	686.66	113.99	16.60	1
	%	69.86	69.85		
Diversification of agricultural activities and activities close to agricultural activity to provide multiple activities or alternative incomes	number of finished projects	3601	410	11.39	3
	number of payments	3859	434	11.25	3
	amount, million PLN	247.94	31.03	12.51	2
	of which EU funds	173.54	21.70	12.51	2
	%	69.99	69.94		
Development and improvement of infrastructure related to agriculture	number of finished projects	2947	450	15.27	2
	number of payments	3043	461	15.15	2
	amount, million PLN	114.92	22.92	19.94	1
	of which EU funds	80.44	16.04	19.94	1
	%	70.00	70.00		

Notes: [1] Final decisions on payments; [2] Data refer to payments that have been already realized.
Source: own calculations based on the ARMA data

Similarly, the RDP measure of support for semi-subsistence farms was targeted at a clearly defined group of agricultural holdings with economic size between 2 and 4 ESU. As Table 1 reports, in Mazovia there were some 48970 holdings in this size class (16.8% of the total number of such farms in Poland and 15.6% of Mazovian agricultural holdings).

The region ranked below the average (on 9th position) only in the case of support for agricultural groups. The Mazovian share in agri-environmental and animal welfare payments was also relatively low (6.7%) resulting in the region's 6th place in the rank.

Those results demonstrate, similarly to previously mentioned studies on the inconsistency of CAP with the cohesion objectives (see introduction), that CAP expenditure tends to be concentrated more on Polish richer regions than on the lagging ones.

An extremely good position of the Mazovian province among Polish regions in terms of absorption of agricultural and rural financial support, especially when projects that required pre-financing and co-financing are taken into consideration, demonstrates that the Mazovian agricultural holders, food processors and government administration were capable to adequately meet the projects' obligations as well as to attract, absorb and process the assistance being offered by both the EU and the Polish state.

Table 5. Distribution of funds between regions: selected measures of the RDP for Poland, 2007-2013

Voivodeship	Setting-up of young farmers		Modernization of farms		Diversification into non-agricultural activities		Basic services for the economy and rural population		Village renewal and development		Micro business creation and development	
	%	rank	%	rank	%	rank	%	rank	%	rank	%	rank
Mazowieckie[1]	**16.61**	**1**	**16.61**	**1**	**16**	**1**	**12.13**	**1**	**12.13**	**1**	**12.14**	**1**
Wielkopolskie	12.69	2	12.69	2	8.3	5	9.75	2	9.75	2	10.19	3
Lubelskie	11.28	3	11.28	3	14.35	2	8.2	3	8.2	3	7.69	5
Łódzkie	9.01	4	9.01	4	9.63	3	6.38	6	6.38	6	6.06	7
Podlaskie	7.88	5	7.88	5	5.93	8	4.89	13	4.89	13	3.37	14
Kujawsko-pomorskie	7.69	6	7.69	6	4.68	9	5.71	8	5.71	8	5.5	9
Warmińsko-mazurskie	4.88	7	4.88	7	2.76	13	5.44	9	5.44	9	4	12
Dolnośląskie	4.38	8	4.38	8	3.65	19	6.14	7	6.14	7	5.83	8
Świętokrzyskie	4.35	9	4.35	9	7.46	6	4.29	14	4.29	14	4.71	11
Pomorskie	4.13	10	4.13	10	2.82	12	5.14	12	5.14	12	4.82	10
Małopolskie	3.69	11	3.69	11	8.67	4	7.77	4	7.77	4	10.84	2
Zachodnio-pomorskie	3.19	12	3.19	12	1.79	15	5.31	11	5.31	11	3.9	13
Podkarpackie	3.11	13	3.11	13	7.28	7	6.83	5	6.83	5	8.25	4
Opolskie	2.7	14	2.70	14	2.16	14	3.15	16	3.15	16	3.35	15
Śląskie	2.48	15	2.48	15	3.01	11	5.33	10	5.33	10	6.66	6
Lubuskie	1.93	16	1.93	16	1.51	16	3.54	15	3.54	15	2.69	16
Poland	100.0		100.0		100.0		100.0		100.0		100.0	

Notes: [1] Polish name of the Mazovian province.

Source: own calculations based on data obtained from ARMA and MARD

This probably results from a relatively privileged economic situation of the Mazovian province that is more likely to determine the bargaining position of regional authorities vis-

à-vis national authorities managing programs under the SOP and the RDP, as well as from the Mazovian agricultural holders' position in comparison to that of the potential support beneficiaries from other regions in Poland.

On 24 July 2007 the EU accepted the Rural Development Program (RDP) for Poland and the financial perspective 2007-2013 with a total budget equal to 17.2 billion euro, of which 77% will originate from the European Agricultural Fund for Rural Development and the rest from the Polish state budget. Poland will be the largest beneficiary of RDP funding in the entire EU-27.

Data in Table 5, showing ranks of the provinces according to their shares in the total value of support from selected programs in Poland, suggest that the distribution of rural development funding among Polish regions still favours the Mazovian province.

However, because of some objections that may be raised against the above results a different procedure for comparison of the distribution of the support between regions has been applied. So, in order to verify the suggestion that the Mazovian region received more privileged treatment than the other regions, transfers to the beneficiaries proposed in the 2007-2013 perspective were expressed in euros per hectare of agricultural area and per AWU employed in family farms. This method was applied to the rural development measures directly linked to agricultural holdings (Table 6).

Table 6. Programmed support under the RDP for Poland 2007-2013 per hectare of agricultural land and per AWU of family labour force

Voivodeship	Setting-up of young farmers				Modernization of farms				Diversification into non-agricultural activities			
	per 1 hectare		per 1 AWU		per 1 hectare		per 1 AWU		per 1 hectare		per 1 AWU	
	EUR	rank	EUR	rank	EUR	rank	EUR	rank	EUR	rank	EUR	rank
Dolnośląskie	18.3	14	194.0	11	77.3	14	822.0	11	12.5	13	133.0	13
Kujawsko-pomorskie	31.3	4	353.5	3	132.7	4	1498.0	3	15.7	10	177.0	8
Lubelskie	30.9	5	176.6	12	131.2	5	748.5	12	32.4	4	184.9	3
Lubuskie	17.7	15	330.3	4	75.1	15	1399.9	4	11.4	14	212.6	1
Łódzkie	35.2	1	208.1	10	149.2	1	881.8	10	31.0	5	183.0	4
Małopolskie	23.4	10	63.7	15	99.3	10	270.1	15	45.3	2	123.2	14
Mazowieckie	**34.4**	**2**	**218.8**	**9**	**145.7**	**2**	**927.5**	**9**	**27.2**	**6**	**173.5**	**10**
Opolskie	20.5	12	267.1	8	86.9	12	1131.8	8	13.5	11	175.8	9
Podkarpackie	18.3	13	61.0	16	77.7	13	258.4	16	35.3	3	117.4	16
Podlaskie	30.3	7	290.2	7	128.3	7	1230.0	7	18.7	8	179.7	7
Pomorskie	23.6	9	324.8	5	100.2	9	1376.4	5	13.3	12	182.5	5
Śląskie	25.8	8	118.5	14	109.2	8	502.4	14	25.7	7	118.4	15
Świętokrzyskie	32.7	3	137.0	13	138.5	3	580.4	13	46.1	1	193.3	2
Warmińsko-mazurskie	21.2	11	359.1	2	89.9	11	1522.0	2	9.9	15	167.1	11
Wielkopolskie	30.5	6	295.9	6	129.4	6	1253.9	6	16.4	9	159.2	12
Zachodnio-pomorskie	14.6	16	392.0	1	62.0	16	1661.2	1	6.8	16	181.0	6
Poland	27.1		196.3		115.0		831.9		22.3		161.5	

Notes: Data on agricultural land and labour refer to 2007.

Source: own calculations based on data obtained from ARMA and Eurostat.

In the case of three individual measures the Mazovian farm holders will obtain the support above the national average. Per hectare values of the aid in the Mazovian province would exceed the national average by 22 to 29% depending on the measure. Similarly, the support per unit of family farm labour may be approximately 7-11% higher compared with this support for the whole of Poland.

Mazovia still ranks high (2nd) among Poland's 16 administrative regions for amount of assistance for young farmers and for modernization of farms obtained per hectare of agricultural land. However, this support in relation to farm family labour force places the region 9th in the whole country.

Because sums that will be transferred to financing the development measures are designed to reinforce the economic progress in rural areas, they are expected to affect not only farmers but the rural population as a whole. Table 7 shows funding in the framework of selected measures of the RDP 2007-2013 per rural inhabitant in the regions.

Table 7. Programmed support under the RDP for Poland 2007-2013 per capita of rural population[1]

Voivodeship	Diversification into non-agricultural activities			Basic services for the economy and rural population			Village renewal and development			Micro business creation and development	
	euro per capita	rank	Poland =100	euro per capita	rank	Poland =100	euro per capita	rank	Poland =100	euro per capita	Poland =100
Dolnośląskie	13.8	12	62.4	99	8	105.3	39.7	8	105.3	65.4	100.0
Kujawsko-pomorskie	18.8	7	85.1	97.7	9	103.9	39.1	9	103.7	65.4	100.0
Lubelskie	41.2	1	186.4	100.3	5	106.7	40.2	5	106.6	65.4	100.0
Lubuskie	12.4	14	56.1	123.6	4	131.5	49.5	4	131.3	65.3	99.8
Łódzkie	35.1	3	158.8	99	7	105.3	39.7	7	105.3	65.4	100.0
Małopolskie	17.7	9	80.1	67.4	16	71.7	27	16	71.6	65.4	100.0
Mazowieckie	**29.1**	**5**	**131.7**	**93.9**	**10**	**99.9**	**37.6**	**10**	**99.7**	**65.4**	**100.0**
Opolskie	14.2	11	64.3	88.5	12	94.1	35.4	12	93.9	65.4	100.0
Podkarpackie	19.5	6	88.2	77.8	14	82.8	31.2	14	82.8	65.4	100.0
Podlaskie	38.8	2	175.6	136.3	1	145.0	54.6	1	144.8	65.3	99.8
Pomorskie	12.9	13	58.4	100.2	6	106.6	40.1	6	106.4	65.4	100.0
Śląskie	10	16	45.2	75.3	15	80.1	30.2	15	80.1	65.4	100.0
Świętokrzyskie	35	4	158.4	85.6	13	91.1	34.3	13	91.0	65.4	100.0
Warmińsko-mazurskie	15.3	10	69.2	128	2	136.2	51.3	2	136.1	65.5	100.2
Wielkopolskie	18	8	81.4	90	11	95.7	36.1	11	95.8	65.4	100.0
Zachodnio-pomorskie	10.1	15	45.7	127.9	3	136.1	51.2	3	135.8	65.3	99.8
Poland	22.1		100.0	94		100.0	37.7		100.0	65.4	100.0

[1] Refers to rural populations in rural communes, urban-rural communes and towns with population up to 5 thousand people.

Source: own calculations based on data obtained from ARMA and the Central Statistical Office of Poland.

In author's opinion a special attention should by paid to 'Micro-business creation and

development' program that is supposed to help rural population to start, expand or enhance micro businesses, to create employment opportunities and to diversify rural areas. Unfortunately, figures in the last column of Table 7 suggest that this program seems not to promote cohesion between Poland's rural regions, since it adopts an equal per capita distribution of the aid between regions in spite of the differences in their economic development. Mazovia being Poland's best developed region is going to receive the same amount of support per rural habitant as the least developed regions or regions with the highest formal employment in agriculture in relation to the total employment (for example Lubelskie, Podlaskie, Podkarpackie), where labour force should be shifted from agriculture to industry or services.

Likewise, support for the basic services for economy and rural population per capita in the Mazovian province is at the same level as in the whole Poland. Rozkrut [2008] points out that development of services in the regions of Poland is correlated with their overall economic development. So, one can expect that in the Mazovian province the development of services sector is far above the Polish average.

Conclusions

1. The Mazovian province represents about 12.7% of all agricultural holdings, 12.2% of overall agricultural area, 14.7% of total standard gross margin in agriculture and 14.7% of total farm labour force in Poland. Over the period 2004-2006 Mazovian farm holders received on average 13.3% of the total amount of single area payments and 12.9% of complementary direct payment for basic crops but 18.4% of compensatory payments for less favoured areas. The region attracted a relatively high proportion of aid for adjustment of agricultural holdings to EU standards (20%), for development and improvement of infrastructure related to agriculture (19.9%) and for early retirement (17.5%).
2. By comparing the Mazovian shares in Poland's agricultural resources (land, farm holdings and labour) and the region's shares in the overall support under selected measures in Poland, the present study results indirectly suggest disparities in the distribution of CAP support across regions in Poland. Likewise, funding under the Polish Rural Development Program for 2007-2013 shows ongoing imbalances in the distribution of aid.
3. Disparities between administrative provinces in Poland in the distribution of the EU and national funds for agriculture and rural development to some extend reflect differences in the size of the regions in terms of their territory and population. To overcome the limitations of the regional comparison according to the total amounts of the distributed support, the programmed budget for 2017-2013 was related to the agricultural area, farm labour and rural population in order to obtain the support per hectare, per AWU and per capita in each region. Based on these estimates Mazovia ranks high among all Polish regions in relation to the support in absolute terms but loses its top position when the support per AWU and per capita is taken into consideration. However, in the case of all selected measures the aid per hectare, per AWU and per capita in the Mazovian province is equal to or above the Polish average.
4. If Poland is to exploit its economic potential, all regions, wherever they are situated, need to contribute to the economic growth and the whole of Polish population, including rural and farm population, must be given a chance to benefit from the economic development. Territorial cohesion "implies that people should not be disadvantaged by

wherever they happen to live or work in the Union" [A new.... 2004, p. 27]. For fairness reasons there is a need for a better balanced distribution of the CAP support among Polish regions.

References

Agriculture and food economy in Poland. [2007]. Ministry of Agriculture and Rural Development, Warsaw.

Anders S., Harsche J., Herrmann R., Salhofer K., Teuber R. [2007]: The Interregional and Intertemporal Allocation of EU Producer Support: Magnitude and Determinants, *Jahrbuch furRegionalwissenschaft* no. 27, pp. 171–193, DOI 10.1007/s10037-007-0018-3.

A new partnership for cohesion, convergence, competitiveness, cooperation. Third report on economic and social cohesion. [2004]. European Commission, Office for Official Publications of the European Communities, Luxembourg.

ARiMR – trzy lata po akcesji. [2007]. ARMA, Warsaw.

CAP and the Regions: Building a Multidisciplinary Framework for the Analysis of the EU Agriculture Space. [1997] Laurent C., Bowler I. (eds.). INRA Editions, Versailles.

Dax T., Machold, I., Roberts, D. [2005]: The CAP, Rural Development Policy and Territorial Cohesion: Findings from an EU-wide Analysis. [In:] Assessing rural development policies of the Common Agricultural Policy, selection of papers from the 87th Seminar of the European Association of Agricultural Economists (EAAE), 21-23 April. Ortner K. M. (ed.). Vienna, pp. 107-123.

Rozkrut M. [2008]: Sektor usług w Polsce w ujęciu regionalnym. *Studia i Prace Wydziału Nauk Ekonomicznych i Zarządzania Uniwersytetu Szczecińskiego* no. 2, pp. 211-218.

Shucksmith M., Thomson K. J., Roberts D. [2005]: The CAP and the Regions: The Territorial Impact of the Common Agricultural Policy. CABI Publishing, Wallingford, UK.

Sprawozdanie z działalności Agencji Restrukturyzacji i Modernizacji Rolnictwa w 2007 roku. [2008]. ARMA, Warsaw.

Study of the Impact of Community Agricultural Policies on Economic and Social Cohesion. [2001]. Directorate General for Regional Policy. European Commission, Brussels.

The regional dimension in agricultural economics and policies. [1995]. Sotte F. (ed.). [In:] Proceedings of the 40th EAAE seminar, 26-28 June. Ancona.

Uchwała Nr 2/2004 Komitetu Sterującego Sektorowym Programem Operacyjnym „Restrukturyzacja i modernizacja sektora żywnościowego oraz rozwój obszarów wiejskich" z dnia 25 listopada 2004 r. [2004].

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Basic present tendencies in swine breeding

Abstract. Swine breeding is a branch of agriculture with high level of development and traditional in Belarus. The problem of basic directions in development of swine breeding is examined in the paper. In conclusion the main reserves for growth of the economic efficiency of pork production are found in strengthening of food reserve and using of complete feed mixture balanced on feed protein, increasing of leguminous plants and many other factors.
Key words: pork production, Belarus, economic efficiency

Introduction

Agriculture of the Byelorussian Republic is in enough complicated position in the modern economic conditions. The state support is being decreased and prices for energy carriers are enlarged and the system of deliveries of agricultural products from abroad becomes complicated.

Swine breeding is a branch of agriculture with a high level of development and is traditional for Belarus. It is an essential branch for vital functions of people and is widely practised in majority of regions of the globe. It is one of the most profitable branches of animal breeding. It can not only stop recession of meat production but also create its necessary supplies for the export and import purposes. In all countries of the world have occurred essential shifts in the structure of meat production during the last years. The share of pork in the total meat production has increased from 35 up to 40 %. Especially big weight it has in the EU countries where it more pork than beef and poultry meat together taken is produced.

Material and methods

All kinds of meat production have been investigated, in particular pork production. The statistical information about pig breeding in the world and Belarus has been analyze analyzed.

Results of research

Food problem is the main question of modern developing world. It is known that in many countries of the world a food deficiency takes place. According to FAO in the beginning of the 21st century the following model of food consumption is expected: in the developed countries on average 800 kg of grain per capita annually (100-150 kg in the form

of bread, cereals, etc. and 650-700 kg transformed into meat, eggs, milk etc.) and in the poorest countries 200 kg of grain per capita annually (in the form of bread).

To swine breeding belongs the leading role in solution of the meat problem. Pork is the first in world meat supply. Its share in whole world production of 255 million tons of meat made up in 2005 more than 100 million tons (39,4 %), poultry meat more than 78 million tons (30,7 %), beef, veal and buffalo, camel, ass and mule meat more than 62 million tons (24,4 %), mutton and goat meat more than 12 million tons (4,8 %), rabbit meat more than 1 million tons (0,4 %) and horse meat about 1 million tons (0,3 %).

Number of pig stock grows constantly in the world. Now there are 960 million of pig heads in the world and for the last 5 years production and consumption of pork have increased by 20 %.

Production of pork has achieved 84.4 million tons. China produces 44 % of pork world output and the stock of pigs numbers 486 million heads.

Table 1. Production of pork in selected countries in the world, thousand ton

Country	Country population, thousand people	Year					Production of meat, kg per	
		2001	2002	2003	2004	2005	pig	person
Russia	143246	1568	1494	1579	1678	1750	109.5	12.2
Ukraine	48523	675	591	599	631	630	86	12.9
Belarus	9895	301	303	300	290	327	94.3	31.3
Belgium	10312	1042	1062	1040	1029	1050	164.9	101.8
Brazil	178470	2600	2637	2798	3059	3110	94.2	17.4
Canada	31510	1640	1726	1852	1952	1970	132.7	62.5
China	1311709	41405	42982	44373	46236	47752	101	36.4
Denmark	5364	1624	1716	1759	1762	1762	132.9	328.5
France	60144	2312	2315	2346	2321	2290	150.8	38.1
Germany	82476	3981	4047	4110	4239	4366	164.8	52.9
Italy	57423	1478	1509	1535	1588	1618	175.4	28.2
South Korea	47700	915	927	1005	1149	1100	120.9	23.1
Mexico	103457	1029	1057	1070	1043	1100	60.8	10.1
Moldova	4264	49	43	47	44	44	88	10.3
the Netherlands	16149	1622	1432	1377	1250	1245	110.9	77.1
Philippine Islands	79999	1008	1064	1332	1385	1400	111.8	17.5
Poland	38587	1923	1849	2023	2188	2100	116	54.4
Spain	41060	2904	2989	3070	3189	3335	139	81.2
Sweden	8876	277	275	283	287	288	151.3	32.4
USA	294043	8597	8691	8929	9056	9332	154.5	31.7
Vietnam	81377	1409	1515	1653	1800	1700	72.3	20.9

Source: [Левантин 2006] and own work

Per head of pig livestock France produces 152 kg of pork, Sweden 148 kg, Austria 145 kg, the USA 135 kg, Russia 48 kg, Republic of Belarus 86 kg. In number of countries such as Poland, Great Britain and Italy the production of pork has been enlarged and number of pigs decreased due to the at decrease intensifying factors of development.

Social and economic crisis had its impact on development of swine breeding in the countries of former USSR in 90ies of the past century. So, in comparison with 1989 the livestock of pigs in Russia by 2005 was decreased by 2.3 times and production of pork was diminished by 2.89 times. In Russia having population of 150 million people the production of pork is less than in Denmark where population is 5 million. Russia has come into first position in the world with respect to imports of pigs' meat. And this position continues to strengthen.

Experience of highly developed countries testifies to that a steady tendency of growing specialization and growth of concentration in swine breeding is independent of type of ownership and management. In conditions of different organizational forms of management the part of big enterprises of industrial type will increase in process of development and introduction of new technologies of production.

So, while in the structure of world meat production pork constitutes 39.4 %, then in Asia it will be 53.2%, in Europe 49.3%, in North America 25.4%, in South America 14.3%, in Oceania 10.3% and in Africa 7.2 %. The highest consumption takes place in Europe, namely 34.3 kg/person/year, and the lowest is in Africa, 1 kg/person/year, but still pork remains the most consumed meat in the world. The best world producers, for example Denmark, produce 5 times more pork than they consume. Denmark is its main exporter.

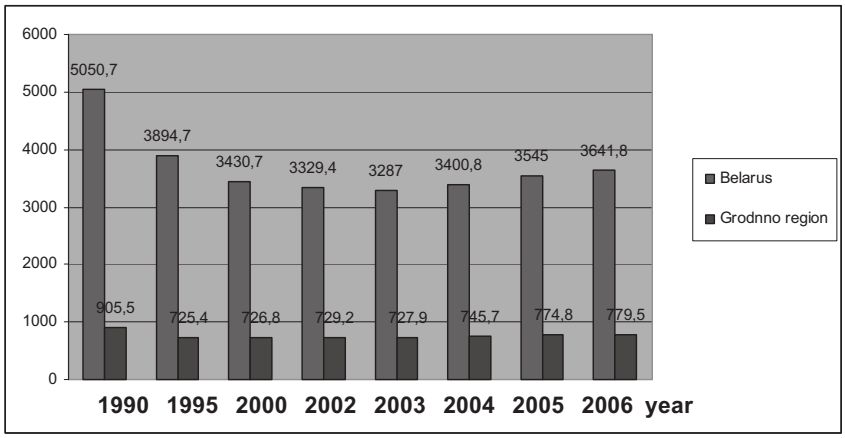

Fig. 1. Dynamics of a mid-year number of livestock of pigs in Belarus and the Grodno region, thousand heads

Swine breeding is very important for our country as the most precious and productive branch of animal breeding. In 2006 in Belarus was produced 327 thousand tons of pork. About 80% of pork is produced in the socialized sector of economy in industrial complexes. However since 1990 a process of recession has begun in the branch. The livestock of pigs in all classes of farms has decreased more than by quarter including that in the public sector. Reasons to that were a deficiency and a rising cost of mixed fodder, an imbalance of

feeding rations with respect to the basic nutrient elements, a rising cost of fuel, electric power, prophylactic and medical preparations and a break of inter-economic and inter-branch relations.

But in the middle of nineties the situation began to improve. The most considerable breakdown in livestock heads in comparison to 2006 happened in 1995. During last years in the structure of pig, cattle and poultry products the pork proportion, thanks to decreasing share of beef and poultry meat, is observed.

Territorially swine breeding is takes place all over the republic. More than 60% of the livestock of pigs is concentrated in the farms of public sector. Each administrative region has some agricultural enterprises which breed and fatten up pigs for sale. Today 107 industrial complexes in the republic are breeding and fattening pigs, 12 thousand up to 108 thousand porkers a year in one complex, and about 86% of all pork is produced there.

From year to year the number of pigs' livestock decreases in the republic and the product grows. Gross production of pork in Belarus in 1990 amounted to 438 thousand tons. Then, because of decreasing of livestock number, the production began to drop sharply and in 1995 it fell down to 263 thousand tons. It decreased 1.7 times. Then the production began to increase gradually and despite of continuing decrease of livestock number in the last years it has stabilized on a level of more than 300 thousand tons. It is necessary to underline that this growth was achieved due to increasing average daily growth of fat mass from 295 gram in 1995 up to 468 gram in 2006. It is necessary to notice that inputs of feedstuffs for production of 1 hundredweight of pork have decreased from 8.99 hundredweight of fodder units down to 5.2 hundredweight of fodder units. It is necessary to underline that on present day filling up of complexes capacity is still low and reaches about 72%. It means that the branch has a sufficient potential for further growth of production volume of meat by means of employment of progressive technology and the republic has a gene pool capable to supply production of this national Belarussian product.

But in the Grodno region the daily lifeweight accretion increases above 10.0% annually. In 2006 a peak value of this parameter was achieved. It was 515 gram (fig. 2)

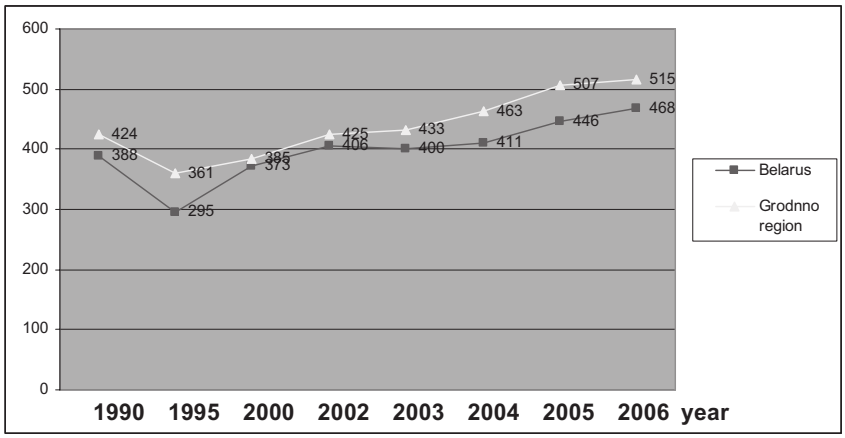

Fig. 2. Dynamics of a daily average weight increase

Thus despite of seriously unfavourable economic conditions the livestock number is raised and the gross production of pork is increased. The level of pork production has been

maintained mainly due to an increase of daily average increment of animal weight and a decrease of consumption of feedstuffs per product unit.

It is one of few indices of which level is higher than that achieved in 1990. At the same time number of animal falls has increased and litter from one sow has decreased.

But there are still many unsolved problems in swine breeding in the republic. There has been a negative situation with profitability of animal breeding branch during last years. The profitability (profit/cost ratio) of branch equaled 35.7 % in 1990. Such situation was caused by attention the state paid to the animal breeding branch and by determination of optimum purchasing prices of pork and subsidies allotted first of all to mixed fodder.

However the subsequent negative trends in agriculture and the swine breeding branch connected with disintegration of the USSR have led to a slump in the profitability of swine breeding. The unprofitability of swine breeding has equaled 0.9% in 2000 and 2.8% in 2001. The profitability of pork production in agricultural organizations in Belarus in 2006 reached 9.1% yet. Situation in Grodno region is a little bit better. Here the profitability in 2006 was 12.9% (this is peak value for all regions).

But in the developed economic conditions the prospects of development of swine breeding branch look rather pessimistic. The deterioration of main fixed assets continues to increase and a majority of enterprises do not have enough resourses not only for modernization but also for elementary repairs and substitution of the falling out equipment. In such conditions further branch intensification remains as big problem and the competitiveness of production in such conditions practically is not possible. To solve problems of the branch is impossible in modern economic conditions. It is necessary to study experience of leading farms of the republic and neighbouring states. But it will be difficult in such conditions to solve such problems without a support from the state.

Last year some documents were issued which were directed at developing this branch. They are the republican complex program of livestock breeding for years 2005-2010, the concept of development of swine breeding branch in Belarus and the republican complex program of intensification of fodder production in years 2004-2008. The basic paths of further development of all agricultural industry and the cattle breeding branch are concentrated and defined in a state program of reconstruction and development of villages in years 2005-2010.

At present stage the development of main reserves of growth of economic efficiency of pork production are concluded in strengthening of food reserve and using of complete feed mixture balanced on feed protein, increasing of leguminous plants acreage and many other factors.

Conclusion

The world and domestic experience shows that for increasing the volume of pork production, rising its quality and competitiveness it is necessary to conduct action aimed at rising of the animal productivity and decreasing of fodder costs. Solution of this problem is seen in a general change from a prodigal and intensive way of development with big costs of material resources and a constant growth of capital investments to another way of development. Such way of development requires raising of the genetic potential of animal productivity on the basis of deeper individual and breed selection work, introducing adequate nutrition of animals, using of promising technologies, perfecting the mechanism

of management and raising of interest of each worker from milkmaid to manager of farm in the economic results of the farm.

For the purpose of enhancing the productive efficiency of pork production and its competitiveness it is necessary to improve the internal and external economic relations on the basis of agri-industrial integration and coordination of all production processes, beginning from pig rearing to realization of products of swine breeding in view of market needs.

References

Агропромышленный комплекс (сельское хозяйство). [2007]. Vol. 1. Minsk.

Государственная программа возрождения и развития села на 2005-2010 гг. [2005]. Указ Президента Республики Беларусь от 25 марта 2005 года.

Горфинкель И. [2001]:Организационно-экономические вопросы в производстве свинины. *Агроэкономика* no. 6, p. 5.

Дегтяревич И.И. [2004]: Резервы увеличения объемов производства свинины. *Агроэкономика* no. 4, pp. 59-60.

Левантин Д. [2006]: Развитие свиноводства в странах мира. *Свиноводство* no. 4, pp. 26-28.