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INSTITUTE OF AGRICULTURAL
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Impact of “Greening” of the Common Agricultural Policy on the Polish Farms

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

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Agricultural Policy
on the Polish Farms**



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This publication was prepared as a contribution to the research on the following subject
Budget grounds for improvement of the competitiveness of the Polish agriculture,
within the framework of the research task: *Direct payments and budget subsidies versus
finance and functioning of holdings and agricultural enterprises.*

The main objective of this book is to describe the relationship between subsidies and financial performance of Polish farms. The authors used optimisation and regression models to examine the effects of implementation of the proposed Common Agricultural Policy for the period 2014-2020. This book therefore explores the probable impacts of the “greening of the CAP”.

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Preface

Proposal of a reform of the Common Agricultural Policy for the period 2014-2020 is a subject of a long debate of farmers, policy makers, researchers as well as other stakeholders. In the past the CAP has undergone numerous transformations in response to changing macroeconomic environment and in reaction to developments in the farming sectors in the EU countries. A new CAP 2013 was presented by the EU Commission in a form of "a set of legal proposals designed to make the CAP a more effective policy for a more competitive and sustainable agriculture and vibrant rural areas". The proposal brings under consideration new elements, some of them raising strong controversies such as national allocations of subsidies that lead to convergence of direct payments or introducing greening as a component of direct payments.

Stronger environmental focus is one of the features of the proposal and, specifically concept of greening of the CAP, is the subject of intense and sometimes emotional debate. For many stakeholders involved in this discussion the concept of greening seems to be controversial, because it does not stress environmental objectives strongly enough, or rather, impose too restrictive limits interfering with the organisation of agricultural holdings. Changes in direct payments scheme in line with EC proposition forcing adjustments in cropping pattern and creating Ecological Focus Areas on the farm level create an uncertainty about consequences on size and structure of agricultural production, and thus the changes in economic performance of farms and the whole agricultural sector.

Authors of this publication analyze historical changes of the CAP with a focus on a growing importance of the environmental component of the CAP, discuss different scenarios of shaping the direct payments system and present results of modelling of impacts of greening of the CAP on the Polish farming sector.

Results show that a majority of farmers in Poland complies with the crop diversification constraint of the greening. However, establishing required Ecological Focus Area and necessary diversification in farms with simplified cropping structures will have a negative impact on the volume of agricultural production as well as on farm incomes. Further studies are desired to consider a potential for long-term adjustments of farming systems to the greening requirements and their environmental and economic effects.

1. Estimation of the effects of greening the EU Common Agricultural Policy in Poland in the perspective of 2014 on the example of FADN farms

Stefania Czekaj, Edward Majewski, Adam Wąs

1.1. Introduction

Proposals for the reform of the Common Agricultural Policy of the European Union for budgetary perspective 2014-2020 are still discussed and analyzed regarding the potential effects of these reforms. The basic document defining the shape of the future common agricultural policy is the proposal of the European Commission¹, although a significant voice to the discussion was brought by the European Parliament, and also by the individual Member States. One of the essential elements of the reform is the concept of *greening* the CAP. It raises numerous controversies arising, *inter alia*, from ambiguously defined objectives of greening, and because of the difficulty in estimating its effects.

Implementation of the requirements of the greening of CAP will enforce above all the obligation to adjust the crop structure in agricultural holdings, as well as to designate a suitable ecological focus area. This will mainly affect the size and structure of agricultural production, and thus the changes in agricultural income.

The potential impact of the CAP reform after 2013, taking into account the proposals of the European Commission of November 2010, on various environmental and economic aspects, was discussed in a number of publications^{2,3}. In addition to examining the impact of changes in the CAP on biodiversity and reducing greenhouse gas emissions, the authors also made an attempt to estimate the cost of greening and the impact on the development of agricultural income in the EU using the CAPRI model. The analysis shows that the inclusion of the requirements on greening to the direct payments system will improve income in regions with extensive agricultural production, for example, with the grazing system, but will worsen the results in regions with intensive agricultural production. The authors conclude that the reform will have impact mainly on improving the agricultural income in the new Member States, while

¹ Proposal for a Regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy [COM(2011)625].

² Helming J.F.M., Terluin I.J.; Scenarios for a CAP beyond 2013. Implications for EU27 agriculture and the CAP budget, Werkdocument 267, LEI Wageningen, November 2011.

³ Van Zeijts H., Overmars K., Van der Bilt W., Schulp N., Notenboom J., Westhoek H., Helming J., Terluin I., Janssen S., Greening the Common Agricultural Policy: impacts on farmland biodiversity on an EU scale, PBL Netherlands Environmental Assessment Agency, The Hague, 2011.

in the EU-15 it will remain unchanged. However, one should refer to that conclusion with some caution, because due to its nature, the sectoral CAPRI model does not directly reflect the processes carried out in individual farms. This doubt is confirmed in analyses done by DG AGRI⁴, cited by A. Matthews who states that “implementation of the instruments related to green payment will affect the increase in management costs in the EU or in short-term the decrease in agricultural income”. It is estimated that the cost of greening can reach 33 EUR/ha in 2020. The consequence of the exclusion of the use of arable land intended for ecological focus area will also be the reduction in supply and increase in the market prices of crops. The European Commission projects that the increase in prices would apply to wheat and sugar beet (increase by 3%), barley (12%) and beef. It is estimated, however, that the increase in prices and the expected increase in yields will not fully compensate for higher production costs, which will result in an average drop in agricultural income by 2%⁵.

The authors of another publication⁶ analysed the impact of the greening of CAP on the environment and concluded that the introduction of the obligation to diversify crop structure will not have a significant impact on improving the quality of the natural environment due to the fact that according to the estimates, the need to comply with this requirement applies only to 2% of the agricultural area in the EU.

More in-depth analysis of the production and financial effects of greening the CAP in Poland was done under one of the tasks of the research programme “Direct payments and budget subsidies versus finance and functioning of holdings and agricultural enterprises” realized by the Institute of Agricultural and Food Economics. Methodology of the analysis was developed and preliminary estimates of the effects of greening were made in selected types of cereal farms in the first stage of the implementation of the tasks. It was found, among other things, that in the population of farms in the Polish FADN, which have been the subject of analysis, the degree of adaptation to the requirements of greening is diverse, and thus the effects are unevenly spread between different groups of farms. In cereal farms adjusted to diversification of crops, in which it is necessary to isolate ecological focus area, the reduction in agricultural income does not exceed 4%. However, in farms with highly simplified structure of crops (mainly monocultures) and the lack of ecological focus area consistent with the

⁴ European Commission, *Common Agricultural Policy towards 2020 Impact Assessment*. Annex 3: Direct payments, Commission Staff Working Paper, DG Agriculture and Rural Development, Brussels, 2011.

⁵ A. Matthews, *Post-2013 EU Common Agricultural Policy, Trade and Development*, A Review of Legislative Proposals. International Centre for Programme on Agricultural Trade and Sustainable Development (ICTSD), Issue Paper No. 39, 2011, p. 17.

⁶ H. Westhoek, H. Van Zeijts, M. Witmer, M. Van den Berg, K. Overmars, S. Van der Esch, W. Van der Bilt, *Greening the CAP. An analysis of the effects of the European Commission's proposals for the Common Agricultural Policy 2014-2020*, PBL Netherlands Environmental Assessment Agency, 2012.

requirement of greening, the reduction in income can be as high as 20% in case of monocultures on good soils. The increase in the degree of adjustment in crop diversification causes a decrease in the impact of CAP reform on the development of the income in particular groups of farms. Preliminary analysis of only one type of FADN farms shows that in Poland, the required separation of ecological focus area will have by far the greater impact on the agricultural income than the obligation of diversification⁷.

This paper presents the estimation of the effects of the CAP greening for different types of farms, up-scaled further to the entire population of FADN farms. The results of the analysis pertain to the first year (2014) of the new EU budget perspective. In this research we used a linear static farm optimization model FARM-OPTY using MS Excel and SOLVER. Farm models were developed for specific types of farms using FADN typology with use of three agricultural policy scenarios.

1.2. Methodology

Analyses of the effects of greening the CAP were made for a specific variant referred to in the European Commission's proposal as “**integration scenario**”, which includes the concept of “greening”⁸. Basic requirements for greening included in the optimization model are:

- a. minimum of 3 crops in rotation, with maximum proportion of one of them at the level of 70% and a minimum proportion in the crop structure at the level of 5%;
- b. maintaining the existing areas of permanent grassland, with the right to reduce the area by not more than 5% compared to the base year;
- c. allocation of 7% of arable land to ecological focus area, including ecological land such as land left fallow, terraces, landscape features, buffer strips and afforested areas.

According to the initial assumption and guided by the European Commission's proposal for the purpose of modelling, five agricultural policy scenarios were constructed:

A. Base Scenario [Base_2009] and Baseline_2014 scenario

These scenarios assume continuation of the current CAP. The base scenario is used only to calibrate models constructed on the basis of FADN data as of 2009. Baseline scenario will provide a benchmark for other scenarios of the reformed CAP. Baseline scenario assumes no change to the existing

⁷ S. Czekaj, E. Majewski, A. Wąs [in:] *Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych*, IAFE-NRI, Warsaw 2011.

⁸ Preliminary methodological assumptions presented in the study [Czekaj, Majewski, Wąs 2011] have been reviewed and modified for the purposes of this study.

mechanisms of the CAP, assuming that the model will apply direct payment rate at the level that would be achieved in Poland in 2013.

B. Integration Scenarios, including the concept of greening the CAP as proposed by the European Commission. This scenario highlights three options: B1. basic variant of greening [**GREEN_2014**], in which, in the absence of a clear definition of the term "crop" in the European Commission's proposal, it was assumed that the crop is a single plant (species) – e.g. wheat, rye, rape, corn, etc.

B2. simplified variant of greening [**GREEN_ZB 2014**], in which the term is understood as cereals in general, forming a group of crops.

B3. variant of the resignation from 30% of payment for greening [**GREEN (-30%)_2014**], which allows for the possibility of not meeting the conditions of greening and reducing direct payments by 30%.

Optional payments (related to the production and LFA) were adopted at the current level, and it was assumed that existing agri-environmental payments per average farm, which will be the subject of modelling, will be reduced by 50% due to the inclusion of greening component and the likely reduction in financing for ecological focus measures of the second pillar.

The main data sources were Polish FADN resources. Data from 2009 were used to develop a concept of typology and parameters for farm models. Data come from 12,258 research facilities (individual farms). The entire population was divided into production types, adopting the criteria consistent with the Community typology for agricultural holdings of 2009⁹.

According to the adopted methodology, the standard output (SO) was used to determine the economic size and type of production, which is defined as “the average value of production of five years in specified plant and animal production obtained from 1 ha or 1 animal within 1 year in average production conditions for the region”¹⁰.

1.2.1. Types of model farms

The process of selecting the types of farms for modelling consisted of four basic steps and proceeded according to the following scheme:

- Step 1 – Division of farms by type of production, according to the Community typology for agricultural holdings of 2009 (Table 1.1).

⁹ L. Goraj, I. Cholewa, D. Osuch, R. Płonka, *Analiza skutków zmian we Wspólnotowej Typologii Gospodarstw Rolnych*, Warsaw 2010 after Commission Regulation No 1242/2008 and RI/CC rev.3 Typology Handbook 05.10.2009

¹⁰ Ibidem.

Table 1.1

Classes of farms by production, according to the Community typology for agricultural holdings

nTF14		PRODUCTION TYPE
15	Specializing in the cultivation of cereals, oilseeds and plants with high protein content	CEREAL
16	Specializing in the cultivation of other field crops	ARABLE
61	Mixed crops	
45	Specialising in dairy cattle	CATTLE
46	Specialising in the breeding of cattle	
51	Specialising in pig production	PIG
73 and 74	Different livestock	MIXED
83 and 84	Mixed crops and livestock	
20	Horticultural crops	OTHER (NOT ANALYZED)
35	Specialising in viticulture	
36	Specializing in the cultivation of orchards - fruits	
37	Specialising in the cultivation of olives	
38	Mixed permanent crops total	
48	Specializing in the breeding of sheep and goats	
52	Poultry	
53	Other granivorous animals	

Source: Own study based on „Analiza skutków...” Goraj L. et al. 2011 and FADN data.

• Step 2 – Division of farms in production types due to the degree of adaptation to the “greening” requirements. The starting point in this stage was to classify farms into one of two groups:

- “green”, that meet both or one of the two requirements of greening – diversification of crops and ecological area (7% of arable land);
- “non-green” that do not meet the criteria for greening both in terms of diversification of crops and minimum fallow land on the farm.

Among the “green” farms the following were distinguished:

- farms that meet the requirement of diversification and ecological area in all of the greening scenarios [designated as $D < 70\% + E$],
- farms that meet the requirement of diversification and fallow except for the GREEN_ZB scenario. This group will include farms with more than 70% of cereals in the crop [$D > 70\% + E$],
- farms that meet the requirement of diversification in accordance with all the analyzed greening scenarios [$D < 70\%$],

- farms that meet the requirement of diversification except for the GREEN_ZB scenario, i.e. the group includes farms with more than 70% of cereals in the crop [$D > 70\%$].

“Non-green” farms were divided into three subgroups:

- farms with cultivation of plants in monoculture,
- farms with two equivalent crops (proportion of approximately 50% each),
- farms with a dominant crop (marked as MAIN+).

The result obtained after completion of the second phase is to determine the structure of farms with regard to the degree of fulfilment of the “greening” conditions in the various production types according to nT14 in the FADN sample (Table 1.2).

Table 1.2

Structure of farms according to production types in the FADN sample with regard to fulfilment of the greening criteria

Description	CEREAL	ARABLE	CATTLE	PIG	MIXED	OTHER	TOTAL
D+E	5%	9%	6%	3%	5%	60%	11%
D	71%	82%	86%	84%	89%	28%	79%
DOMINANT CROP	9%	5%	4%	4%	3%	6%	4%
TWO CROPS 50/50	12%	2%	3%	8%	3%	3%	4%
MONOCULTURES	3%	2%	1%	1%	0%	4%	2%

Source: Own study.

90% of the farms in FADN meet the conditions for recognising them as “green” based on the criterion of crop diversification. However, only 11% of farms are fully adjusted and meet the two essential criteria (diversification of crops and ecological area), while 79% of the FADN sample are farms with diversified structure of crops, but without the required ecological focus area. Among the farms which are not adjusted for diversification, 2% are farms with different crops in monoculture, and about 4% are farms with two plants of similar structure and farms with dominant main plant (over 70%). From the above it follows that the introduction of the requirement to diversify crops will not require significant adjustments to the structure of crop production (apart from the relatively small percentage of farms with a strongly simplified crop structures), and stronger production and financial effects may be brought about by increase in the ecological area to the level of 7% of arable land.

- Step 3 – Division of farms by economic size. For ranges of economic size expressed in standard output (SO) there are four classes of farms, of which three: small, medium and large, will be the subject of modelling (Table 1.3).

Table 1.3

Farm classes selected by economic size

Size class	nTF 14 corresponding size classes	SO size range (EUR)	Proportion of farms in the FADN sample in %	Proportion of farms represented by FADN in %
MICRO	1-2	< 4,000	1.3	4.1
SMALL	3-4	4,000 ≥ and < 15,000	29.8	64.1
MEDIUM	5-6	15,000 ≥ and < 50,000	48.2	14.2
LARGE	7-14	≥ 50,000	20.7	4.6
Total	x	x	100.0	87.0

Source: Own study based on “Analiza skutków...” Goraj L. et al. 2011 and FADN data.

- Step 4 – Selection of farms with similar crop structure. This step applied only to farms which were not adjusted for diversification of crops. As a result of the analysis of the crop structure, we defined 448 types of farms selected on the basis of the criteria of belonging to the production type, adjustment to the proposed requirements of the new CAP, economic size and the dominant crop in the crop structure.

The farms were also assigned a word describing the soil quality determined by the average index of soil quality¹¹, which allowed for aggregate results of model solutions due to this criterion:

- poor, if $SQI < 0.75$,
- average, if $0.75 \leq SQI < 1.0$,
- good, if $SQI \geq 1.00$.

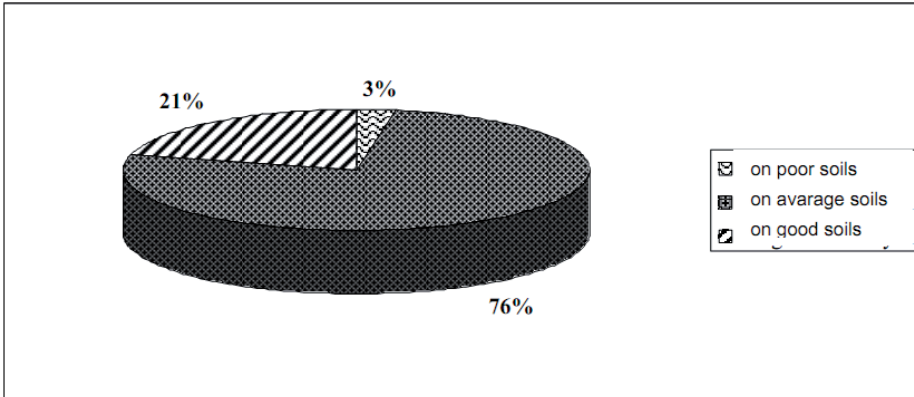
The structure of farms in the FADN sample with regard to the soil quality is shown on Figure 1.1.

In all types of farms, we specified an average value of parameters included in the optimization model, covering the area of permanent grassland and ecological focus area, which form, in addition to diversification of the crop structure, the basic requirements of greening. The estimated size of the ecological focus area includes land left fallow.

¹¹ Soil quality indicator is calculated by dividing the conversion area by the agricultural land area, expressed as physical hectares of the analysed farm.

Figure 1.1

Structure of farms in FADN sample with regard to soil quality



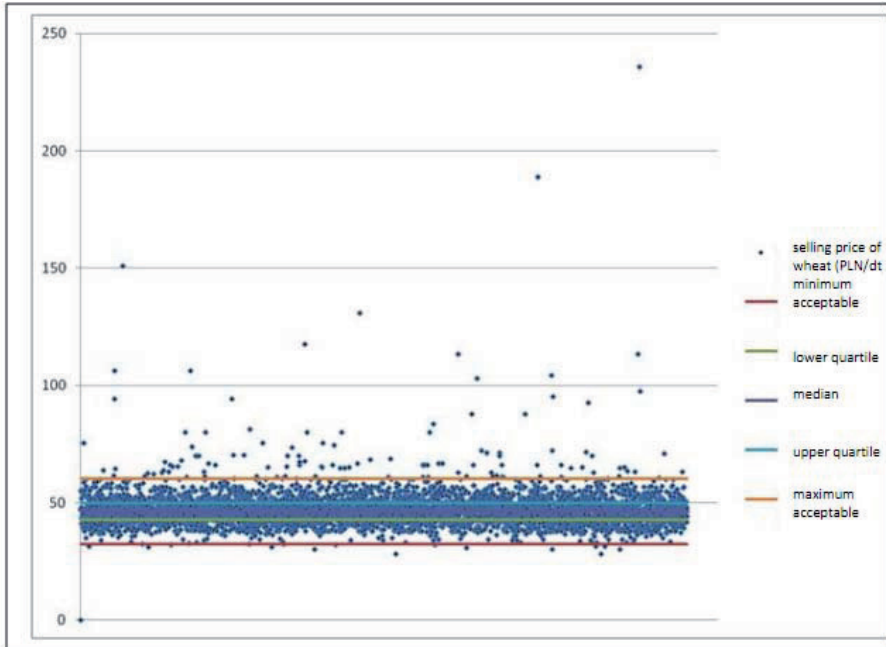
Source: Own study.

In the development of parameters for models based on FADN data it was found that there are outliers (abnormally high or low), especially in relation to variables such as marginal productivity, product prices, or some financial data from farms. Even if they are the result of special circumstances in a single farm (e.g. dramatically low yields due to adverse weather or an extremely high price of the product, if it comes from seed plantations), then with relatively low population of farms in each type of model farms, such values can strongly influence the average size of model parameters, thus distorting the results generalized to the general population, represented by FADN farms. Analysis of data from FADN indicated the presence of numerous data that significantly differ from the mean values. Due to the creation of model farms for the types, which often consisted of a small number of farms, it was necessary to reduce the impact of such data on the results of analyses. For this purpose, we used the procedure for the elimination of outliers, shown graphically in Figure 1.2.

Due to the wide variety of data distributions we decided to use non-parametric methods. Procedure consisted in determining the quartiles for each of the observed characteristics, then calculating the interquartile range and limits of the permissible value of characteristic. The acceptable minimum limit is the value of the first quartile minus 1.5 of value of the interquartile range or the lowest observed value, depending on which of them is greater. Similarly, the maximum permissible value of characteristic is the value of the third quartile plus 1.5 of interquartile range or the observed maximum value of characteristic, depending on which is lower.

Figure 1.2

Schematic diagram for the approach to the elimination of outliers in the FADN data set for model farms



Source: Own study.

The values of the characteristic appearing out of permissible range were replaced respectively by the maximum allowable value of characteristic for values above the permissible maximum or by the minimum acceptable value for values less than acceptable minimum. The above procedure was applied to crops, prices, productivity of animals, production values of residual crops (not subject to optimization) per 1 ha, and the values of animal production not subject to optimization per 1 LU.

1.2.2. FARM-OPTY agricultural farm model¹²

For each farm type we solved the optimization model with the use of analysed agricultural policy scenarios and calculated the average change in income resulting from the introduction of appropriate greening scenarios.

Structure of the model used in the calculations allows for optimization of the structure of crops and livestock production, reflecting the specific conditions

¹² FARM-OPTY model was developed in the Department of Economics and Organisation of Farms of the Warsaw University of Life Sciences.

of the different types of farms in order to maximize agricultural income. The objective function is:

$$DR = \mathbf{p}^T (\mathbf{x} \bullet \mathbf{y}) + \mathbf{s}^T \mathbf{x} + \mathbf{f}s - \mathbf{c}^T \mathbf{T}\mathbf{x} - \mathbf{f}c$$

provided that $Ax \leq B$, where:

DR – agricultural income (numerical value of objective function); *p* – vector of prices ($n \times 1$); *y* – vector of yields and productivity ($n \times 1$); *x* – non-negative vector of optimum levels of production activities ($n \times 1$); $\mathbf{x} \bullet \mathbf{y}$ – Hanamard product; *s* – vector of payments for production activities ($n \times 1$), *c* – vector of input prices ($z \times 1$); *T* – matrix for input consumption for individual activities ($z \times n$); *fc* – value of relatively fixed costs; *fs* – value of operational subsidies relatively independent of the level of production; *A* – resource utilization coefficient matrix ($m \times n$); *B* – vector of available resources ($m \times 1$).

In the process of optimisation the model enables us to determine the production structure based on the parameters entered for 23 crop production activities, complemented by non-productive activities (set aside, green manure in main crop, ecological infrastructure) dependent on a scenario and basic activities in animal production. When determining the boundary conditions of the model we assumed that the set of crops found in the base models will not be expanded with potentially high-yield activities (such as potatoes, sugar beets, vegetables, fruit, etc.), considering that the increase in acreage of these crops in the whole sector is limited by existing demand, technological barriers and skills at the level of a farm. In the greening variant of GREEN (-30%)_2014, with reduced area of cereals, we admitted the possibility of introducing or increasing the share of plants similar to cereals – rapeseed and legumes for grain.

Model solutions were prepared for 2014, the first year of the new budget perspective and the reformed CAP. This allowed us to disregard long-term trends in prices and marginal productivities in our considerations – we accepted assumption that in the short term these parameters will not change significantly in relation to the current state.

1.3. Results of model solutions

Farms with economic size over 3 SO, representing the most numerous production types of farms in Poland, were selected for modelling from a total of 448 separate types of farms, as shown in Table 1.4.

Types of farms for modelling are marked in Table 4 with “+”. For other farms marked with “k”, which were treated as residual, changes in income were determined using the calculation method. This group includes all farms from economic class 1-2 SO and orchard farms, which, due to small area or specific activities, are exempted from the obligation of greening, as well as others, e.g. poultry farms and other using nutritive fodder, which number is small in both the FADN sample, as well as in the general population of farms in Poland.

Table 1.4

Types of farms for modelling

Model type	Classes according to line of production	Name of line of production	Classes according to criterion of economic size (SO)						Proportion in FADN sample (%)	Proportion in FADN population (%)	
			1-2	3	4	5	6	7			8-14
			micro	small	medium	large					
Cereal	15	<i>Cereal</i>		+	+	+	+	+	+	8.7	3.5
Arable	16	<i>Field crops</i>		+	+	+	+	+	+	8.6	7.5
	61	<i>Mixed arable</i>		+	+	+	+	+	+	1.8	3.7
Mixed	73	<i>Mixed - cattle</i>	k	+	+	+	+	+	+	7.9	15.8
	74	<i>Mixed - pig</i>		+	+	+	+	+	+	8.4	11.8
	83	<i>Mixed - arable - cattle</i>		+	+	+	+	+	+	5.9	9.4
	84	<i>Other mixed</i>		+	+	+	+	+	+	13.8	16.3
Cattle	45	<i>Milk</i>	k	+	+	+	+	+	+	19.8	12.6
	46	<i>Cattle</i>		+	+	+	+	+	+	2.5	3.1
Pig	51	<i>Pig</i>		+	+	+	+	+	+	13.4	7.6
Other	48	<i>Sheep and goats</i>		k	k	k		k	k		0.5
	52	<i>Poultry</i>		k			k	k	k	1.1	1.1
	53	<i>Other</i>				k				0.1	0.2
	20	<i>Horticultural</i>	k	k	k	k	k	k	k	3.9	3.1
	30	<i>Orchard</i>	k	k	k	k	k	k	k	3.6	3
Proportion of farms in FADN sample (%)			1.4	10.4	19.4	21	27.2	14	6.5	100	
Proportion in the FADN farms (%)			4.2	37.6	29.5	15	9.1	3.4	1.2	100	

Source: Own study.

From the types created for modelling 338 were selected. Separate modelling types of farms were created on the basis of 10,966 farms from the FADN sample and represent 654,960 individual farms.

The remaining 110 types of farms classified to the group of residual farms were created on the basis of data from 1292 FADN farms representing 95,586 real farms in Poland.

Model results presented below (for 338 types of farms) are aggregated based on the weights constructed on the basis of proportion of each model type represented by farms in FADN sample. Since the structure of the FADN sample is different from the structure of the population in terms of characteristics other

than the economic size, these results cannot be fully generalized to the level of the country. Whilst the effects of the implementation of assumed changes in the CAP can be considered objectively estimated for farms from the FADN sample, the generalization of the results to the level of farm population represented by analyzed farms from the FADN sample using the variable SYS 02 (number of represented farms is 654 thousand) is approximate.

It should be noted that the method of sampling and the calculation method for the variable SYS 02 includes representativeness of the FADN sample with respect to the type of production, economic size and location of the farm. For this reason, the results of aggregation to the level of the represented population of farms, based on the typology of farms adopted in the study, which takes into account compliance with the requirements of greening the CAP, or the dominant share of crops, may be biased. However, due to the inability to determine the appropriate weights, they are the best alternative.

Table 1.5 shows the general characteristics of the types of model farms, distinguished by type of production and economic size of farms.

Table 1.5

Basic data characterizing the types of model farms distinguished by type of production and economic size for the FADN sample

Type of farm	Number of farms	Average area of agricultural land in ha	Proportion of permanent grassland in %	LU*/100 ha
Cereal	1,177	80.50	2.77	1.07
<i>small</i>	328	23.71	3.64	1.06
<i>medium</i>	567	70.04	2.57	1.35
<i>large</i>	212	222.96	2.79	0.83
Arable	1,209	39.59	4.80	4.30
<i>small</i>	475	11.10	8.67	4.66
<i>medium</i>	552	36.01	6.05	5.30
<i>large</i>	182	124.85	2.82	3.34
Cattle	2,943	28.98	36.08	63.77
<i>small</i>	506	11.15	37.53	42.01
<i>medium</i>	1,866	24.13	36.50	62.18
<i>large</i>	571	60.64	35.29	69.38
Pig	1,562	28.83	4.16	209.80
<i>small</i>	176	7.72	5.27	97.59
<i>medium</i>	599	17.90	5.64	138.87
<i>large</i>	787	41.88	3.64	237.50
Mixed	4,075	24.76	13.57	58.09
<i>small</i>	1,579	10.42	18.79	42.03
<i>medium</i>	1,943	23.98	14.68	58.31
<i>large</i>	553	68.45	9.93	64.80
Total	10,966	34.09	13.71	56.32
<i>small</i>	3,064	11.91	16.50	29.97
<i>medium</i>	5,527	29.30	16.12	44.25
<i>large</i>	2,305	76.11	10.91	72.95

* Livestock Unit in accordance with the conversion factors used by Eurostat.

Source: Own study.

In general, we used nearly 11 thousand farms from FADN database to distinguish types of model farms, of which the most numerous are mixed farms (with varying proportion of different species in animal production) and cattle farms. There is also a significant number of farms engaging mainly in plant production, which is the result of changes taking place in the Polish agriculture. On cereal farms, and on a slightly larger scale on arable farms, there is little animal production, which may be the result of the desire to use small areas of permanent grassland on these farms.

The average modelled farm in the FADN sample has an area of approximately 34 ha of agricultural land. It is not only greater than the national average, but also than the average area of farms in the FADN population (17.8 ha) according to the standard results of 2009. This difference is due to the disproportion between the share of farms according to the scale of production in the FADN sample and the population represented by them. Respectively, 30% of small, 49% of medium and 21% of large farms in the FADN sample and 70% of small, 25% of medium and 5% of large farms in the population they represent. In addition, this study omitted the smallest farms, but because of their small number in the FADN sample, it had little effect on the average area. The general characteristic of the types of farms with varying degrees of fulfilment of the greening requirements is shown in Table 1.6.

Of the entire sample of model farms, approximately 5% meet the basic requirements of greening (the share of ecological focus area at 7% and diversification of cropping patterns). Nearly 85% of farms have sufficiently diversified structure (these farms must allocate relevant part of the arable land to create ecological area) and other farms do not meet any of these conditions. The highest percentage of farms that fully or partially meet the requirements of greening is on cattle and mixed farms, which to some extent is due to their dominant share in the total population of farms (over 60% of analyzed population). But the main factor contributing to the diversification of crops is the need of fodder crops on arable land, supplementing, in relation to permanent grassland, the demand for forage for cattle.

Nearly 10% of model farms is characterized by a highly simplified structure of crops (including just over 1% of farms with crops in monoculture), which must introduce additional crops to achieve the greening conditions, while reducing the shares of plants grown on these farms.

Density and structure of livestock corresponds to the types of cattle and pig farms. On mixed farms, the predominant livestock are pigs. Small population, with the majority of pigs, is also found on cereal and arable farms.

Table 1.6

Basic data characterizing the isolated farm types with varying degrees of adaptation to the greening in the FADN sample

Description		Agricultural land in ha	Soil valuation	Number of animals (LU)**	including: cattle [%]	including: pigs [%]	Proportion of farms
Cereal	D+E	79.85	0.96	0.88	2.51	94.98	0.34
	D	86.32	0.98	1.04	12.37	75.31	7.72
	MONO	70.83	1.04	0.10	9.89	90.11	0.36
	50/50	63.53	1.19	0.37	2.63	97.37	1.32
	MAIN+	61.48	1.14	0.34	15.07	72.89	0.98
Arable	D+E	25.69	0.87	0.67	20.88	48.39	0.69
	D	42.25	1.08	1.89	21.94	68.63	9.30
	MONO	20.65	0.96	0.06	-	100	0.16
	50/50	29.17	0.99	0.52	10.85	57.79	0.28
	MAIN+	24.31	1.07	0.93	14.59	75.73	0.58
Cattle	D+E	26.26	0.54	11.89	95.32	1.90	1.67
	D	29.41	0.66	18.91	95.02	4.05	22.98
	MONO	24.11	0.72	21.59	99.72	0.25	0.31
	50/50	27.13	0.65	16.10	96.35	1.93	0.93
	MAIN+	26.73	0.59	21.10	98.31	1.36	0.95
Pig	D+E	31.46	0.69	59.44	0.24	99.45	0.45
	D	29.79	0.83	59.97	0.56	99.25	11.90
	MONO	18.07	0.73	55.93	0.32	99.67	0.18
	50/50	23.33	0.77	71.10	0.37	99.39	1.15
	MAIN+	21.33	0.68	52.16	0.51	98.72	0.57
Mixed	D+E	20.38	0.66	8.56	26.85	66.20	1.91
	D	25.47	0.82	15.15	26.12	69.92	33.06
	MONO	26.37	0.79	6.71	24.15	47.68	0.16
	50/50	17.23	0.79	8.05	15.64	80.78	0.99
	MAIN+	17.07	0.77	8.08	31.55	64.43	1.04
TOTAL	D+E	28	0.81	12.56	36.95	60.02	5.05
	D	34.51	0.91	19.71	32.99	65.34	84.97
	MONO	37.52	0.91	15.34	38.68	59.58	1.18
	50/50	34.51	0.96	22.51	15.21	84.04	4.68
	MAIN+	31.51	0.92	14.26	38.46	60.31	4.12
Total population		34.10	0.90	19.20	32.36	65.98	100.0

* "D+E" – fully adjusted farms, "D" – farms with a sufficient degree of diversification of crops, "MONO" – farms with monoculture, "50/50" – farms with two dominant crops, "MAIN+" – farms with dominant crop above 70% in the crop structure;

** Livestock Unit

Source: Own study.

Table 1.7 shows the result of model solutions for estimation of the impact of greening on financial results of farms. The modelling results are presented for different greening scenarios and for types of farms distinguished according to different criteria. The results refer to the average values for the specified farm types, so that the condition is met for presenting the results from FADN system at the aggregation level not lower than 15 farms.

Table 1.7

Effect of greening on the level of agricultural income in the population of farms from the FADN sample

Types of farms	BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Value in PLN	Baseline = 100	Value in PLN	Baseline = 100	Value in PLN	Baseline = 100	Value in PLN	Baseline = 100
According to types of production								
Cereal	168,817	100	157,848	93.5	157,254	93.2	148,189	87.8
Arable	97,162	100	90,480	93.1	92,758	95.5	87,119	89.7
Cattle	59,794	100	57,587	96.3	59,413	99.4	52,474	87.8
Pig	186,962	100	183,966	98.4	180,600	96.6	179,609	96.1
Mixed	63,308	100	61,374	96.9	61,392	97.0	57,278	90.5
According to economic size								
Small	22,660	100	21,710	95.8	21,657	95.6	19,854	87.6
Medium	67,983	100	65,115	95.8	65,711	96.7	60,546	89.1
Large	258,307	100	249,102	96.4	248,720	96.3	239,162	92.6
According to the degree of adaptation to greening								
D+E	59,980	100	59,582	99.3	59,262	98.8	59,932	99.9
D	96,038	100	92,500	96.3	93,071	96.9	87,022	90.6
50/50	112,614	100	106,877	94.9	104,060	92.4	103,335	91.8
MAIN+	91,661	100	87,507	95.5	85,153	92.9	82,956	90.5
MONO	115,830	100	99,976	86.3	96,964	83.7	105,738	91.3
According to soil quality								
Good	168,185	100	153,166	91.1	154,123	91.6	150,492	89.5
Medium	137,015	100	132,240	96.5	131,589	96.0	126,228	92.1
Poor	53,467	100	51,772	96.8	52,622	98.4	47,556	88.9
Population								
Total	95,035	100	91,383	96.2	91,588	96.0	86,461	91.0

Source: own study.

All greening scenarios involve lowering of the level of agricultural income compared to the Baseline reference model – in the base Green_2014 scenario by an average of 3.8 percentage points. In the case of scenarios Green_2014 and Green_ZB 2014, differing in the interpretation of the term “crop”, the drop in revenue is similar, reaching in the model farm population respectively 3.8 and 4.0 percentage points. The difference between the two variants of the model solutions is low mainly due to the high average degree of diversification of crops in Polish agriculture. Highly simplified structures of crops with a limited number of activities occur mainly in the relatively small group of cereal farms. Because of this, the variant that hypothetically is more limiting the freedom of selection of activities, in which all the cereals are one “crop” of the allowable 70% share in the structure (Green_ZB 2014), is somewhat less unfavourable for most types of model farms. The exceptions are primarily cattle farms and mixed farms with a large proportion of cattle and

farms with poor soils where agricultural incomes are rising slightly. This is due to the adoption of a reasonable, it would seem, assumption that at least in the first year of a greening policy, farmers will not be inclined to take more radical changes in the structure of production, if not necessary. According to this assumption, in the model for the Green_2014 scenario, the model boundary conditions were specified in such a way that the possibility of introducing new crops to the crop structure was limited. In the models for these types in Green_ZB 2014 scenario, due to the more restrictive boundary conditions for the proportion of cereals, it was necessary to loosen some restrictions on the model allowing for the introduction of new crops, especially rapeseed and legumes. Although it was assumed that the yield of new crops not existing on farms will be lower (by about 30%) compared to average values for a given type of soil, they were characterized by higher gross margin compared to extensive cereals (rye, cereals mixes). As a result, agricultural income on these farms was slightly increased. On farms breeding cattle, the model optimized, within the accepted limits, cattle feeding, replacing part of the forage area on arable land (maize silage) with less expensive grass from permanent grassland.

Model results indicate that the highest costs of greening are in the types of arable and cereal farms, as well as on farms on good soils and in these types of farms, which are characterized by a low degree of adjustment to greening, especially on farms with crops in monoculture. The largest decline in agricultural income in the whole population under study concerns farms with crop monoculture on good soils on which the replacement in part of the most cost-intensive and profitable activities (wheat, rapeseed) lowers the income to about 77% compared to the Baseline reference solution (Annex, Table 1).

On average, the Green (-30%)_2014 variant is far less favourable to farmers; it assumes the possibility of not complying with the requirements of greening and the resignation from 30% of direct payments per farm. In the scale of the whole population, while leaving the structure of production and revenues as in the Baseline scenario, the decline of income is 9 percentage points. The differences in the size of agricultural incomes between scenarios result in changes in the share of direct payments in agricultural income (Table 1.8).

Due to the increase in prices of some agricultural products in the past few years (mainly cereals), agricultural income in the Baseline scenario and greening scenarios are on average higher than in the base scenario for 2009. Changes in prices are beneficial mainly to crop farms (increase in revenue by about 70%) and to a lesser extent to the animal farms. Significantly higher incomes are achieved also on farms on good soils and on larger farms. This affects the proportion of direct payments – for all types of farms it is the highest in the base scenario and comparable in the Baseline scenario and in greening scenarios. In the GREEN (-30%)_2014 scenario, the share of payments in income is significantly lower. This is due to the fact that with the same income from

agricultural production as in the Baseline scenario, direct payments are reduced by 30% for failure to meet to greening requirements.

Table 1.8

Share of direct payments in agricultural income in the analyzed farms from the FADN sample

Types of farms	BASE_2009	BASELINE_2014	GREEN_2014	GREEN_ZB_2014	GREEN (-30%) 2014
According to types of production					
Cereal	76.0%	41.9%	44.8%	45.0%	33.9%
Arable	51.6%	35.8%	38.5%	37.5%	28.5%
Cattle	36.1%	42.6%	44.2%	42.9%	34.8%
Pig	14.2%	13.6%	13.8%	14.0%	10.0%
Mixed	38.3%	34.4%	35.5%	35.5%	27.1%
According to economic size					
Small	56.6%	45.2%	47.2%	47.3%	37.3%
Average	43.1%	37.9%	39.6%	39.2%	30.3%
Large	29.4%	25.9%	26.9%	26.9%	19.9%
According to the degree of adaptation to greening					
D	35.7%	31.6%	32.8%	32.6%	24.4%
D+E	45.3%	41.0%	41.3%	41.5%	41.1%
MONO	35.7%	28.5%	33.0%	34.0%	21.8%
50/50	34.3%	26.9%	28.4%	29.2%	20.6%
MAIN+	38.5%	30.2%	31.7%	32.5%	23.4%
According to soil quality					
Good	60.3%	34.9%	38.4%	38.1%	27.3%
Medium	33.5%	27.7%	28.7%	28.8%	21.3%
Poor	36.5%	38.8%	40.1%	39.5%	31.6%
Population					
Total	36%	31.5%	32.8%	32.7%	24.7%

Source: own study.

The implementation of greening requirements in model farms has a noticeable impact on the transformation in the structure of crops and production of major commodities (Tables 1.9 and 1.10). Both lists were limited to three scenarios – Baseline scenario and basic variants of the greening scenario (Green_2014 and Green_ZB_2014). In other model scenarios (Base and Green (-30%)_2014), both crop structure and the volume of production are the same as in Baseline_2014 scenario. In consideration for 2014, it was assumed that the level of individual performance will be the same as in the base year.

Table 1.9

Changes in the crop structure in model solutions in greening scenarios (on average on model farm from the FADN sample)

Description	BASELINE 2014		GREEN 2014		GREEN ZB 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%
Population						
Wheat	6.34	21.5	5.97	20.30	6.17	21
Other cereals	14.18	48.2	13.11	44.60	10.95	37.20
<i>Total cereals</i>	<i>20.52</i>	<i>69.7</i>	<i>19.08</i>	<i>64.80</i>	<i>17.12</i>	<i>58.20</i>
Legumes	0.39	1.3	0.36	1.20	1.57	5.30
Rapeseed	3.37	11.4	3.15	10.70	3.68	12.50
Other crops	4.87	16.6	4.68	15.90	4.87	16.50
EFA	0.27	0.9	2.15	7.30	2.19	7.40
TOTAL		100		100		100
Good soil						
Wheat	26.33	40.30	24.15	36.90	24.44	37.40
Other cereals	12.78	19.50	12.37	18.90	9.74	14.90
<i>Total cereals</i>	<i>39.1</i>	<i>59.80</i>	<i>36.53</i>	<i>55.90</i>	<i>34.18</i>	<i>52.30</i>
Legumes	0.82	1.30	0.75	1.10	2.33	3.60
Rapeseed	14.34	21.90	12.99	19.90	14.23	21.80
Other crops	10.95	16.70	10.58	16.20	10.1	15.50
EFA	0.17	0.30	4.54	6.90	4.54	6.90
TOTAL		100		100	1.44	100
Average soil						
Wheat	9.77	24.10	9.2	22.70	9.62	23.80
Other cereals	19.3	47.70	17.83	44	14.94	36.90
<i>Total cereals</i>	<i>29.08</i>	<i>71.80</i>	<i>27.03</i>	<i>66.70</i>	<i>24.57</i>	<i>60.60</i>
Legumes	0.64	1.60	0.59	1.50	2.57	6.40
Rapeseed	5.88	14.50	5.54	13.70	5.93	14.60
Other crops	4.58	11.30	4.44	11	4.53	11.20
EFA	0.33	0.80	2.91	7.20	2.91	7.20
TOTAL		100		100		100
Poor soil						
Wheat	1.68	9.90	1.63	9.60	1.65	9.70
Other cereals	10.03	59.20	9.25	54.60	7.72	45.60
<i>Total cereals</i>	<i>11.71</i>	<i>69.10</i>	<i>10.89</i>	<i>64.20</i>	<i>9.37</i>	<i>55.30</i>
Legumes	0.14	0.80	0.13	0.80	0.66	3.90
Rapeseed	0.29	1.70	0.28	1.70	0.85	5
Other crops	4.57	27	4.35	25.70	4.68	27.60
EFA	0.24	1.40	1.3	7.70	1.38	8.10
TOTAL		100		100		100

Source: own study.

Transformations in the structure of crops result from the constraints on the number of crops and their maximum share in the crop structure, as well as the need to exclude 7% of arable land from use. As a result, in the basic variant of the greening scenario (Green_2014), the proportion of all major crops is decreasing, except for the most cost-effective crops, such as potatoes, sugar beet and vegetables and fruits in field cultivation. In the scale of the entire population, the area of cereals, dominant in the base crop structure, is reduced to

the greatest extent (by nearly 5 percentage points), with the smallest reduction recorded for wheat. On farms with different soil quality, the essential relationships are similar, except that on good soils the area of wheat and rapeseed is reduced to a greater extent due to their high share in the crop structure, taking into account the numerous crops in monoculture on good soils. On poor soils, the share of the most profitable crops of wheat and rapeseed remains at the similar level; other cereals are sacrificed to create the required ecological focus area.

A more significant reduction in the proportion of cereals in crop structure takes place in the Green_ZB_2014 scenario – from nearly 70% in the base scenario to about 58%. Released shares of cereals in crop structure are occupied by other plants in model solutions after the creation of 7% of ecological focus area. The share of wheat and rapeseed is at a level similar to the original, while the area of legumes is increasing, especially on farms with poor soils, where, within the accepted limits, they are the only alternative crop that allows full use of existing arable land. The model increases the proportion of leguminous crops, despite the fact that for the farms where they were not cultivated, it was assumed that yields and selling prices would be lower than the average for FADN population. It seems that this assumption is justified, assuming the introduction of new activities on the farm, as well as significant increase in supply that results from the model solutions.

Transformations in the structure of crops due to restrictions placed on the number of crops and their maximum size, and the need to exclude parts of arable land from use for production purposes, result in changes in the volume of production (Table 1.10). As in the case of crop structure, the differences concern only Green_2014 and Green_ZB_2014 scenarios, as other scenarios adopted the structure of production of the base year.

Table 1.10

Volume of production of major crops on average per analyzed farm from the FADN sample

Crops	BASELINE 2014		GREEN 2014		GREEN ZB 2014	
	Production in tonnes	Baseline =100	Production in tonnes	Baseline =100	Production in tonnes	Baseline =100
Wheat	34.01	100	32.01	94	33.12	97
Barley	13.22	100	12.08	91	9.15	69
Triticale	16.80	100	15.76	94	14.83	88
Rye	7.20	100	6.71	93	4.74	66
Oats and other	13.43	100	12.32	92	10.29	77
Maize	7.41	100	6.82	92	6.77	91
Legumes	0.92	100	0.85	93	3.80	415
Rapeseed	10.97	100	10.27	94	11.78	107

Source: Own study.

Compared to the base year, as well as the Baseline scenario, the model solution for the basic greening scenario (Green_2014) relatively uniformly reduced production of all types of cereals, rapeseed and legumes. In the scenario that limits the area under cereals to a greater extent (Green_ZB_2014), there is a significant decrease in the production of barley, rye and oats, with a slight increase in production of wheat and rapeseed. In the absence of other possibilities to supplement crop structure, in model solutions for this scenario, the production of legumes increases more than four times in relation to the Baseline scenario.

The modelling results generalized to the general population of farms represented by the analyzed farms from the FADN sample are shown in Tables 1.11 and 1.12.

Table 1.11

Structure of crops and changes in agricultural income for the population of farms represented by farms from the FADN sample

Description	BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	[ha/farm]	share [%]	[ha/farm]	share [%]	[ha/farm]	share [%]	[ha/farm]	share [%]
Wheat	2.41	17.4%	2.29	16.5%	2.34	16.9%	2.41	17.4%
Other cereals	7.85	56.7%	7.24	52.3%	6.04	43.7%	7.85	56.7%
Total cereals	10.25	74.1%	9.53	68.8%	8.38	60.6%	10.25	74.1%
Legumes	0.20	1.5%	0.19	1.4%	0.83	6.0%	0.20	1.5%
Rapeseed	0.83	6.0%	0.77	5.5%	1.12	8.1%	0.83	6.0%
Other crops	2.39	17.3%	2.33	16.8%	2.41	17.4%	2.39	17.3%
EFA	0.17	1.2%	1.03	7.5%	1.10	7.9%	0.17	1.2%
Share of direct payments in income	[PLN/farm]		[PLN/farm]		[PLN/farm]		[PLN/farm]	
	14,739	36.4%	14,739	37.7%	14,739	37.6%	10,602	29.1%
Agricultural income	40,485	100%	39,078	96.5%	39,216	96.9%	36,389	89.9%

Source: Own study (average weight by number of represented farms - variable SYS02).

The different types of farms with different levels of greening are not equally represented in the FADN population and in the general population, which results among other things, in differences in the share of fully adjusted types (slightly larger share of type “D + E” in the FADN population) and diversified types (slightly smaller share of type “D”). Despite this, the aggregated results to the scale of the population represented in the FADN show the same dependence with respect to the financial consequences of greening and directions of shifts in the crop structure. By analyzing changes in the crop structure, one can see that the inclusion of the number of represented farms as weights in the aggregation process increases the share of cereals in crop structure in the base scenario. Therefore, after introducing greening

requirements to model solutions, the share of cereals in the population of represented farms decreases more than in the FADN sample, but to the area of wheat is decreasing less. Regardless of the method of aggregating the results, in variant Green_ZB 2014 the area under rapeseed and legumes is increasing. Average decline in income in the population of represented farms is similar to FADN population. Aggregation of the results to the scale of the FADN farm population and the general population leads to very close relationships when it comes to changes in production volume (Table 12).

Table 1.12

Production of basic agricultural crops in tonnes per 1 farm in the analyzed scenarios

Crops	BASELINE 2014	GREEN_2014 baseline =100	GREEN_ZB_2014 baseline =100
Wheat	11.81	11.18	95%
Barley	5.86	5.35	91%
Triticale	8.42	7.87	93%
Rye	3.78	3.52	93%
Oats and other	8.96	8.21	92%
Maize	1.61	1.49	93%
Legumes	0.44	0.42	95%
Rapeseed	2.62	2.43	93%

Source: Own study (average weight by number of represented farms - variable SYS02).

Although optimum solutions exclude the least profitable crops from production in a given type of farms, the aggregated production shows a decline for all crops. In the case of farms with good soils, in which the intensive and most profitable crops grow there is a relatively large decrease in the production of wheat, rapeseed and maize for grain. At the same time, due to the maximum allowed 70% share of the most important crop, less profitable plants are used in these farms to diversify cropping patterns. On farms with average and poor soils, plants such as cereals, rye, barley and oats, characterized by relatively low profitability, are more often displaced by ecological focus area than wheat and rapeseed. Despite the relatively low profitability, legumes are an attractive alternative to cereals on farms with poor soils, but in extreme cases, even on poor soils wheat and rapeseed enter the model solutions as a complement to crop structure.

Almost five-fold increase in the production of legumes - in Green_ZB 2014 scenario could give rise to doubts as to the feasibility of selling, even at low prices, such quantities of legumes. In light of the recent interpretation of the term “crop” in the greening proposals, this scenario should be treated as a benchmark, because the likelihood of its implementation in practice is negligible.

1.4. Summary

The reform of the common agricultural policy of the EU for the period 2014-2020 covers many aspects, as evidenced by regulatory proposals for the new budget perspective:

- Proposal for a Regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy (“the direct payments regulation”);
- Proposal for a Regulation of the European Parliament and of the Council establishing a common organisation of the markets in agricultural products (Single CMO Regulation) (“the Single CMO regulation”);
- Proposal for a Regulation of the European Parliament and of the Council on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) (“the rural development regulation”);
- Proposal for a Regulation of the European Parliament and of the Council on the financing, management and monitoring of the common agricultural policy (“the horizontal regulation”);
- Proposal for a Council regulation determining measures on fixing certain aids and refunds related to the common organisation of the markets in agricultural products;
- Proposal for a Regulation of the European Parliament and of the Council amending Council Regulation (EC) No 73/2009 as regards the application of direct payments to farmers in respect of the year 2013;
- Proposal for a Regulation of the European Parliament and of the Council amending Council Regulation (EC) No 1234/2007 as regards the regime of the single payment scheme and support to vine-growers.

Important elements of the reformed CAP will be the changes in the distribution of support measures for agriculture between Member States, the coverage of the increasing volatility of the market conditions with agricultural policy, and better targeting of measures aiming at addressing environmental challenges.

The current reform proposal assumes that the new CAP will address future challenges to the agricultural sector and will be compatible with the basic objectives of the CAP related primarily to:

- viable food production;
- sustainable management of natural resources and climate action;
- balanced territorial development¹³.

¹³ European Commission, *Impact assessment. Common Agricultural Policy towards 2020*, Annex 2: Greening of the CAP, Commission Staff Working Paper, SEC(2011) 1153 final/2, Brussels.

The objectives of the reformed agricultural policy of the EU will be achieved through effective use of resources while maintaining agricultural support from the existing two pillars of the CAP. The documents of the European Commission conclude at the same time that “this reform accelerates the process of integration of environmental requirements. It introduces a strong greening component into the first pillar of the CAP for the first time thus ensuring that all EU farmers in receipt of support go beyond the requirements of *cross compliance* and deliver environmental and climate benefits as part of their everyday activities”. Making 30% of direct payments dependant on greening is to ensure achieving these benefits through the retention of soil carbon, protection of species on permanent grassland (grassland habitats associated with permanent grassland), protection of waters and habitat protection through the establishment of ecological focus areas and the improvement of the resilience of the soil and ecosystems through diversification of crops.

Since the announcement of the European Commission's proposal, greening of the CAP is the subject of intense and sometimes emotional debate. For many stakeholders involved in this discussion the concept of greening seems to be controversial, because it does not stress environmental objectives strongly enough, or rather, imposing too restrictive limits interfering with the organisation of agricultural holdings. One of the important reasons for the existence of the controversy is the lack of reliable and comprehensive assessments of the effects of greening, in particular in relation to the expected environmental benefits. Although there are numerous positive effects of greening to the environment, including those mentioned in the Impact Assessment, they are merely of general regularity. At the same time the expected effects are assessed as doubtful due to the relatively stringent requirements of greening. For example, it is stressed that the diversification of crops within the meaning of the European Commission's proposal is different from "crop rotation", which requires crop rotation in the meaning of cultivating plants on various fields in the coming years. Thus, the benefits of diversification of crops will not be of the kind that one would expect from agriculturally proper crop rotation¹⁴.

¹⁴ Crop diversification, however, differs significantly from crop rotation: the crop diversification measure proposed states that a farmer must have three different crops on his or her land, with no crop covering more than 70%, or less than 5%, of the total arable area. The measure, however, does not include any requirements to apply agronomic practices, such as specifying the appropriate types of crops, or rotating different crops in the same field that would deliver genuine benefits for farmers. Moreover the limits set in the proposal will not change monoculture cropping practices found in a many cereal-based cropping systems across Europe. Under the current proposals a farmer with 100 ha of land could plant 70 ha of maize, 25 ha of wheat and 5 ha of barley annually, and repeat that over subsequent years. This type of “diversification” would not be enough to break monocultures, or result in the agronomic and environmental benefits of rotations in annual cropping systems. “Crop rotation.

Supporters of strong environmental protection are also critical of attempts to alleviate the greening requirements and of optional solutions that arise in the ongoing discussion, concluding that they would lead to the continuation of financial support for agriculture "without providing any environmental effects"¹⁵.

As regards the issue of production and financial effects, the analyses made so far, including the estimates presented in this study for Polish agriculture, indicate that the agricultural sector of the European Union will bear the costs of greening, not compensated in the short term by the increase in productivity of production factors, or the expected increase in prices of certain agricultural products. In the absence of any convincing arguments for the positive, long-term effects of greening, it seems rational to argue that this is in contradiction with one of the main objectives of the CAP, i.e. ensuring the viability of food producers. Moreover, it can mean a decrease in the share of EU agriculture in meeting the growing global demand for agricultural products. Thus it causes understandable criticism from pro-production part of the farming community.

The estimates of greening effects presented in this paper for Polish agriculture indicate that in the first year of implementing the reformed CAP, there would be a reduction in farm income by about 3-4 percentage points compared to the scenario without changes in agricultural policy [Baseline_2014]. This would be primarily due to exclusion of part of arable land for the creation of ecological focus area and changes in crop structure, necessary to meet the condition of crop diversification.

The analysis, carried out on the basis of the initial European Commission's proposal, known as the "integration scenario", assumes several variants of greening scenarios. The results of calculations relate to 2014, adopted as the first year of the CAP reform. In determining the parameters for the model calculations, it was established, in this connection, that compared to the Baseline scenario (no greening), adjustments to greening requirements will have impact on changes in the structure of production, but will not cause significant changes in the development of the agricultural product prices and costs.

The results of the analyses are presented for different types of farms selected from the FADN farm population after aggregation with SYS02 parameter and, in the synthetic approach, in the scale of the general population of farms represented by the analysed part of FADN population. In the process of aggregation, the results obtained for individual types of farms have been averaged. As a result, the differences in the crop structure between the scenarios

Benefiting farmers, the environment and the economy". http://www.foe.co.uk/resource/reports/crop_rotation_2012.pdf

¹⁵ "...keep pumping money into the pockets of farmers without any environmental delivery being assured". Ariel Brunner, BirdLife, "Leaked council paper suggests attempt to kill the greening of the CAP", Media Release, [Brussels, April 30, 2012].

for aggregated values are smaller than those observed at the level of the modelled individual types of farms.

Comparison of the results indicates that the most advantageous to the farmers, because of the level of agricultural income, would be continuation of the current CAP [Baseline_2014]. Implementation of the requirements of greening the CAP results in a slight decrease in agricultural income in the analyzed population of farms (3-4 percentage points). On average, it is not a rational choice to not comply with the terms of greening, and resign from 30% of direct payments (agricultural income decline by more than 9 percentage points). The exception are arable farms with good soils, where reduction in the area under highly profitable crops and diversification of cropping patterns lead to decreased revenue, despite obtaining the full rate of payment.

In view of the relatively high degree of diversification of crops in Polish agriculture, except for some crop farms, the main determinant of changes in plant production is the need for delimitation of ecological focus area. Assuming that the estimated size of ecological focus area is now on average ca. 1%, it means that almost 6% of arable land would have to be excluded from agricultural use.

While diversification leads to shifts in crop structure, the requirement of 7% of ecological focus area is the main driving force of the decline in agricultural income and reduced production in Polish agriculture. This condition is particularly controversial given the fact that in Poland there is a relatively small share of good soils in the structure of arable land. Farms on good soils have significantly lower percentage of areas recognised as ecological focus area than farms with poor soils (Table 1.9). This causes, for example, that, despite the slight decrease in the area under wheat in model solutions, there is a significant decrease in the volume of wheat production. This is due to restrictions on the cultivation on good soils, and at the same time growing this crop on farms with average and poor soils. With regard to the efficiency of using production factors it is an irrational action, which weakens competitiveness of the EU agriculture.

ANNEX

Aggregated values for the analyzed farms from FADN population

Table 1.1a. Changes in the area of selected crops in types of farms by soil type in the analyzed farms from the FADN sample

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Good soil										
Wheat	25.90	39.6	26.33	40.3	24.15	36.9	24.44	37.4	26.33	40.3
Other cereals	12.78	19.5	12.78	19.5	12.37	18.9	9.74	14.9	12.78	19.5
Legumes	0.82	1.3	0.82	1.3	0.75	1.1	2.33	3.6	0.82	1.3
Rapeseed	14.59	22.3	14.34	21.9	12.99	19.9	14.23	21.8	14.34	21.9
Other crops	12.74	17.3	12.56	17.0	16.56	23.1	16.08	22.4	12.56	17.0
Average soil										
Wheat	9.71	24.0	9.77	24.1	9.20	22.7	9.62	23.8	9.77	24.1
Other cereals	19.30	47.6	19.30	47.7	17.83	44.0	14.94	36.9	19.30	47.7
Legumes	0.65	1.6	0.64	1.6	0.59	1.5	2.57	6.4	0.64	1.6
Rapeseed	5.89	14.5	5.88	14.5	5.54	13.7	5.93	14.6	5.88	14.5
Other crops	7.57	12.2	7.52	12.1	9.96	18.1	10.05	18.4	7.52	12.1
Poor soil										
Wheat	1.66	9.8	1.68	9.9	1.63	9.6	1.65	9.7	1.68	9.9
Other cereals	10.02	59.1	10.03	59.2	9.25	54.6	7.72	45.6	10.03	59.2
Legumes	0.15	0.9	0.14	0.8	0.13	0.8	0.66	3.9	0.14	0.8
Rapeseed	0.29	1.7	0.29	1.7	0.28	1.7	0.85	5.0	0.29	1.7
Other crops	11.52	28.5	11.49	28.4	12.34	33.3	12.75	35.8	11.49	28.4

Table 1.1b. Changes in the area of selected crops in types of farms by economic size in the analyzed farms from the FADN sample

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
small										
Wheat	1.96	20.1	1.97	20.2	1.84	18.9	1.87	19.2	1.97	20.2
Other cereals	5.48	56.4	5.49	56.4	5.09	52.3	4.15	42.7	5.49	56.4
Legumes	0.15	1.6	0.15	1.6	0.15	1.5	0.71	7.3	0.15	1.6
Rapeseed	0.50	5.1	0.49	5.0	0.46	4.7	0.71	7.3	0.49	5.0
Other crops	3.56	16.8	3.55	16.8	4.12	22.6	4.21	23.5	3.55	16.8
medium										
Wheat	4.82	19.6	4.87	19.8	4.60	18.7	4.73	19.2	4.87	19.8
Other cereals	12.38	50.4	12.39	50.4	11.44	46.5	9.47	38.5	12.39	50.4
Legumes	0.38	1.6	0.37	1.5	0.34	1.4	1.33	5.4	0.37	1.5
Rapeseed	2.22	9.0	2.21	9.0	2.04	8.3	2.60	10.6	2.21	9.0
Other crops	9.50	19.4	9.46	19.3	10.87	25.0	11.18	26.3	9.46	19.3
large										
Wheat	15.65	23.1	15.80	23.3	14.84	21.9	15.48	22.8	15.80	23.3
Other cereals	30.27	44.6	30.30	44.7	28.04	41.3	23.73	35.0	30.30	44.7
Legumes	0.76	1.1	0.75	1.1	0.70	1.0	3.29	4.9	0.75	1.1
Rapeseed	10.09	14.9	10.04	14.8	9.47	14.0	10.30	15.2	10.04	14.8
Other crops	19.33	16.3	19.20	16.1	23.06	21.8	23.29	22.1	19.20	16.1

Table 1.1c. Changes in the area of selected crops in types of farms by production type in the analyzed farms from the FADN sample

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Cereal										
Wheat	25.52	32.6	25.60	32.7	23.68	30.3	24.69	31.5	25.60	32.7
Other cereals	32.30	41.3	32.32	41.3	30.30	38.7	24.92	31.8	32.32	41.3
Legumes	0.93	1.2	0.91	1.2	0.83	1.1	4.48	5.7	0.91	1.2
Rapeseed	16.79	21.5	16.74	21.4	15.92	20.3	16.62	21.2	16.74	21.4
Other crops	4.96	3.5	4.93	3.5	9.77	9.6	9.79	9.7	4.93	3.5
Arable										
Wheat	10.88	28.9	11.11	29.5	10.27	27.2	10.95	29.1	11.11	29.5
Other cereals	9.25	24.5	9.26	24.6	8.57	22.7	7.14	19.0	9.26	24.6
Legumes	0.71	1.9	0.70	1.9	0.64	1.7	0.97	2.6	0.70	1.9
Rapeseed	5.51	14.6	5.39	14.3	4.92	13.1	5.49	14.6	5.39	14.3
Other crops	13.25	30.1	13.14	29.8	15.19	35.3	15.03	34.8	13.14	29.8
Cattle										
Wheat	1.52	8.2	1.56	8.4	1.50	8.1	1.53	8.2	1.56	8.4
Other cereals	8.91	48.1	8.94	48.2	8.23	44.4	6.83	36.8	8.94	48.2
Legumes	0.13	0.7	0.12	0.7	0.11	0.6	0.21	1.2	0.12	0.7
Rapeseed	0.24	1.3	0.25	1.3	0.24	1.3	0.91	4.9	0.25	1.3
Other crops	18.18	41.7	18.12	41.4	18.92	45.6	19.52	48.9	18.12	41.4
Pig										
Wheat	3.75	13.6	3.75	13.6	3.68	13.3	3.67	13.3	3.75	13.6
Other cereals	20.26	73.3	20.27	73.3	18.72	67.7	15.03	54.4	20.27	73.3
Legumes	0.41	1.5	0.40	1.5	0.38	1.4	3.49	12.6	0.40	1.5
Rapeseed	1.73	6.3	1.74	6.3	1.64	5.9	2.05	7.4	1.74	6.3
Other crops	2.69	5.4	2.68	5.3	4.43	11.7	4.60	12.3	2.68	5.3
Mixed										
Wheat	3.76	17.6	3.80	17.8	3.68	17.2	3.71	17.4	3.80	17.8
Other cereals	11.85	55.4	11.86	55.4	10.88	50.8	9.45	44.2	11.86	55.4
Legumes	0.34	1.6	0.33	1.6	0.31	1.5	1.14	5.3	0.33	1.6
Rapeseed	1.78	8.3	1.78	8.3	1.62	7.6	2.02	9.5	1.78	8.3
Other crops	7.03	17.1	6.99	17.0	8.27	22.9	8.43	23.7	6.99	17.0

Table 1.1.d. Changes in the area of selected crops in types of farms by degree of adjustment in the analyzed farms from the FADN sample

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
D+E										
Wheat	3.01	14.5	3.01	14.5	2.97	14.3	2.97	14.3	3.01	14.5
Other cereals	10.01	48.1	10.05	48.3	10.07	48.4	9.14	43.9	10.05	48.3
Legumes	0.20	1.0	0.16	0.7	0.16	0.8	0.58	2.8	0.16	0.7
Rapeseed	1.63	7.8	1.63	7.8	1.61	7.7	1.82	8.8	1.63	7.8
Other crops	13.15	28.7	13.15	28.6	13.19	28.8	13.50	30.3	13.15	28.6
D										
Wheat	6.14	20.5	6.20	20.7	5.88	19.6	6.15	20.5	6.20	20.7
Other cereals	14.47	48.3	14.48	48.3	13.27	44.3	11.14	37.2	14.48	48.3
Legumes	0.44	1.5	0.43	1.4	0.40	1.3	1.51	5.0	0.43	1.4
Rapeseed	3.46	11.6	3.45	11.5	3.24	10.8	3.75	12.5	3.45	11.5
Other crops	10.01	18.2	9.96	18.0	11.74	24.0	11.97	24.8	9.96	18.0
50/50										
Wheat	9.47	31.0	9.49	31.1	8.59	28.1	8.26	27.0	9.49	31.1
Other cereals	13.81	45.2	13.80	45.2	13.45	44.1	10.43	34.2	13.80	45.2
Legumes	0.09	0.3	0.08	0.3	0.07	0.2	2.41	7.9	0.08	0.3
Rapeseed	5.33	17.4	5.33	17.4	4.70	15.4	5.52	18.1	5.33	17.4
Other crops	5.82	6.0	5.81	6.0	7.69	12.2	7.89	12.8	5.81	6.0
MAIN+										
Wheat	9.77	36.2	9.78	36.2	8.98	33.3	8.76	32.5	9.78	36.2
Other cereals	11.38	42.2	11.39	42.2	10.75	39.9	8.40	31.1	11.39	42.2
Legumes	0.23	0.9	0.22	0.8	0.19	0.7	2.08	7.7	0.22	0.8
Rapeseed	2.38	8.8	2.38	8.8	2.29	8.5	2.87	10.6	2.38	8.8
Other crops	7.76	11.9	7.75	11.9	9.31	17.7	9.41	18.0	7.75	11.9
MONO										
Wheat	5.86	18.7	5.86	18.7	4.18	13.4	4.15	13.3	5.86	18.7
Other cereals	21.38	68.3	21.44	68.5	22.20	71.0	16.06	51.4	21.44	68.5
Legumes	0.27	0.9	0.20	0.6	0.18	0.6	4.66	14.9	0.20	0.6
Rapeseed	0.93	3.0	0.93	3.0	0.67	2.1	2.16	6.9	0.93	3.0
Other crops	9.09	9.1	9.09	9.1	10.29	12.9	10.49	13.6	9.09	9.1

Table 1.1e. Changes in the area of selected crops in types of farms by production type and economic size in the analyzed farms from the FADN sample

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Cereal small										
Wheat	6.31	33.5	6.31	33.5	5.81	30.9	5.81	30.9	6.31	33.5
Other cereals	8.88	47.2	8.90	47.3	8.41	44.7	6.40	34.0	8.90	47.3
Legumes	0.23	1.2	0.22	1.2	0.21	1.1	2.06	10.9	0.22	1.2
Rapeseed	2.63	14.0	2.63	14.0	2.47	13.1	2.62	13.9	2.63	14.0
Other crops	1.48	4.1	1.47	4.1	2.62	10.1	2.65	10.3	1.47	4.1
Cereal medium										
Wheat	20.58	30.2	20.71	30.3	19.68	28.8	19.83	29.1	20.71	30.3
Other cereals	30.71	45.0	30.73	45.0	28.71	42.1	23.71	34.7	30.73	45.0
Legumes	1.23	1.8	1.20	1.8	1.10	1.6	4.98	7.3	1.20	1.8
Rapeseed	12.99	19.0	12.89	18.9	11.96	17.5	12.89	18.9	12.89	18.9
Other crops	4.53	4.0	4.51	4.0	8.59	10.0	8.63	10.0	4.51	4.0
Cereal large										
Wheat	74.83	34.5	74.90	34.6	67.92	31.3	73.15	33.8	74.90	34.6
Other cereals	80.52	37.2	80.52	37.2	75.64	34.9	62.93	29.0	80.52	37.2
Legumes	1.44	0.7	1.41	0.7	1.29	0.6	7.66	3.5	1.41	0.7
Rapeseed	53.55	24.7	53.55	24.7	51.77	23.9	52.90	24.4	53.55	24.7
Other crops	12.62	3.0	12.57	2.9	26.33	9.3	26.31	9.3	12.57	2.9
Arable small										
Wheat	2.44	24.0	2.46	24.3	2.27	22.4	2.39	23.6	2.46	24.3
Other cereals	3.35	33.1	3.36	33.1	3.12	30.7	2.63	25.9	3.36	33.1
Legumes	0.19	1.9	0.18	1.8	0.17	1.7	0.48	4.7	0.18	1.8
Rapeseed	0.46	4.5	0.44	4.3	0.40	4.0	0.48	4.7	0.44	4.3
Other crops	4.67	36.5	4.66	36.5	5.14	41.2	5.13	41.1	4.66	36.5
Arable medium										
Wheat	9.18	27.1	9.28	27.4	8.45	25.0	9.22	27.3	9.28	27.4
Other cereals	9.41	27.8	9.41	27.8	8.74	25.9	7.03	20.8	9.41	27.8
Legumes	0.56	1.6	0.54	1.6	0.50	1.5	0.96	2.9	0.54	1.6
Rapeseed	3.77	11.1	3.77	11.1	3.46	10.2	3.83	11.3	3.77	11.1
Other crops	13.09	32.3	13	32.0	14.85	37.5	14.96	37.8	13	32.0
Arable large										
Wheat	38.06	31.4	39.20	32.3	36.64	30.2	38.55	31.8	39.20	32.3
Other cereals	24.14	19.9	24.16	19.9	22.27	18.4	19.30	15.9	24.16	19.9
Legumes	2.55	2.1	2.55	2.1	2.31	1.9	2.29	1.9	2.55	2.1
Rapeseed	23.96	19.7	23.26	19.2	21.18	17.5	23.60	19.5	23.26	19.2
Other crops	36.13	26.9	35.66	26.5	42.45	32.1	41.11	31.0	35.66	26.5
Cattle small										
Wheat	0.59	8.4	0.59	8.4	0.56	8.0	0.57	8.2	0.59	8.4
Other cereals	4.48	64.4	4.48	64.3	4.13	59.2	3.47	49.8	4.48	64.3
Legumes	0.09	1.3	0.09	1.3	0.09	1.3	0.35	5.0	0.09	1.3
Rapeseed	0	0.1	0	0.1	0	0.1	0.33	4.7	0	0.1
Other crops	5.98	25.8	5.99	25.9	6.38	31.5	6.44	32.3	5.99	25.9
Cattle medium										
Wheat	1.22	8.0	1.25	8.2	1.19	7.8	1.22	7.9	1.25	8.2
Other cereals	7.97	52.0	7.98	52.0	7.32	47.8	5.97	38.9	7.98	52.0
Legumes	0.13	0.8	0.12	0.8	0.10	0.7	0.20	1.3	0.12	0.8
Rapeseed	0.12	0.8	0.13	0.8	0.13	0.8	0.76	4.9	0.13	0.8
Other crops	14.70	38.4	14.67	38.2	15.40	43.0	16.01	46.9	14.67	38.2
Cattle large										
Wheat	3.33	8.5	3.43	8.7	3.32	8.5	3.38	8.6	3.43	8.7
Other cereals	15.93	40.6	16.03	40.8	14.80	37.7	12.60	32.1	16.03	40.8
Legumes	0.18	0.5	0.18	0.5	0.16	0.4	0.15	0.4	0.18	0.5
Rapeseed	0.84	2.1	0.84	2.1	0.83	2.1	1.94	4.9	0.84	2.1
Other crops	40.36	48.3	40.16	47.8	41.52	51.3	42.57	53.9	40.16	47.8

Table 1.1e. Changes in the area of selected crops in types of farms by production type and economic size in the analyzed farms from the FADN sample: cont.

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Pig small										
Wheat	0.71	9.7	0.71	9.7	0.69	9.4	0.69	9.4	0.71	9.7
Other cereals	6.14	83.8	6.14	83.9	5.71	78.0	4.40	60.2	6.14	83.9
Legumes	0.09	1.2	0.09	1.2	0.08	1.1	0.29	3.9	0.09	1.2
Rapeseed	0.03	0.4	0.03	0.4	0.02	0.3	0.38	5.1	0.03	0.4
Other crops	0.76	4.9	0.76	4.9	1.22	11.2	1.96	21.3	0.76	4.9
Pig medium										
Wheat	1.87	11.1	1.87	11.1	1.84	10.9	1.84	10.9	1.87	11.1
Other cereals	13.48	79.8	13.48	79.8	12.48	73.9	9.80	58.0	13.48	79.8
Legumes	0.24	1.4	0.23	1.4	0.21	1.2	2.30	13.6	0.23	1.4
Rapeseed	0.41	2.4	0.41	2.4	0.39	2.3	0.97	5.8	0.41	2.4
Other crops	1.90	5.3	1.91	5.3	2.99	11.7	2.99	11.7	1.91	5.3
Pig large										
Wheat	5.86	14.5	5.86	14.5	5.74	14.2	5.73	14.2	5.86	14.5
Other cereals	28.58	70.8	28.59	70.9	26.38	65.3	21.38	53.0	28.59	70.9
Legumes	0.61	1.5	0.60	1.5	0.58	1.4	5.11	12.7	0.60	1.5
Rapeseed	3.12	7.7	3.13	7.8	2.95	7.3	3.23	8.0	3.13	7.8
Other crops	3.71	5.4	3.69	5.4	6.24	11.7	6.41	12.1	3.69	5.4
Mixed small										
Wheat	1.30	15.3	1.30	15.4	1.25	14.7	1.26	14.9	1.30	15.4
Other cereals	5.51	65.1	5.52	65.2	5.09	60.0	4.23	50.0	5.52	65.2
Legumes	0.15	1.8	0.15	1.8	0.15	1.8	0.60	7.1	0.15	1.8
Rapeseed	0.18	2.1	0.17	2.1	0.16	1.9	0.46	5.4	0.17	2.1
Other crops	3.28	15.6	3.28	15.6	3.79	21.5	3.87	22.5	3.28	15.6
Mixed medium										
Wheat	3.36	16.4	3.39	16.6	3.24	15.8	3.30	16.1	3.39	16.6
Other cereals	11.77	57.5	11.77	57.5	10.80	52.8	9.27	45.3	11.77	57.5
Legumes	0.38	1.9	0.37	1.8	0.34	1.7	1.16	5.7	0.37	1.8
Rapeseed	1.22	6.0	1.22	5.9	1.10	5.4	1.52	7.4	1.22	5.9
Other crops	7.26	18.3	7.24	18.1	8.49	24.3	8.73	25.5	7.24	18.1
Mixed large										
Wheat	12.24	19.9	12.36	20.0	12.15	19.7	12.15	19.7	12.36	20.0
Other cereals	30.22	49.0	30.25	49.1	27.72	45.0	25	40.6	30.25	49.1
Legumes	0.73	1.2	0.72	1.2	0.66	1.1	2.62	4.2	0.72	1.2
Rapeseed	8.36	13.6	8.36	13.6	7.62	12.4	8.28	13.4	8.36	13.6
Other crops	16.89	16.4	16.76	16.2	20.31	21.9	20.40	22.1	16.76	16.2

Table 1.1f. Changes in the area of selected crops in types of farms by production type and degree of adjustment in the analyzed farms from the FADN sample

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Cereal D+E										
Wheat	19.93	25.4	19.93	25.4	19.63	25.0	19.63	25.0	19.93	25.4
Other cereals	32.57	41.5	32.58	41.5	32.79	41.8	29.73	37.9	32.58	41.5
Legumes	0.47	0.6	0.46	0.6	0.49	0.6	3.41	4.3	0.46	0.6
Rapeseed	13.70	17.5	13.70	17.5	13.63	17.4	13.72	17.5	13.70	17.5
Other crops	13.19	15.0	13.19	15.0	13.32	15.2	13.35	15.2	13.19	15.0
Cereal D										
Wheat	25.52	30.5	25.61	30.6	23.87	28.5	25.54	30.5	25.61	30.6
Other cereals	35.63	42.5	35.64	42.6	32.89	39.3	27.44	32.8	35.64	42.6
Legumes	1.19	1.4	1.17	1.4	1.07	1.3	4.30	5.1	1.17	1.4
Rapeseed	18.51	22.1	18.44	22.0	17.73	21.2	18.26	21.8	18.44	22.0
Other crops	5.48	3.5	5.45	3.4	10.76	9.8	10.77	9.8	5.45	3.4
Cereal MONO										
Wheat	14.77	21.4	14.78	21.4	10.54	15.2	10.47	15.1	14.78	21.4
Other cereals	50.55	73.1	50.66	73.3	51.66	74.7	36.79	53.2	50.66	73.3
Legumes	0.11	0.2	-	0.0	0.05	0.1	11.27	16.3	-	0.0
Rapeseed	2.40	3.5	2.40	3.5	1.72	2.5	5.07	7.3	2.40	3.5
Other crops	3	1.9	3	1.9	6.86	7.5	7.24	8.0	3	1.9
Cereal 50/50										
Wheat	26.59	42.5	26.65	42.5	24.20	38.6	23.15	37.0	26.65	42.5
Other cereals	17.60	28.1	17.57	28.0	17.92	28.6	14.17	22.6	17.57	28.0
Legumes	0.03	0.0	0.02	0.0	0.02	0.0	3.75	6.0	0.02	0.0
Rapeseed	17.66	28.2	17.66	28.2	15.57	24.9	16.64	26.6	17.66	28.2
Other crops	1.65	1.2	1.64	1.2	5.83	7.9	5.82	7.9	1.64	1.2
Cereal MAIN+										
Wheat	30.03	50.3	30.04	50.3	27.74	46.5	27.12	45.4	30.04	50.3
Other cereals	19.12	32.0	19.14	32.1	17.87	29.9	13.50	22.6	19.14	32.1
Legumes	0.56	0.9	0.54	0.9	0.48	0.8	4.65	7.8	0.54	0.9
Rapeseed	8.58	14.4	8.58	14.4	8.26	13.8	9.06	15.2	8.58	14.4
Other crops	3.20	2.4	3.18	2.3	7.13	9.0	7.14	9.0	3.18	2.3
Arable D+E										
Wheat	3.60	16.2	3.61	16.2	3.56	16.0	3.57	16.0	3.61	16.2
Other cereals	5.98	26.9	5.98	26.9	6.08	27.3	5.93	26.6	5.98	26.9
Legumes	0.09	0.4	0.09	0.4	0.08	0.4	0.19	0.9	0.09	0.4
Rapeseed	2.27	10.2	2.27	10.2	2.23	10.0	2.25	10.1	2.27	10.2
Other crops	13.75	46.4	13.75	46.3	13.73	46.3	13.76	46.4	13.75	46.3
Arable D										
Wheat	11.71	28.9	11.97	29.6	11.07	27.3	11.88	29.4	11.97	29.6
Other cereals	9.90	24.5	9.91	24.5	9.06	22.4	7.48	18.5	9.91	24.5
Legumes	0.80	2.0	0.79	2.0	0.73	1.8	1.03	2.6	0.79	2.0
Rapeseed	6.24	15.4	6.11	15.1	5.57	13.8	6.20	15.3	6.11	15.1
Other crops	13.61	29.2	13.48	28.9	15.83	34.7	15.64	34.3	13.48	28.9

Table 1.1f. Changes in the area of selected crops in types of farms by production type and degree of adjustment in the analyzed farms from the FADN sample: cont.

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Arable MONO										
Wheat	1.43	9.5	1.43	9.5	1.02	6.8	1.01	6.7	1.43	9.5
Other cereals	4.80	31.9	4.80	31.9	6.34	42.1	4.82	32.0	4.80	31.9
Legumes	1.49	9.9	1.49	9.9	1.09	7.2	2.12	14.1	1.49	9.9
Rapeseed	1.41	9.3	1.41	9.3	1	6.6	1.50	9.9	1.41	9.3
Other crops	11.52	39.4	11.52	39.4	11.21	37.3	11.21	37.3	11.52	39.4
Arable 50/50										
Wheat	11.45	41.8	11.47	41.9	10.22	37.4	10.04	36.7	11.47	41.9
Other cereals	4.76	17.4	4.78	17.5	5.38	19.7	4.49	16.4	4.78	17.5
Legumes	0.02	0.1	-	0.0	-	0.0	0.80	2.9	-	0.0
Rapeseed	0.83	3.0	0.83	3.0	0.72	2.6	1.04	3.8	0.83	3.0
Other crops	12.11	37.6	12.09	37.6	12.84	40.3	12.80	40.2	12.09	37.6
Arable MAIN+										
Wheat	8.74	38.0	8.79	38.2	8.11	35.3	8.11	35.2	8.79	38.2
Other cereals	6.18	26.9	6.19	26.9	5.94	25.8	5.16	22.4	6.19	26.9
Legumes	0.17	0.7	0.16	0.7	0.13	0.6	0.74	3.2	0.16	0.7
Rapeseed	1.07	4.6	1.06	4.6	0.99	4.3	1.25	5.4	1.06	4.6
Other crops	8.14	29.7	8.10	29.6	9.14	34.1	9.04	33.7	8.10	29.6
Cattle D+E										
Wheat	0.61	5.9	0.61	5.9	0.60	5.8	0.60	5.8	0.61	5.9
Other cereals	5.07	48.8	5.17	49.7	5.14	49.4	4.91	47.2	5.17	49.7
Legumes	0.16	1.5	0.06	0.6	0.06	0.6	0.11	1.0	0.06	0.6
Rapeseed	0.02	0.2	0.02	0.2	0.02	0.2	0.20	1.9	0.02	0.2
Other crops	20.40	43.6	20.40	43.7	20.45	44.1	20.45	44.1	20.40	43.7
Cattle D										
Wheat	1.63	8.3	1.68	8.5	1.62	8.2	1.65	8.4	1.68	8.5
Other cereals	9.44	48.0	9.46	48.1	8.63	43.9	7.13	36.3	9.46	48.1
Legumes	0.13	0.7	0.13	0.7	0.12	0.6	0.18	0.9	0.13	0.7
Rapeseed	0.28	1.4	0.28	1.4	0.28	1.4	0.99	5.0	0.28	1.4
Other crops	17.94	41.6	17.87	41.3	18.78	45.9	19.48	49.4	17.87	41.3
Cattle MONO										
Wheat	0.55	6.1	0.55	6.1	0.39	4.3	0.38	4.3	0.55	6.1
Other cereals	3.14	35.2	3.14	35.2	4.24	47.7	3.16	35.6	3.14	35.2
Legumes	-	0.0	-	0.0	0.01	0.1	0.63	7.0	-	0.0
Rapeseed	-	0.0	-	0.0	-	0.0	0.45	5.0	-	0.0
Other crops	20.43	58.6	20.43	58.6	19.47	47.9	19.49	48.1	20.43	58.6
Cattle 50/50										
Wheat	1.24	9.3	1.24	9.3	1.11	8.3	1.08	8.1	1.24	9.3
Other cereals	8.20	61.5	8.20	61.5	7.89	59.1	6.33	47.5	8.20	61.5
Legumes	0.18	1.4	0.18	1.4	0.17	1.2	0.91	6.8	0.18	1.4
Rapeseed	0.01	0.1	0.01	0.1	0.01	0.1	0.67	5.0	0.01	0.1
Other crops	17.50	27.8	17.50	27.8	17.96	31.2	18.14	32.6	17.50	27.8

Table 1.1f. Changes in the area of selected crops in types of farms by production type and degree of adjustment in the analyzed farms from the FADN sample: cont.

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Cattle MAIN+										
Wheat	1.03	7.5	1.03	7.5	0.94	6.9	0.90	6.6	1.03	7.5
Other cereals	5.60	40.7	5.61	40.8	5.51	40.0	4.42	32.2	5.61	40.8
Legumes	0.03	0.2	0.02	0.1	0	0.0	0.42	3.0	0.02	0.1
Rapeseed	0.08	0.6	0.08	0.6	0.08	0.6	0.70	5.1	0.08	0.6
Other crops	20	51.0	19.99	51.0	20.21	52.5	20.28	53.1	19.99	51.0
Pig D+E										
Wheat	1.97	6.5	1.97	6.5	1.94	6.4	1.94	6.4	1.97	6.5
Other cereals	21.16	70.2	21.16	70.2	21.14	70.1	17.73	58.8	21.16	70.2
Legumes	0.17	0.6	0.17	0.6	0.17	0.6	0.77	2.6	0.17	0.6
Rapeseed	1.21	4.0	1.21	4.0	1.19	3.9	1.65	5.5	1.21	4.0
Other crops	6.93	18.7	6.93	18.7	7.01	18.9	9.36	26.7	6.93	18.7
Pig D										
Wheat	4.19	14.6	4.19	14.6	4.13	14.4	4.13	14.4	4.19	14.6
Other cereals	20.49	71.7	20.50	71.7	18.83	65.9	15.20	53.2	20.50	71.7
Legumes	0.45	1.6	0.44	1.6	0.42	1.5	3.61	12.6	0.44	1.6
Rapeseed	1.95	6.8	1.96	6.9	1.84	6.5	2.17	7.6	1.96	6.9
Other crops	2.72	5.3	2.71	5.2	4.58	11.8	4.68	12.2	2.71	5.2
Pig MONO										
Wheat	2.60	15.0	2.60	15.0	1.84	10.6	1.83	10.6	2.60	15.0
Other cereals	14.48	83.4	14.49	83.5	14.05	81.0	10.30	59.3	14.49	83.5
Legumes	0.01	0.1	-	0.0	0.09	0.5	2.98	17.2	-	0.0
Rapeseed	-	0.0	-	0.0	-	0.0	0.87	5.0	-	0.0
Other crops	0.99	1.5	0.99	1.5	2.09	7.9	2.09	7.9	0.99	1.5
Pig 50/50										
Wheat	1.50	6.7	1.50	6.7	1.34	6.0	1.34	6.0	1.50	6.7
Other cereals	19.67	88.2	19.67	88.2	18.43	82.6	13.91	62.4	19.67	88.2
Legumes	0.16	0.7	0.16	0.7	0.14	0.6	3.61	16.2	0.16	0.7
Rapeseed	0.65	2.9	0.65	2.9	0.57	2.5	1.60	7.2	0.65	2.9
Other crops	1.35	1.4	1.35	1.4	2.86	8.2	2.88	8.3	1.35	1.4
Pig MAIN+										
Wheat	0.97	4.8	0.97	4.8	0.90	4.5	0.80	4.0	0.97	4.8
Other cereals	17.80	89.0	17.82	89.1	16.59	83.0	13.18	65.9	17.82	89.1
Legumes	0.35	1.8	0.34	1.7	0.31	1.6	2.97	14.8	0.34	1.7
Rapeseed	0.30	1.5	0.30	1.5	0.29	1.5	1.02	5.1	0.30	1.5
Other crops	1.90	2.9	1.90	2.9	3.23	9.5	3.37	10.2	1.90	2.9
Mixed D+E										
Wheat	2.15	12.6	2.15	12.6	2.12	12.4	2.12	12.4	2.15	12.6
Other cereals	9.18	53.9	9.22	54.2	9.24	54.3	8.35	49.0	9.22	54.2
Legumes	0.24	1.4	0.21	1.2	0.21	1.2	0.58	3.4	0.21	1.2
Rapeseed	0.77	4.5	0.77	4.5	0.75	4.4	1.02	6.0	0.77	4.5
Other crops	8.04	27.5	8.03	27.5	8.06	27.6	8.31	29.1	8.03	27.5

Table 1.1f. Changes in the area of selected crops in types of farms by production type and degree of adjustment in the analyzed farms from the FADN sample: cont.

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Mixed D										
Wheat	3.87	17.5	3.91	17.7	3.81	17.2	3.86	17.5	3.91	17.7
Other cereals	12.15	55.0	12.15	55.0	11.09	50.2	9.68	43.8	12.15	55.0
Legumes	0.37	1.7	0.36	1.6	0.34	1.5	1.16	5.3	0.36	1.6
Rapeseed	1.93	8.7	1.93	8.7	1.75	7.9	2.15	9.7	1.93	8.7
Other crops	7.16	17.1	7.12	17.0	8.50	23.2	8.63	23.8	7.12	17.0
Mixed MONO										
Wheat	3.87	19.1	3.87	19.1	2.81	13.9	2.75	13.6	3.87	19.1
Other cereals	14.33	70.9	14.54	71.9	14.72	72.8	11.40	56.4	14.54	71.9
Legumes	0.24	1.2	0.03	0.2	0.03	0.2	1.85	9.1	0.03	0.2
Rapeseed	-	0.0	-	0.0	-	0.0	1.01	5.0	-	0.0
Other crops	7.94	8.8	7.94	8.8	8.82	13.2	9.37	15.9	7.94	8.8
Mixed 50/50										
Wheat	3.04	21.2	3.05	21.3	2.75	19.2	2.65	18.5	3.05	21.3
Other cereals	9.79	68.4	9.79	68.4	9.26	64.7	6.94	48.5	9.79	68.4
Legumes	0.01	0.1	0.01	0.1	0.01	0.1	1.10	7.7	0.01	0.1
Rapeseed	0.58	4.0	0.58	4.0	0.54	3.8	1.09	7.6	0.58	4.0
Other crops	3.80	6.3	3.79	6.2	4.66	12.3	5.44	17.7	3.79	6.2
Mixed MAIN+										
Wheat	3.89	27.7	3.90	27.7	3.42	24.3	3.23	22.9	3.90	27.7
Other cereals	8.75	62.2	8.75	62.2	8.32	59.1	6.42	45.6	8.75	62.2
Legumes	0.07	0.5	0.06	0.4	0.06	0.4	1.41	10.0	0.06	0.4
Rapeseed	0.47	3.3	0.46	3.3	0.45	3.2	0.90	6.4	0.46	3.3
Other crops	3.89	6.3	3.89	6.3	4.82	12.9	5.11	15.0	3.89	6.3
Cereal poor soils										
Wheat	4.03	5.8	4.03	5.8	3.96	5.7	3.96	5.7	4.03	5.8
Other cereals	51.20	73.5	51.53	73.9	49.06	70.4	39.92	57.3	51.53	73.9
Legumes	1.94	2.8	1.61	2.3	1.42	2.0	7.29	10.5	1.61	2.3
Rapeseed	5.12	7.3	5.12	7.3	4.67	6.7	7.39	10.6	5.12	7.3
Other crops	10.25	10.6	10.25	10.6	13.43	15.2	13.99	16.0	10.25	10.6
Cereal average soils										
Wheat	27.07	30.7	27.16	30.8	25.24	28.6	26.80	30.4	27.16	30.8
Other cereals	38.19	43.3	38.21	43.3	35.54	40.3	29.46	33.4	38.21	43.3
Legumes	1.14	1.3	1.13	1.3	1.03	1.2	4.88	5.5	1.13	1.3
Rapeseed	18.65	21.1	18.58	21.1	17.84	20.2	18.51	21.0	18.58	21.1
Other crops	5.86	3.6	5.83	3.5	11.24	9.7	11.25	9.7	5.83	3.5
Cereal good soils										
Wheat	22.78	48.1	22.81	48.2	20.71	43.8	20.05	42.4	22.81	48.2
Other cereals	11.47	24.2	11.45	24.2	11.55	24.4	8.79	18.6	11.45	24.2
Legumes	0.14	0.3	0.14	0.3	0.13	0.3	2.90	6.1	0.14	0.3
Rapeseed	12.04	25.5	12.04	25.5	10.90	23.1	11.52	24.4	12.04	25.5
Other crops	1.53	1.9	1.51	1.8	4.66	8.5	4.67	8.5	1.51	1.8

Table 1.1f. Changes in the area of selected crops in types of farms by production type and degree of adjustment in the analyzed farms from the FADN sample: cont.

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Arable poor soils										
Wheat	1.73	10.5	1.73	10.5	1.71	10.4	1.71	10.4	1.73	10.5
Other cereals	6.92	42.0	6.93	42.1	6.83	41.5	5.92	36.0	6.93	42.1
Legumes	0.15	0.9	0.14	0.9	0.14	0.8	0.77	4.7	0.14	0.9
Rapeseed	0.69	4.2	0.69	4.2	0.57	3.5	0.84	5.1	0.69	4.2
Other crops	10.85	42.3	10.85	42.3	11.11	43.8	11.13	43.9	10.85	42.3
Arable average soils										
Wheat	6.71	26.0	6.77	26.2	6.21	24.1	6.73	26.0	6.77	26.2
Other cereals	7.87	30.5	7.88	30.5	7.29	28.2	6.08	23.5	7.88	30.5
Legumes	0.49	1.9	0.48	1.8	0.44	1.7	0.84	3.2	0.48	1.8
Rapeseed	2.56	9.9	2.55	9.9	2.36	9.1	2.59	10.0	2.55	9.9
Other crops	10.09	31.8	10.03	31.6	11.40	36.9	11.46	37.1	10.03	31.6
Arable good soils										
Wheat	34.09	33.3	35.18	34.3	32.73	31.9	34.43	33.6	35.18	34.3
Other cereals	16.74	16.3	16.74	16.3	15.42	15.0	12.78	12.5	16.74	16.3
Legumes	1.98	1.9	1.98	1.9	1.81	1.8	1.71	1.7	1.98	1.9
Rapeseed	21.48	21.0	20.82	20.3	18.85	18.4	21.17	20.7	20.82	20.3
Other crops	29.72	27.5	29.29	27.1	35.20	32.8	33.92	31.6	29.29	27.1
Cattle poor soils										
Wheat	1.46	7.9	1.50	8.1	1.44	7.8	1.48	7.9	1.50	8.1
Other cereals	8.99	48.4	9.01	48.5	8.27	44.6	6.87	37.0	9.01	48.5
Legumes	0.13	0.7	0.13	0.7	0.11	0.6	0.20	1.1	0.13	0.7
Rapeseed	0.24	1.3	0.25	1.3	0.24	1.3	0.91	4.9	0.25	1.3
Other crops	18.11	41.7	18.05	41.4	18.86	45.7	19.47	49.0	18.05	41.4
Cattle average soils										
Wheat	3.66	21.4	3.66	21.4	3.27	19.2	3.15	18.5	3.66	21.4
Other cereals	5.43	31.9	5.44	31.9	6.62	38.8	4.99	29.2	5.44	31.9
Legumes	0.05	0.3	0.04	0.2	0.04	0.3	1.04	6.1	0.04	0.2
Rapeseed	-	0.0	-	0.0	-	0.0	0.86	5.0	-	0.0
Other crops	25.96	46.4	25.96	46.4	25.16	41.8	25.06	41.1	25.96	46.4
Cattle good soils										
Wheat	10.32	72.1	10.35	72.3	9.10	63.5	8.84	61.8	10.35	72.3
Other cereals	0.66	4.6	0.67	4.7	1.18	8.2	0.45	3.1	0.67	4.7
Legumes	0.01	0.0	-	0.0	-	0.0	0.73	5.1	-	0.0
Rapeseed	0.62	4.3	0.61	4.3	0.59	4.1	0.84	5.8	0.61	4.3
Other crops	18.88	18.9	18.87	18.8	19.63	24.1	19.64	24.2	18.87	18.8
Pig poor soils										
Wheat	0.71	4.3	0.71	4.3	0.70	4.2	0.70	4.2	0.71	4.3
Other cereals	14.60	88.3	14.60	88.4	13.80	83.5	10.81	65.4	14.60	88.4
Legumes	0.20	1.2	0.20	1.2	0.18	1.1	1.69	10.2	0.20	1.2
Rapeseed	0.16	1.0	0.16	1.0	0.16	1.0	0.80	4.9	0.16	1.0
Other crops	1.84	5.2	1.84	5.2	2.68	10.2	3.51	15.3	1.84	5.2

Table 1.1f. Changes in the area of selected crops in types of farms by production type and degree of adjustment in the analyzed farms from the FADN sample: cont.

Description	BASE_2009		BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%	Area [ha]	%
Pig average soils										
Wheat	4.41	14.5	4.41	14.5	4.33	14.3	4.33	14.3	4.41	14.5
Other cereals	21.69	71.6	21.70	71.6	19.96	65.8	16.11	53.1	21.70	71.6
Legumes	0.46	1.5	0.45	1.5	0.43	1.4	3.91	12.9	0.45	1.5
Rapeseed	2.11	7.0	2.12	7.0	2	6.6	2.34	7.7	2.12	7.0
Other crops	2.90	5.4	2.89	5.4	4.86	11.9	4.87	11.9	2.89	5.4
Pig good soils										
Wheat	10.01	47.9	10.01	47.9	8.02	38.3	7.97	38.1	10.01	47.9
Other cereals	9.47	45.3	9.50	45.4	10.13	48.4	6.01	28.8	9.50	45.4
Legumes	0.06	0.3	0.03	0.1	0.05	0.2	3.29	15.7	0.03	0.1
Rapeseed	0.35	1.7	0.35	1.7	0.30	1.4	1.22	5.8	0.35	1.7
Other crops	1.21	4.9	1.21	4.9	2.61	11.6	2.60	11.6	1.21	4.9
Mixed poor soils										
Wheat	1.98	13.7	1.98	13.7	1.95	13.5	1.95	13.5	1.98	13.7
Other cereals	10.28	71.1	10.29	71.1	9.46	65.4	8.03	55.5	10.29	71.1
Legumes	0.14	1.0	0.14	0.9	0.13	0.9	0.99	6.9	0.14	0.9
Rapeseed	0.29	2.0	0.29	2.0	0.29	2.0	0.72	5.0	0.29	2.0
Other crops	4.86	12.3	4.86	12.2	5.73	18.3	5.85	19.2	4.86	12.2
Mixed average soils										
Wheat	6.35	20.0	6.44	20.2	6.20	19.5	6.29	19.8	6.44	20.2
Other cereals	14.30	44.9	14.31	45.0	13.10	41.2	11.66	36.7	14.31	45.0
Legumes	0.64	2.0	0.63	2.0	0.58	1.8	1.36	4.3	0.63	2.0
Rapeseed	4.02	12.6	4.01	12.6	3.62	11.4	3.98	12.5	4.01	12.6
Other crops	10.29	20.4	10.22	20.2	12.10	26.1	12.31	26.8	10.22	20.2
Mixed good soils										
Wheat	9.89	58.0	9.93	58.2	8.72	51.1	8.64	50.6	9.93	58.2
Other cereals	3.05	17.9	3.07	18.0	3.44	20.1	2.17	12.7	3.07	18.0
Legumes	0.07	0.4	0.05	0.3	0.05	0.3	1.07	6.3	0.05	0.3
Rapeseed	1.28	7.5	1.28	7.5	1.21	7.1	1.57	9.2	1.28	7.5
Other crops	4.50	16.3	4.45	16.0	5.37	21.4	5.35	21.2	4.45	16.0

Table 1.2a. Agricultural income by type and degree of adjustment in analyzed farms in the FADN sample

Description		BASE_2009	BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
		Income (PLN)	Income (PLN)	%	Income (PLN)	%	Income (PLN)	%	Income (PLN)	%
Cereal	D+E	85,502	149,101	100.0	148,091	99.3	146,580	98.3	149,051	100.0
	D	99,508	178,573	100.0	168,575	94.4	169,668	95.0	155,749	87.2
	MONO	78,702	165,493	100.0	126,877	76.7	119,954	72.5	146,780	88.7
	50/50	69,403	147,441	100.0	133,925	90.8	128,764	87.3	130,621	88.6
	MAIN+	64,609	128,992	100.0	120,650	93.5	115,614	89.6	112,716	87.4
Arable	D+E	29,910	54,316	100.0	53,281	98.1	53,153	97.9	54,324	100.0
	D	63,479	102,116	100.0	95,310	93.3	98,069	96.0	90,942	89.1
	MONO	21,039	35,674	100.0	22,998	64.5	22,404	62.8	30,225	84.7
	50/50	41,273	95,783	100.0	83,903	87.6	83,575	87.3	88,069	91.9
	MAIN+	53,409	87,579	100.0	80,192	91.6	79,715	91.0	81,147	92.7
Cattle	D+E	35,593	27,496	100.0	27,387	99.6	27,474	99.9	27,415	99.7
	D	69,462	61,868	100.0	59,515	96.2	61,744	99.8	54,094	87.4
	MONO	114,788	98,305	100.0	92,822	94.4	91,276	92.8	91,264	92.8
	50/50	51,738	44,160	100.0	42,619	96.5	41,360	93.7	36,257	82.1
	MAIN+	73,984	69,117	100.0	67,171	97.2	66,422	96.1	60,521	87.6
Pig	D+E	180,476	188,717	100.0	188,391	99.8	185,652	98.4	188,709	100.0
	D	172,402	187,607	100.0	184,415	98.3	180,955	96.5	179,741	95.8
	MONO	168,432	174,306	100.0	169,847	97.4	167,910	96.3	169,532	97.3
	50/50	188,275	193,963	100.0	191,797	98.9	188,830	97.4	187,808	96.8
	MAIN+	153,383	161,853	100.0	159,662	98.6	156,497	96.7	156,226	96.5
Mixed	D+E	38,842	44,522	100.0	44,194	99.3	44,228	99.3	44,475	99.9
	D	56,118	65,831	100.0	63,775	96.9	63,907	97.1	59,371	90.2
	MONO	48,060	49,300	100.0	48,780	98.9	48,212	97.8	42,306	85.8
	50/50	33,645	41,094	100.0	39,398	95.9	37,707	91.8	36,503	88.8
	MAIN+	33,683	40,978	100.0	39,524	96.5	37,636	91.8	36,396	88.8

Table 1.2b. Agricultural income by type and soil quality in analyzed farms in the FADN sample

Description		BASE 2009	BASELINE 2014		GREEN 2014		GREEN ZB 2014		GREEN (-30%) 2014	
		Income (PLN)	Income (PLN)	%	Income (PLN)	%	Income (PLN)	%	Income (PLN)	%
Cereal	poor soil	70,161	100,286	100.0	94,544	94.3	91,427	91.2	8,2824	82.6
	average soil	104,074	186,160	100.0	175,871	94.5	176,368	94.7	162,958	87.5
	good soil	53,122	120,199	100.0	106,507	88.6	102,671	85.4	107,503	89.4
Arable	poor soil	6,396	10,213	100.0	8,849	86.6	8,617	84.4	8,048	78.8
	average soil	45,367	70,218	100.0	65,823	93.7	67,029	95.5	63,270	90.1
	good soil	144,328	253,925	100.0	234,453	92.3	242,729	95.6	226,399	89.2
Cattle	poor soil	66,794	59,237	100.0	57,067	96.3	58,926	99.5	51,946	87.7
	average soil	143,592	125,283	100.0	119,265	95.2	118,922	94.9	115,272	92.0
	good soil	51,289	48,892	100.0	46,400	94.9	45,620	93.3	40,827	83.5
Pig	poor soil	98,345	103,464	100.0	102,535	99.1	100,723	97.4	99,973	96.6
	average soil	190,685	206,537	100.0	203,087	98.3	199,348	96.5	198,258	96.0
	good soil	175,642	192,440	100.0	186,147	96.7	183,433	95.3	186,852	97.1
Mixed	poor soil	35,172	40,811	100.0	39,631	97.1	39,667	97.2	36,316	89.0
	average soil	82,139	96,864	100.0	93,831	96.9	93,834	96.9	88,528	91.4
	good soil	44,060	64,753	100.0	60,587	93.6	59,768	92.3	59,746	92.3

Table 1.2c. Agricultural income by type and economic size in analyzed farms in the FADN sample

Description		BASE_2009	BASELINE_2014		GREEN_2014		GREEN_ZB_2014		GREEN (-30%) 2014	
		Income (PLN)	Income (PLN)	%	Income (PLN)	%	Income (PLN)	%	Income (PLN)	%
Cereal	small	17,399	32,576	100.0	30,392	93.3	28,979	89.0	27,644	84.9
	medium	75,671	133,985	100.0	126,421	94.4	125,183	93.4	116,259	86.8
	large	272,666	517,752	100.0	481,180	92.9	483,846	93.5	459,895	88.8
Arable	small	15,547	25,342	100.0	23,655	93.3	23,805	93.9	22,617	89.2
	medium	60,502	89,924	100.0	84,040	93.5	85,778	95.4	80,709	89.8
	large	171,956	306,555	100.0	284,419	92.8	293,888	95.9	274,902	89.7
Cattle	small	14,190	14,092	100.0	13,576	96.3	14,000	99.3	11,494	81.6
	medium	47,077	42,317	100.0	40,368	95.4	42,151	99.6	36,138	85.4
	large	181,096	157,408	100.0	152,859	97.1	156,069	99.1	142,173	90.3
Pig	small	22,837	26,400	100.0	25,801	97.7	25,230	95.6	24,469	92.7
	medium	76,555	85,754	100.0	84,153	98.1	82,664	96.4	81,189	94.7
	large	280,245	299,900	100.0	295,307	98.5	289,887	96.7	289,212	96.4
Mixed	small	18,024	21,683	100.0	21,087	97.3	21,221	97.9	19,224	88.7
	medium	53,114	61,660	100.0	59,746	96.9	60,055	97.4	55,638	90.2
	large	159,597	187,957	100.0	182,127	96.9	180,795	96.2	171,695	91.3

2. Taking into account the environmental functions in the draft of the Common Agricultural Policy for 2014-2020

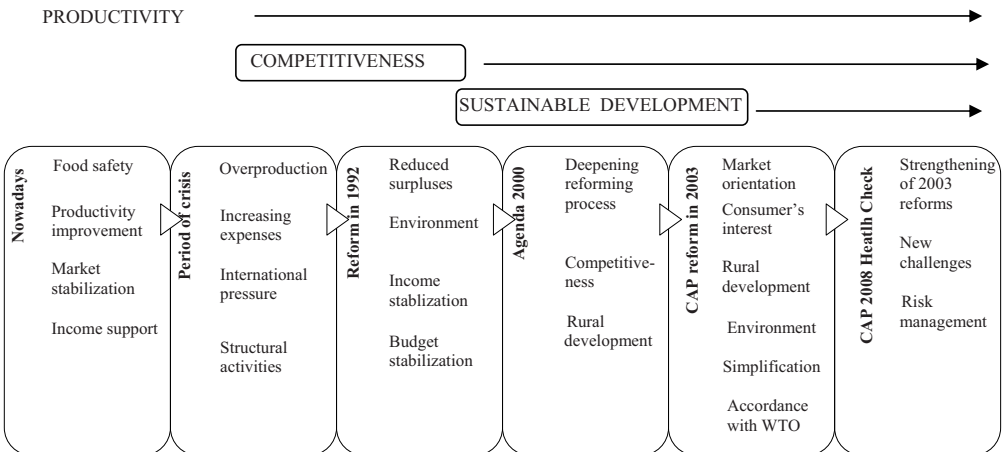
Waldemar Guba

2.1. Milestones of changes in the Common Agricultural Policy

The Common Agricultural Policy (CAP) was subject to a number of transformations in response to changes in the objective needs and economic, social and political conditions within the EU and internationally. In the history of the one of the oldest and most “common” of EU policies, we can point to several fixed elements, including consistency with the principles of: the single market, Community preference and financial solidarity, although in this respect there has also been a change in emphasis. At the same time, however, the foundations of CAP in the Treaties noted that this policy should take into account the specific social structure of agriculture, regional structural and natural differences and agricultural relations with the entire economy.

Figure 2.1

Successive reforms of the Common Agricultural Policy and its priorities



Source: Elaboration based on [Purgal, 2011, according to the European Commission].

Objectives of the CAP established in the Treaty of Rome (Article 39) assumed increase in productivity, ensuring the security of food supply to consumers at affordable prices, stabilisation of markets and ensuring a fair standard of living for the agricultural community¹⁶. In Europe, devastated by

¹⁶ *Treaties of Rome (consolidated version)*, Official Journal C 325 of 24 December 2002, http://eur-lex.europa.eu/pl/treaties/dat/12002E/pdf/12002E_EN.pdf [access: December 2012]

war, it was a key objective to increase production. CAP effectively contributed to the achievement of food self-sufficiency, and pretty soon there was a problem of overproduction, and consumers began to criticize the high level of prices in the internal market. The surplus of production was dealt with by costly instruments of trade policy and market intervention. The rising budgetary costs increasingly burdened taxpayers and massive export subsidies caused sharp criticism on the international forum due to distortions of competition. This period coincided with the exceptional rise in oil prices (and other commodities) on the world market, which in turn resulted in an increase in the cost of agricultural production. The Common Agricultural Policy required reforms.

In response to this crisis and growing public criticism in 1984 the Community has introduced the milk quota and froze the support prices. In 1988, the so-called maximum guaranteed quantities were applied, leading to reductions in subsidies or prices, if the total production of goods within the Community exceeded established levels. In addition, for the first time the voluntary mechanism of land left fallow was used, under which a farmer was paid financial compensation for giving up agricultural production.

These changes in the CAP were also conducive to a reduction in the budget cost and the CAP acceptance on the international arena at the background of the agricultural negotiations started in 1986 within the Uruguay Round of the GATT.

In the early 1990s, at the time when the European Commission's work in the area of agriculture was directed by the Commissioner R. MacSharry, the CAP proceeded to the next reform. As a result, in 1995-1999, intervention prices were reduced by introducing the so-called compensatory payments, dependent mainly on the amount of livestock and cereal production, but corresponding to the limits of historical production¹⁷.

Simultaneously, due to the growing pressure of agriculture on the environment (also the result of support to agriculture) in the context of the reform of 1992, the EU introduced the so-called accompanying instruments. These were the programmes co-financed by the EU, including support to: afforestation, encouraging farmers to use environment-friendly methods of production. Another element was the instruments supporting the improvement of the agrarian structure, executed for instance by early retirement of farmers, which in fact was the beginning of today's rural policy. Land left fallow became obligatory for farmers receiving direct payments.

¹⁷ European Commission, 2011, *The CAP in perspective: from market intervention to policy innovation*, DG Agriculture and Rural Development, Agricultural Policy Analysis and Perspectives Unit, Brussels, http://ec.europa.eu/agriculture/publi/app-briefs/01_en.pdf [access: December 2012].

Changes introduced by the Commissioner MacSharry opened the way for the next commissioner for agriculture (Franz Fischler in 1995-2004) to carry out further reforms, such as Agenda 2000 adopted at the EU summit in Berlin in 1999, and its subsequent review of 2003, commonly known as the “Luxembourg reform”¹⁸.

2.2. Reorientation and new priorities

As a part of Agenda 2000, which constitutes a comprehensive package of reforms to modernise and prepare the EU for the biggest expansion in its history to include the countries of Central and Eastern Europe, the CAP objectives were reformulated in accordance with the requirements of the Treaty of Amsterdam. Reference was made to the concept of the so-called European agricultural model, which assumed to combine multi-functionality of agriculture and strengthening its competitiveness¹⁹. A further reduction in the intervention prices was compensated to farmers by increasing direct payments. “Second pillar” of the CAP was created to support rural development and multi-functionality of agriculture, expanding “accompanying instruments” introduced by R. MacSharry with assistance to farmers in the so-called less favoured areas (LFA) and agri-environmental measures²⁰.

The reform agreed upon in June 2003 in Luxembourg included further reductions of institutional prices, but above all the decoupling of direct payments. This new form of the Single Payment Scheme (SPS), including a system of allocation and trading of entitlements was introduced in two variants: (i) in the form of a uniform area rate in the region (the regional model) and (ii) in the form of personalised rates corresponding to the support obtained in the farm in the historical period (historical model). The new Member States had the possibility to use Single Area Payment Scheme (SAPS) until 2009 as a transitional form (subsequently extended to 2013). Full payments were conditional on respecting a number of Community requirements (13 EU directives and regulations), and 8 good agricultural standards, within the so-called cross-compliance principle²¹.

The decision from Luxembourg was continued through including the system of decoupled payments to the sectors of: tobacco, hops, cotton and olive

¹⁸ Purgał, P., 2011, *Determinanty reformy wspólnej polityki rolnej w perspektywie 2020 roku*, [in:] A. Czyżewski, W. Poczta (sc. ed.), *Projekty inwestycyjne w agrobiznesie a zasady wspólnej polityki rolnej po 2013 roku*, Wydawnictwo Uniwersytetu Ekonomicznego w Poznaniu, Poznań.

¹⁹ Wilkin, J., 2007, *Uwarunkowania rozwoju polskiego rolnictwa w kontekście europejskim i globalnym. Implikacje teoretyczne i praktyczne*, paper prepared for the VIII Congress of Polish Economists.

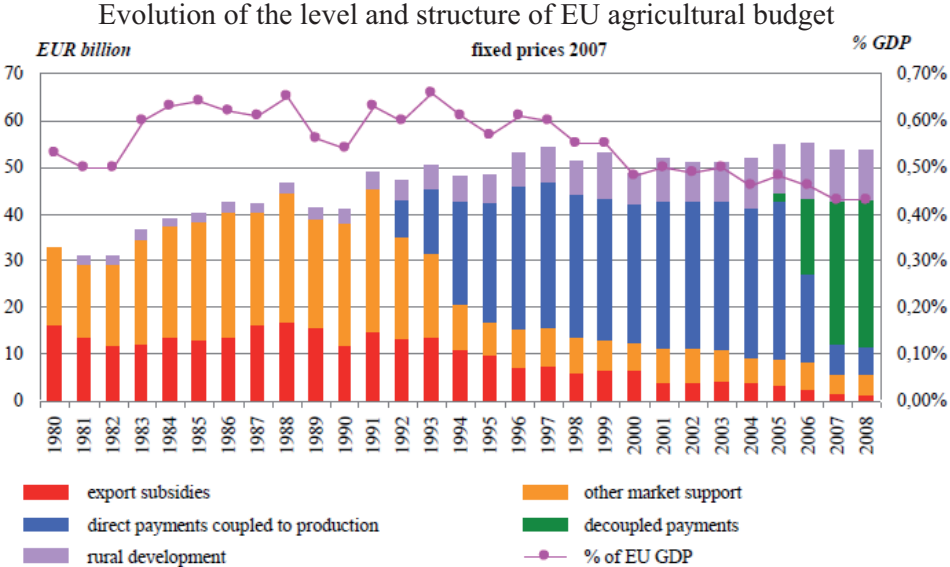
²⁰ European Commission, 1999, *Agenda 2000*, Brussels.

²¹ Guba W., 2001, *Potencjalne preferencje Polski co do kierunku reform WPR*, FAPA, Warsaw.

oil (2004), sugar (2005), fruit and vegetables (2007), as well as conducting review of the CAP in 2008 (Health Check).

The course of the CAP reforms in the last two decades is well reflected in the changes in the structure of the CAP budget expenditure for individual instruments (Figure 2.2).

Figure 2.2

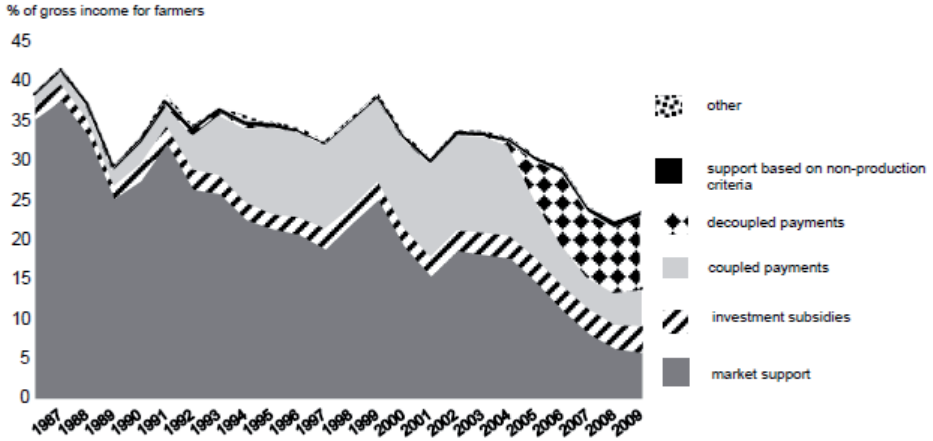


Source: European Commission 2011.

Another way of describing the evolution of the CAP are the changes in the level and structure of support for agricultural producers, measured by the share of support in agricultural income (the PSE index – producer support estimate)²² (Figure 2.3). Analysis of the structure of the budget and PSE index confirms the declining importance of market intervention instruments for direct support instruments, including an increase in decoupled payments.

²² Producer support estimate (PSE) determines the value of the annual gross transfer of money from consumers and taxpayers to agricultural producers, which results from the measures of agricultural support policy. It comes from the OECD database (Producer and Consumer Support Estimates Database) and cyclic OECD publication on monitoring and evaluation of agricultural policy. More on this topic: <http://www.oecd.org/agriculture/>.

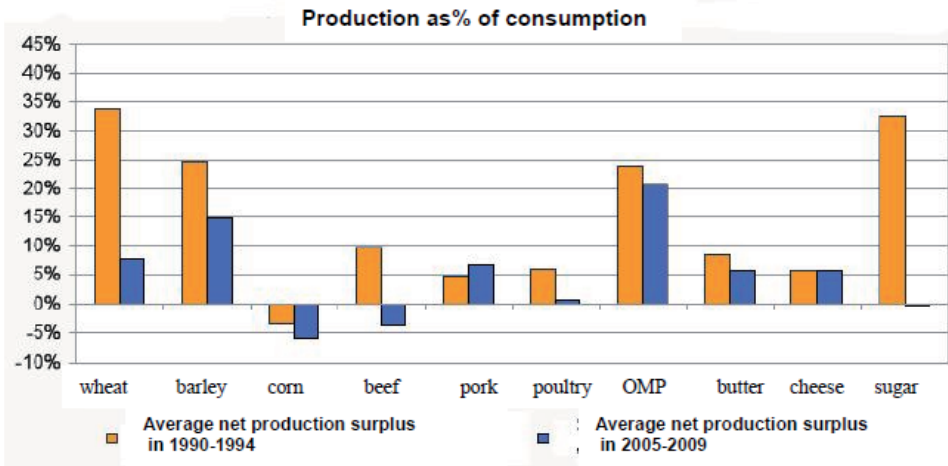
Figure 2.3
 Level and structure of Producer Support Estimate (PSE) in the EU in 1986-2009



Source: OECD, Producer and Consumer Support Estimates Database.

Consistent shift away from support for agricultural prices in favour of decoupled direct payments have helped to reduce unjustified surplus (Figure 2.4).

Figure 2.4
 Changes in the amount of surplus production in the EU



Source: European Commission 2011.

The current CAP resulted from the past reforms, which is a policy used now not only to ensure the EU food security. CAP has become a multi-purpose policy, realising the objectives of sustainable development – conducive to stable and harmonious development of Europe and the Member States. It has

become an important element of the EU's policies on the environment, climate and energy, supporting economic, social and territorial cohesion of the enlarged EU²³.

2.3. Existing elements of the CAP of significance for the environment

Considerations regarding the implementation of the Community environmental objectives since the early 1990s included an approach consisting in the integration of public services in this area with the EU agricultural policy. The high share of agricultural land in the total area of EU and the strong relationship between agricultural production and environmental services are important in this regard²⁴. It is also a consequence of the Treaty requirements – the Treaty on the Functioning of the European Union states that environmental protection requirements must be integrated into the definition and implementation of the Union policies and activities, in particular with a view to promoting sustainable development²⁵.

As part of the previous reforms of the CAP, a number of changes have been introduced that reduced the negative impact (pressure) of the EU agriculture and CAP on the environment. In particular, this includes the following elements:

- introduction, first voluntary (1988), then compulsory (1992) of land left fallow. Although the purpose of this instrument was originally to control the supply of cereals, eventually its environmental implications were also recognised;
- decoupling of agricultural support and production, first by replacing the majority of price support with direct payments, and then by moving to decoupled payments under the SPS and SAPS systems (1992, 1999, 2003);
- transition from the historical SPS payment model, in which the surface rates reflect the historical (correlated with the current) level of production to the

²³ European Commission, 2010, *Communication from the Commission to the European Parliament, the Council, the European Economic and Social Committee and the Committee of the Regions “the CAP towards 2020: meeting the food, natural resources and territorial challenges of the future”*, COM/2010/0672 final, Brussels.

²⁴ European Commission, 2011, *Impact assessment. Common Agricultural Policy towards 2020, Annex 2: Greening of the CAP*, Commission Staff Working Paper, SEC(2011) 1153 final/2, Brussels, http://ec.europa.eu/agriculture/analysis/perspec/cap-2020/impact-assessment/annex2_en.pdf [access: December 2012].

²⁵ Treaty on the Functioning of the European Union (consolidated version), Official Journal of the European Union C83/47 of 30 March 2010, <http://eur-lex.europa.eu/LexUriServ/LexUriServ.do?uri=OJ:C:2010:083:0047:0200:pl:PDF> [access: December 2012].

- regional model (similar to SAPS) with a single area rate in the region or Member State, regardless of the intensity of agricultural production;
- linking direct payments and respect for Community law in the field of environmental protection under the principle of cross-compliance (2003);
 - introduction of mandatory good agricultural standards to the principle of cross-compliance (2003);
 - introduction of agri-environmental action as a compulsory component of rural development programmes with a minimum share of financial allocation (25%, including support to the LFA);
 - ability to use up to 10% of direct payments envelope to support specific types of production, relevant to the protection of the environment²⁶ (i.e. for additional agri-environmental measures) or for the improvement of marketing and quality of agricultural products (2009).

2.4. General EU environmental regulations covering the agricultural sector

In parallel to the activities of the CAP, the EU agriculture is subject to a common EU legal regime for the protection of the environment. The most important legal documents in this regard are:

- Natura 2000, the EU-wide network of protected areas designed to protect the most valuable habitats and endangered species of plants and birds;
- Water Framework Directive – defines long-term approach to sustainable management of water resources;
- Nitrate Directive, introduced in 1991, defining a set of actions in order to prevent pollution by nitrogen compounds from agricultural sources;
- EU legislation on pesticide use to minimize the risk of negative impact of pesticides on human health and on the environment.

Most of the requirements of the EU legislation (in the form in which they were transposed into the national law by the Member States) have been subject to cross-compliance and thus integrated into the CAP. This way, the system of direct payments has been used as a penalizing instrument, but in many cases also as an instrument of additional monitoring of the EU environmental law implementation process.

²⁶ Poland belongs to the Member States that make use of this opportunity by supporting the cultivation of legumes.

2.5. Options considered by the European Commission to further strengthen the environmental functions of the CAP

In the Impact Assessment²⁷, a document accompanying the draft regulations, the European Commission provides justification for the new component of direct payments, as the most effective method of strengthening the environmental functions of the CAP after 2013. The Commission emphasizes that it is to be a mandatory component for all farmers, which will be implemented throughout the EU, and in the form proposed by the Commission will reduce significantly discretion of Member States and will allow for effective penalizing of farmers.

According to the European Commission, the differences between Member States in the implementation of good agricultural standards and requirements of cross-compliance would undermine the effectiveness of further “greening” of the CAP through the expansion of cross-compliance. Such an approach could be perceived by farmers as additional “restrictions” and not “incentives”.

The Commission notes, however, that greater funding of the second pillar activities is better from the point of view of farmers, as they can adjust instruments for costs and lost income, and specific circumstances. However, such a solution, according to the European Commission, would give too much discretion to the Member States and farmers in the selection of instruments, not necessarily directing them to strictly environmental action. The Commission notes, however, that the proposed “greening” of the CAP does not allow for adjustment of action to specific regional and local conditions, therefore it must be complementary to the activities of rural development.

According to the Commission, “green” component of direct payments should go beyond the requirements of cross-compliance. This requires clarification of good agricultural standards and avoiding duplication of the same requirements under “green payments” and basic payments (good agricultural standards). At the same time, the instruments of rural development should go beyond the greening of direct payments.

The Commission informed that it resigned from previously considered actions in the green component regarding support for areas of high nature value (HNV) and the protection of organic matter in the soil. In the case of HNV areas, the available data would not allow for identification of individual farms (or parts thereof) eligible for the measures of the first pillar. The Commission believes that the rural development policy will better serve the natural

²⁷ European Commission, 2011, *Impact assessment. Common Agricultural Policy towards 2020, Annex 2: Greening of the CAP*, Commission Staff Working Paper, SEC(2011) 1153 final/2, Brussels, http://ec.europa.eu/agriculture/analysis/perspec/cap-2020/impact-assessment/annex2_en.pdf [access: December 2012].

advantages of these areas. Also, the “green” component of payments will have a positive impact on the management of HNV areas.

This approach of the Commission to strengthen the environmental functions of the CAP has been criticized by some participants of the public debate. A group of Member States in the Council of the EU, including Poland, criticized this approach pointing to the contradictions between the various elements of the CAP in terms of environmental effects, as well as to increased administrative burden (Box 2.1). The concept of the European Commission was also negatively assessed by some agricultural economists, mainly due to the limited adjustment of the set of simple matching “greening” requirements to a variety of environmental conditions in the EU, and also because of the withdrawal from financing targeted agri-environmental action under the second pillar of the CAP²⁸.

Box 2.1

Evaluation of the “green” component of payments in the position of the Government of the Republic of Poland²⁹ regarding the proposal for a Regulation of the European Parliament and of the Council on direct payments after 2013

Pro-environment payment [Articles 29-33] (green payment)

The Polish government is critical of the proposal to create additional pro-environment component of direct payments. The proposed concept of enhancing environmental functions of the CAP under the first pillar has some major drawbacks: (i) it differentiates financial capabilities for implementing equal responsibilities across the EU between Member States due to differences in the rates of payment; (ii) it increases administrative costs and is inconsistent with the desire to simplify the CAP; (iii) it ignores the possibility of achieving additional environmental effects through current instruments, such as cross-compliance and agri-environmental programmes; and (iv) it does not include the effects for the competitive position of the EU agriculture in the global market resulting from the increase in environmental efforts in a situation of reduced (in real terms) budget.

Thus, the Polish government advocates that additional environmental effects at the level of the EU are carried out without increasing the administrative costs, mainly through the effective implementation of cross-compliance (e.g. alignment of good agricultural standards and a method for implementing directives between the countries), implementation of agri-environmental programmes and support for Natura 2000 under the financially enhanced the second pillar of the CAP.

The Polish Government is of the opinion that, in order for the direct payments to contribute to the implementation of Community environmental objectives more effectively than today, it is, above all, necessary to complete departure from historical criteria of establishing national rates and envelopes and preferring regions and farms with intensive agricultural production.

²⁸ Tangermann, S., 2011, *Direct payments in the CAP post 2013*, DG for International Policies, European Parliament, Brussels.

²⁹ Ministry of Agriculture and Rural Development, 2012, *Stanowisko Rządu RP do projektu rozporządzenia Parlamentu Europejskiego i Rady ustanawiającego przepisy dotyczące płatności bezpośrednich dla rolników na podstawie systemów wsparcia w ramach wspólnej polityki rolnej (COM(2011)625)*, <http://www.minrol.gov.pl/pol/Informacje-branzowe/WPR-po-2013-roku/Aktualnosci-WPR-po-2013-roku/Informacja-na-temat-stanowiska-rzadu-w-sprawie-WPR-po-2013-r> [access: December 2012].

2.6. Greening of the CAP in the European Commission's legislative proposals for 2014-2020³⁰

Following the above discussion, in the proposal for a new regulation on direct payments for 2014-2020, published in October 2011, the Commission called for the strengthening of the new CAP environmental functions mainly through a new “green” component of direct payments, corresponding to 30% of the national envelopes earmarked for direct payments. Beneficiaries of direct payments would be required to meet the following three requirements:

- to grow at least three crops, each of which would cover at least 5% and not more than 70% of arable land – farms with up to 3 ha of agricultural land would be excluded from this requirement;
- to maintain existing permanent grassland (PG) at the level of the reference year (2014);
- to allocate at least 7% of agricultural land to the so-called ecological focus areas, e.g. to fallow land, landscape elements, terraces, buffer zones and wooded areas outside PG.

At the same time, organic farms and farms that use lump-sum payments for the so-called “small farms” would be treated “by definition” (*ipso facto*) as meeting the requirements of “greening”.

2.7. The current course of the discussion in the Council of the EU and the European Parliament

Greening of the CAP through the green component of direct payments, as well as various parts of this proposal, have become a central element of the debate on the Commission’s legislative package on the forum of the co-deciding EU institutions, both the Council and the European Parliament, and the broad public debate. Already in the first stage of the discussions in the Council carried out during the Polish Presidency (second half of 2011), and then the Danish Presidency (first half of 2012), Member States have developed a number of proposals for modifying provisions of the Commission. The debate in the European Parliament summarised in the report of the rapporteur C. Santos in June 2012, brought a number of proposals for changes³¹. The main topics of discussion and the resulting amendments include:

- the manner of penalizing farmers for failing to meet the requirements of greening, including whether sanctions would apply only to 30% of the

³⁰ European Commission, 2011, *Legal proposals for the CAP after 2013*, http://ec.europa.eu/agriculture/cap-post-2013/legal-proposals/index_en.htm [access: December 2012].

³¹ The full reports by C. Santos are available at the European Parliament website: <http://www.europarl.europa.eu/sides/getDoc.do?pubRef=-//EP//TEXT+COMPARL+PE-474.052+01+NOT+XML+V0//PL> [access: December 2012].

payments (so that this payment would be *de facto* voluntary) or to full payments (which would mean that payment is mandatory). Most Member States are in favour of the first approach and the Commission proposes sanctions that cover even all payments from a given year;

- as regards the ecological focus areas – (i) the minimum percentage share of ecological focus areas (a large part of the discussion participants calls for the reduction from 7% to 3-4%); (ii) a list of types of areas eligible for these areas, which in the course of the discussion has been significantly expanded; (iii) assigning different weights to particular types of ecological focus areas reflecting their environmental significance; (iv) exemption from this requirement of small farms (under 15 ha – the Council, and even less than 20 hectares – EP); (v) the possibility of a joint settlement of the farmers in this requirement within regions, and for adjacent areas, which would also lower the threshold to 5% (PE) and even 3.5% (Council);
- approach to the requirement to maintain permanent grassland, i.e. its eventual implementation at the regional level (as in the current good agricultural standards) rather than individually, as proposed by the Commission;
- categories of farms treated “by definition” as green, i.e. meeting the requirements of greening. There are proposals to include farms with high proportion of permanent grasslands (e.g. 75%) in the category of organic farms, as well as farms implementing agri-environmental measures in the second pillar (the threshold area for eligibility for such treatment of both categories will have to be determined);
- farmers’ ability to pursue the objectives of greening by equivalent ways, e.g. through agri-environmental action of the second pillar of the CAP and other measures established by national law, e.g. associated with environmental certification system. This would provide the opportunity to further expand the categories of farms treated as “green by definition”;
- relationship between greening and agri-environmental measures in the second pillar, particularly the inclusion (or not) of greening activities in the baseline, above which additional voluntary agri-environmental measures and related payment rates would be designed in the second pillar. An important aspect of this debate is the risk of double funding for the same activities under green payments and agri-environmental payments.

An important aspect of the discussion is the importance of decisions on the future EU financial framework for 2014-2020. The common perception of greening of direct payments is not only the way in which the CAP would be more closely involved in the implementation of the EU environmental objectives, but also a significant element of interfering in business decisions of farmers, increasing demands and technological limitations, and thus implying economic costs. In this context, it is important to maintain consistency between the Commission's proposal and the CAP budget. Commission's original proposal on greening was accompanied by a proposal for maintaining the CAP budget at

the current nominal level, i.e. slightly lower in real terms. This means that budget resolutions, including these concerning the amount of direct payments, can affect the final outcome of the negotiations on the shape of the greening, both the direct payments and agri-environmental measures of the CAP second pillar.

Box 2.2

Detailed description of the modified legislative proposals of the Commission for the “green” component of direct payments to reflect the state of the discussion in the Council at the end of 2012³²

The state of the discussion in the Council at the end of the Cypriot Presidency (December 2012):	
-	Diversification of crops – farms > 15 ha of arable land- cultivation ≥ 3 crops on arable land, main crop ≤ 70%, and the 2 main crops ≤ 95% of arable land. Farms “diversified” by definition - farms in which:
(i)	arable land is entirely (100%) left fallow; intended for the production of grass, other herbaceous crops; planted with crops growing in water or a combination of these,
(ii)	> 75% of agricultural land covered with permanent grassland,
(iii)	farmer annually cultivates more than 50% of arable land in the rotation system with other farmers, provided he proves that different crops were planted on each parcel as compared with the previous calendar year,
-	Permanent grassland (PG) - two options:
(i)	maintaining PG at a farm level of 2014 (5% tolerance) or
(ii)	in the Member States where the proportion of PG did not fall in 2012, in comparison to the reference value of 2005, by more than 5%, they may introduce a system of maintaining at regional / national level, however, depending on the observed changes in the proportion of PG - if by less than 3% - unconditionally, and if between 3-5% - then the administrative approval system for farms planning to plough PG, and if more than 5%, then the necessary action against farmers who ploughed PG, so that the level of PG in the region/country returned to a level of at least 95% of the reference year.
-	ecological focus areas (EFA) - farms with area ≥ 15 ha of agricultural land should allocate 7% of the land eligible for payments (excluding PG) to ecological focus area, which may include, among others:
	✓ set aside land,
	✓ terraces,
	✓ landscape features,
	✓ buffer zones, where no fertilisers and pesticides are used,
	✓ agro-forestry areas,
	✓ wooded areas of permanent crops (20 to 50 trees per ha),
	✓ areas where commitments are implemented under agri-environment programmes, agri-environment-climate programmes and programmes relating to the Water Framework Directive
	✓ wooded areas in accordance with the measure of first afforestation of agricultural land.
	In addition, the European Commission will determine weighting factors for each category of EFA areas depending on their environment values. A Member State may decide to apply up to 3.5% of EFA at the geographical level (as defined by the Member State) for the adjacent EFA areas (ecological corridors).
-	farms “green” by definition:
(i)	organic,
(ii)	implementing agri-environment or with national/regional environmental certification, provided that the activities associated with them are “equivalent” to the practices required within the greening framework (in terms of benefits for the climate and the environment) and cover the entire area of the farm.

³² Council of the European Union, 2012, *Proposal for a Regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy (CAP Reform) - Presidency revised consolidated draft Regulation (17383/1/12 REV1)*, <http://register.consilium.europa.eu/pdf/en/12/st17/st17383-re01.en12.pdf> [access: December 2012]

3. Proposals for the system of direct payments after 2013, with particular emphasis on “greening”

Wawrzyniec Czubak, Arkadiusz Sadowski, Walenty Poczta

3.1. Introduction

Direct payments, since their introduction in the MacSharry reforms, are an essential instrument for financial support for agricultural producers in the Member States of the European Union. General public justification for their use comes down to the need for redistribution of funds for agriculture, which, on the one hand, plays a strategic role in ensuring food security and, on the other, due to its characteristics, it is impaired by the market mechanism³³. The essence of these payments is based on the direct transfer of aid funds from the state budget (European Union) to entities³⁴. Thus, in contrast to the forms of price support, used on a large scale before the MacSharry reform, farmers in their decisions related to the direction of production can largely be guided by market signals, while receiving public support. Such an approach, however, raises doubts as to goods or services for which the public (taxpayers) pay the agricultural producers. This is an issue of particular importance in the context of agreements concluded under the World Trade Organisation (WTO), which imply an increasing liberalisation of international trade and a ban on production support by countries and their groupings. Therefore, the original (from the period of MacSharry reform) compensating³⁵ function of payments, defined as a payment for loss of profit due to the reduction of price support, is losing more and more its grounds. Therefore, in the context of the purposefulness of support for the agricultural sector, it became necessary to find another, socially acceptable reason to use payments. Since the Luxembourg reform of 2003, direct payments for farmers have been paid on account of compliance with the environmental

³³ A. Woś, *Ekonomiczny mechanizm modelowania i restrukturyzacji polskiego rolnictwa – Synteza*, IAFE, Warsaw, 1999.

³⁴ W. Czubak, *Systemy wsparcia środkami WPR. Projekty inwestycyjne w agrobiznesie a zasady wspólnej polityki rolnej po 2013 roku* (ed. A. Czyżewski and W. Poczta), Poznań University of Economics, Poznań, 2011; A. Czyżewski, A. Hennisz-Matuszczak, *Rolnictwo Unii Europejskiej i Polski. Studium porównawcze struktur wytwórczych i regulatorów rynków rolnych*, Poznań University of Economics; Poznań, 2006, A. Czyżewski, *Uniwersalia polityki rolnej w gospodarce rynkowej, ujęcie makro i mikroekonomiczne*, Poznań University of Economics, Poznań, 2007.

³⁵ P. Purgał, *Determinanty reformy Wspólnej Polityki Rolnej w perspektywie 2020 roku, Projekty inwestycyjne w agrobiznesie a zasady wspólnej polityki rolnej po 2013 roku* (ed. A. Czyżewski i W. Poczta), Poznań University of Economics, Poznań, 2011.

and health standards contained in the cross-compliance package³⁶. This approach is all the more justified as, on the one hand, it makes the current farmers' decisions related to directions of production completely independent of the applied forms of assistance and, on the other, it contributes to the socially important function, which is the need to reduce the negative effects of highly developed agriculture on the environment and improve the health quality of agricultural raw materials. In the economic sense, payments understood as payments for meeting environmental standards, are payments by society for public goods produced by farmers³⁷. Another reform of the Common Agricultural Policy, including direct payments, planned for the 2014-2020 period, is a continuation of the trend set in 2003. In addition to responsibility for compliance with the standards contained in the cross-compliance, it is anticipated that 30% of national envelopes for each of the Member States will relate to the so-called greening. Its sense comes down to the obligation to meet the following standards by individual agricultural producers (not covered by lump-sum aid scheme for small producers)³⁸:

- preservation of existing permanent grassland (with the possible option of reclassification of up to 5%),
- diversification, i.e. cultivation of at least three crops in one year,
- determining ecological focus areas, consisting in the exclusion from the production of 7% of agricultural land (does not apply to permanent grassland) and use them for the purpose of ecological focus.

Although the ecological focus approach to direct support does not raise significant concerns (especially in a situation of sufficient supply of agricultural products), the proposed regulations raise a number of concerns, both economic, social, and relating to the potential environmental impacts³⁹. This applies, in particular, to the obligation to exclude land from cultivation, which is

³⁶ W. Czubak, W. Poczta, A. Sadowski, *Wpływ proponowanej reformy systemu dopłat bezpośrednich po 2013 roku na sytuację polskiego rolnictwa*, Wieś i Rolnictwo 4, Warsaw, 2011; W. Czubak, A. Sadowski, W. Poczta, *Wpływ reformy systemu dopłat bezpośrednich na dochody polskich gospodarstw rolnych z pola obserwacji FADN, Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych*.

³⁷ R. Baum, *Ocena zrównoważonego rozwoju w rolnictwie (studium metodyczne)*, Poznań University of Life Sciences, Poznań, 2011; J. Wilkin, *Dobra dostarczane przez rolnictwo w świetle teorii dóbr publicznych. Wielofunkcyjność rolnictwa. Kierunki badań, podstawy metodyczne i implikacje praktyczne* (ed. J. Wilkin), IRAD PAS, Warsaw, 2010.

³⁸ *Proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the Common Agricultural Policy, COM/2011/0625 final/3*.

³⁹ W. Czubak, W. Poczta, A. Sadowski, *Wpływ proponowanej reformy systemu dopłat bezpośrednich po 2013 roku na sytuację polskiego rolnictwa*, Wieś i Rolnictwo 4, Warsaw, 2011; W. Czubak, A. Sadowski, W. Poczta, *Wpływ reformy systemu dopłat bezpośrednich na dochody polskich gospodarstw rolnych z pola obserwacji FADN, Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych*, IAFE-NRI, Warsaw, 2011.

inextricably linked with a reduction in the productive potential of individual farms and the EU agriculture as such, which in turn leads to a loss of competitiveness, as well as the growing impact of aid instruments on the income received by farmers. Besides, the designation of ecological focus areas by each farm will contribute to the fact that in some cases, agriculturally useful land will be excluded from production, while in other cases marginal land will be used. The need to diversify crops also raises some concerns, because especially in smaller farms it is possible to use the appropriate sequence of crops, without the need for several crops in a given year – the whole surface can be planted with one crop, while introducing crops in the coming years according to the rules of the crop rotation.

The doubts and concerns regarding the proposed solutions for direct payments after 2013 meant that both the decision-making bodies of the European Union (mainly the European Parliament), as well as civil society organisations (primarily representing the interests of farmers) submitted a number of comments and separate proposals aimed at better “adjustment” of the proposed assumptions to the social expectations and the realities of agricultural production.

This study aims at analysis of the possible scenarios for the future shape of the direct payment system, in the context of the Commission's proposals⁴⁰, as well as the amendments proposed by the European Parliament⁴¹ and (to a lesser extent) social organisations (Copa-Cogeca). In addition to issues relating to problems of “greening”, it also includes proposals for possible payment rates (per 1 ha of agricultural land) across the EU, and their consequences for Poland.

The question of the shape of the Common Agricultural Policy after 2013 is the subject of much debate, not only at the scientific level, but, above all, at the political one. The decisions related to direct payments will be crucial not without reason. The main reason is that direct payments are an important channel for transferring funds to agriculture. At the microeconomic level, there is an increasing share of direct support in farm incomes, and thus dependence of the income situation in agriculture on payments. At the same time, from the point of view of agricultural policy, the commonness of the payment system justifies the possibility of using this instrument in the implementation of additional tasks assigned to European agriculture. One of them is to care for the environment and biodiversity, and the inclusion of these elements will exert a strong influence on the development of European agriculture.

⁴⁰ *Proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the Common Agricultural Policy, COM/2011/0625 final/3.*

⁴¹ *Draft report on the proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy (COM(2011)0625final/2 – C7-0336/2011 – 2011/0280(COD)).*

Experiences gained during the implementation of the various mechanisms of the CAP, including analysis of their negative consequences, as well as emerging new challenges, induce reforms to agricultural policy. Compliance with many regulations and the use of instruments for the protection and sustainability of the environment and animal welfare is not a new issue and it was introduced as compulsory already in the 1990s. In the currently proposed arrangements, the Commission is recommending a mandatory element of subsidies, which aims to provide more environment-friendly direct payments under the first pillar, the so-called “greening”.

The current shape of the subsidies scheme, additionally reinforced by the environmental component, requires simplification of the policy. “Greening” instruments should be easy to define and to assess, and must be integrated into the current system. They should not entail additional administrative burdens for farmers or lead to more inspections on farms⁴². However, farmers who wish to receive direct payments in full will be required to fulfil environmental requirements. National governments, members of the European Parliament and a number of organisations representing the interests of farmers have responded to the requirements proposed by the European Commission⁴³. Due to the importance in the discussion, the list of demands was based primarily on the unified draft report of the Commission for Agriculture and Rural Development of the European Parliament⁴⁴.

3.2. Rates, envelope and justification

From the point of view of the interests of individual countries, the most important issue will be the division of support between the Member States. The envelope calculation algorithm will decide about the rates for the area eligible for payment. The recital 21 of the Preamble, the European Commission's proposal reads as follows:

As regards distribution of support among Member States, it is proposed that all Member States with direct payments below 90% of the EU average will see one third of this gap closed. The national ceilings in the direct payments regulation are calculated on this basis.

⁴² The Future CAP after 2013 Copa-Cogeca proposals for ‘green growth’ (2013). Brussels, www.copa-cogeca.be/img/user/file/PAC2013/pac2013E.pdf.

⁴³ *Proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the Common Agricultural Policy, COM/2011/0625 final/3.*

⁴⁴ *Draft report on the proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy (COM(2011)0625final/2 – C7-0336/2011 – 2011/0280(COD)).*

Many of the demands in this area, including the position of the Polish Government⁴⁵, indicate the need for simplification and harmonization of forms used throughout the EU. The European Parliament proposes in this respect that “(...) the convergence point for the average level of support per Member State, in Euros per hectare, should be the actual average and not 90% of the average, as proposed by the Commission. Thus, the rapporteur proposes that the Member States below 70% of the EU average regained 30% of the difference, the states ranging from 70% to 80% of the average recovered 25% of the difference, while those that are between 80% and the average recovered 10% of the difference. It is not possible for any Member State to be below 65% of the EU average. This process should be funded proportionately by the Member States that are above the EU-27 average, while assuring that none of them falls below the average because of the use of this mechanism”.

In the financial table, which defines national ceilings for each Member State, including the total value of all the benefits, the European Parliament proposes to amend the Polish ceiling for 2014 from EUR 3,038,969 thousand (Amendment 107, Annex II) to EUR 3,079,652 thousand.

The above positions show the ongoing debate on the payment envelopes. There is a general tendency of gradual equalisation of rates per 1 ha of agricultural land, which seems to be justified, especially in the context of the ongoing price convergence across the EU Member States, which is the result of the functioning of the common market, and resulting in alignment of the unit cost of production in agriculture. Therefore, there was a number of proposals to reduce the rate diversification, which means the demand of growth in those countries where it is lower than certain projected ceiling (the EU average, or 90% of the average) and reduction where the ceiling has been exceeded. It should be noted that none of the proposals has foreseen the changes in the overall volume of funds allocated for financing of direct payments system, and hence the size of the national envelope is only the effect of requested reallocation between Member States. The total funds used to finance the system of direct support, and thus the rate possible to obtain per 1 ha, are of much importance for the agricultural sector and individual farms, especially in the context of the planned obligation to exempt part of land from cultivation and use it for ecological focus areas.

Therefore, in the course of the study, an analysis was made, aimed to determine the obtainable envelopes for individual EU countries, based on the submitted draft legislation (Table 3.1). The European Commission's original proposal, contained in Annex II of the *Draft Report...* and the European Parliament's proposals, contained in Amendment 107 and in the *Explanatory*

⁴⁵ The position of the Polish Government on the future of the Common Agricultural Policy. http://www.minrol.gov.pl/pol/content/download/36554/203779/file/Stanowisko_WPR_2013.pdf.

Memorandum of the Draft Report... have been taken into account⁴⁶. For Poland, the most preferred proposal is the one submitted in the *Explanatory Memorandum...* (the possibility of obtaining the rate of 208.9 EUR/ha of agricultural land), which arises from the fact that of all the other it goes the farthest toward equalizing the level of payments, i.e. increasing funds for the countries receiving relatively little funds – including, *inter alia*, Poland, although the greatest “net beneficiaries”, in relation to the European Commission's original proposal would have been the Baltic states, especially Latvia (159.8 EUR/ha, as compared to 92.8 EUR/ha resulting from the Commission's proposal). The calculation of the national envelopes according to the *Explanatory Memorandum...* takes into account the demand for achieving the minimum 65% of the EU average. In Latvia, Romania and Estonia, despite the increase of rate by 30%, the difference still remained below 65% compared to the EU average, and therefore it was assumed in the calculation that, in accordance with the Parliament's demand, it will be set at 65%. Also the principle was taken into account of not reducing the rate below the EU average for countries with rate above average before the reallocation. Such a situation occurred in the case of Luxembourg and the Czech Republic, hence the rate in calculations for these countries was set (Table 3.1) at the EU average.

Calculation of amounts for individual EU Member States was done primarily to identify the possible national envelopes and compare payment rates per 1 ha, mainly in the context of the implementation of the postulate to standardize them. On the basis of the results, an analysis was made of payments possible to obtain by the Polish farms that wish to use the subsidies; they will be obliged to abide by the principles of “greening” (i.e. all except those that are covered by assistance for small producers). To this end, from the data of the Agency for Restructuring and Modernisation of Agriculture, we determined the number of farms with an area of 3 hectares that benefited in recent years from direct payments and the area of good agricultural land, which is used by entities with an area exceeding 3 hectares and benefiting from direct support⁴⁷. We also used the possible national allocations (in line with individual proposals – contained in Table 3.1) and the postulated support for small producers.

⁴⁶ Table of allocation of funds for direct payments contained in Amendment 107 does not meet the criteria set out in the Justification (e.g. in some countries the postulated rate is less than 65% of the EU average), hence an analysis based on the two proposals.

⁴⁷ W. Czubak, W. Poczta, A. Sadowski, *Wpływ proponowanej reformy systemu dopłat bezpośrednich po 2013 roku na sytuację polskiego rolnictwa*, Wieś i Rolnictwo 4, Warsaw, 2011; W. Czubak, A. Sadowski, W. Poczta, *Wpływ reformy systemu dopłat bezpośrednich na dochody polskich gospodarstw rolnych z pola obserwacji FADN, Dopłaty bezpośrednie i dotacje budżetowe a finanse oraz funkcjonowanie gospodarstw i przedsiębiorstw rolniczych*, IAFE-NRI, Warsaw, 2011.

Table 3.1

Proposals for direct payment rates for the EU countries according to the European Commission's proposal and the draft report of the European Parliament

Country	Agricultural land [ha thousand]	According to Annex II of the draft Regulation			According to Amendment of the EP draft report			According to Explanatory Memorandum of the EP draft report*		
		Allocation of the national envelope [EUR million]	Rate [EUR/ha of agricultural land]	Average rate EU-27= 100	Allocation of the national envelope [EUR million]	Rate [EUR/ha of agricultural land]	Average rate EU-27 = 100	Allocation of the national envelope [EUR million]	Rate [EUR/ha of agricultural land]	Average rate EU-27 = 100
Austria	3,186	708	222.0	90	706	221.6	90	715	224.4	91
Belgium	1,376	554	402.3	164	555	403.2	164	528	384.1	156
Bulgaria	3,053	656	214.7	87	658	215.4	88	665	217.8	89
Cyprus	145	52	361.0	147	52	360.2	147	50	342.8	139
Denmark	2,662	943	354.2	144	940	353.1	144	894	336.0	137
Estonia	902	109	120.6	49	113	125.5	51	144	159.8	65
Finland	2,293	534	232.8	95	533	232.6	95	537	234.1	95
France	27,487	7,733	281.3	114	7,656	278.5	113	7,232	263.1	107
Greece	4,075	2,100	515.3	210	2,099	515.0	210	2,026	497.1	202
Spain	24,947	4,935	197.8	80	4,939	198.0	81	5,055	202.6	82
Ireland	4,139	1,241	299.8	122	1,236	298.7	122	1,165	281.5	115
Lithuania	2,657	396	149.2	61	403	151.6	62	474	178.2	72
Luxembourg	131	34	262.4	107	34	259.6	106	32	245.8	100
Latvia	1,759	163	92.8	38	177	100.3	41	281	159.8	65
Malta	10	5	525.2	214	5	530.1	216	5	507.0	206
Netherlands	1,915	807	421.5	171	810	422.9	172	772	403.3	164
Germany	16,916	5,276	311.9	127	5,237	309.6	126	4,968	293.7	119
Poland	15,457	3,039	196.6	80	3,080	199.2	81	3,229	208.9	85
Portugal	3,483	573	164.5	67	582	167.2	68	658	188.9	77
Czech Republic	3,523	893	253.4	103	891	253.0	103	866	245.8	100
Romania	13,729	1,472	107.2	44	1,486	108.2	44	2,194	159.8	65
Slovakia	1,940	387	199.4	81	392	201.9	82	396	204.0	83
Slovenia	488	142	290.1	118	141	288.1	117	133	271.8	111
Sweden	3,121	7,109	227.7	93	710	227.4	93	717	229.5	93
United Kingdom	16,146	3,624	224.5	91	3,653	226.2	92	3,659	226.6	92
Hungary	4,228	1,298	307.1	125	1,296	306.5	125	1,221	288.8	118
Italy	12,741	4,024	315.8	128	4,025	315.9	129	3,792	297.6	121
EU 27	172,509	42,407	245.8	100	42,407	245.8	100	42,407	245.8	100

* Calculation of national envelopes takes into account the demand of the minimum 65% of the EU average and the prohibition to reduce the rate below the EU average for countries with rate above the average before the reallocation.

Source: Own calculations based on the Draft Regulation... and Draft Report....

In this area the European Commission (Draft Regulation...) proposes to multiply the lump sum by three to determine the annual support for small producers, while the European Parliament proposes to increase this kind of assistance, by identifying the amount of subsidies as the product of the lump sum and number five. In both proposals, the share of such payments cannot exceed 10% of the aid allocated to the country. Adoption of the European Parliament's proposal (payment multiplied by five) means, in practice, the possibility of more support in those countries, where the number of farms up to 3 hectares of agricultural land is relatively small, so even with this relatively high aid they will not "consume" 10% of the national envelope.

Based on the above assumptions, subtracting funding for small-scale producers from the amount proposed for Poland in various versions of direct payments, we determined possible rates per 1 hectare for farms covered by support on general principles (Table 3.2).

Table 3.2

Allocations and rates of direct payments on the basis of the proposals of the European Commission and the European Parliament

No.	Description		According to the European Commission's proposals	According to the European Parliament Amendment 107	According to Explanatory Memorandum of the European Parliament
1	National allocation [EUR]*		3,038,969,000	3,079,652,000	3,229,149,579
2	Number of small producers (up to 3 ha of agricultural land) using direct payments		430,800		
3	The rate of payment per 1 farm covered by the scheme for small farms [EUR]	according to the proposal of the European Commission (flat rate * 3)**	670		
4		according to the proposal of the Commission (flat rate *5)	1,117		
5	Total pool of payments to small producers [EUR]	according to the proposal of the Commission (flat rate *3) [No.2*No.3]	288,636,000		
6		according to the proposal of the Parliament (flat rate *5) [No.2*No.4]	481,060,000		
7	Remaining pool of funds for direct payments with payments for small farms [EUR]	according to the proposal of the European Commission (flat rate *3) [No.1-No.5]	2,750,333,000	2,791,016,000	2,940,513,579
8		according to the proposal of the European Parliament (flat rate *5) [No.1-No.6]	2,557,909,000	2,598,592,000	2,748,089,579

Table 3.2

Allocations and rates of direct payments on the basis of the proposals of the European Commission and the European Parliament: cont.

No.	Description	According to the European Commission's proposals	According to the European Parliament Amendment 107	According to Explanatory Memorandum of the European Parliament	
9	Share of payments to small producers [%]	at a flat rate * 3 [1-No.7/No.1]	9.5	9.4	8.9
10		at a flat rate *5 [1-No.8/No.1]	15.8	15.6	14.9
11	Total pool of payments to small producers as 10% of the national allocation [EUR][No.1 * 10%]		303,896,900	307,965,200	322,914,958
12	Remaining funds for direct payments with payments to small farms as 10% of the national allocation [EUR][No.1-No.11]		2,735,072,100	2,771,686,800	2,906,234,621
13	Area of ⁴⁴ 2.1.1. 4. 1 2 on farms with more than 3 ha of agricultural land and benefitting from direct payments [ha]		13,130,489		
14	Rate of payment / 1 ha of agricultural land on farms above 3 ha with payments to small farms according to the Commission's proposal (flat rate *3) [EUR][No.7/No.13]		209.5	212.6	223.9
15	Rate of payment / 1 ha of agricultural land on farms above 3 ha with payments to small producers as 10% of national allocation [EUR] [No.12/No.13]		208.3	211.1	221.3

* See Table 3.1.

** Based on data from the Ministry of Agriculture and Rural Development.

Source: Own calculations based on the Draft Regulation... and Draft Report...

It was assumed that various proposals may be finally adopted in the legislative process, and therefore we included in the calculation six different rates, taking into account both different financial envelope for the Polish, as well as two different variants for support to small producers. In the course of the studies we determined that assistance to small farms as proposed by the European Parliament (multiplied by five) will cause that this form of support would need, in each of the possible options, over 10% of the national budget for direct payments. Therefore, we finally determined the possible rates, taking into account the European Commission's proposal (subsidies for small producers multiplied by three), and payment for small producers as 10% of the envelope. Rates possible to be obtained by farmers covered with subsidies under general

rules oscillate from 208.3 EUR/ha of agricultural land (assuming the European Commission's proposals for the allocation of funds for Poland and the designation of a pool for small producers as 10%) to 223.9 EUR/ha of agricultural land (assuming national envelope according to the proposals contained in the Explanatory Memorandum... and establishing payments to small producers multiplied by three). It must be noted that the cost (or lost revenue) relating to mandatory “greening” will depend on economic conditions, including in particular the economic conditions in individual markets for agricultural products and means of production, and therefore the amount of the possible rate of aid is particularly important in the context of its compensation function.

3.3. Division of the envelope to basic payment and greening (Article 33)

In the proposed reform, 30% of the national envelope for direct payments is to be allocated to greening. Financial provisions (Article 33) state that *in order to finance the payment for agricultural practices beneficial for the climate and the environment, Member States shall use 30% of the annual national ceiling*. The European Parliament did not propose any change to the proportion of the payments related to greening.

3.4. Flexibility between pillars (Article 14)

The mechanisms of the Common Agricultural Policy are divided into two groups, which are referred to as pillars. The first pillar of the CAP is formed by actions with direct impact on farm incomes and market stabilisation. These include primarily direct payments to producers, but also intervention and regulation of the agricultural market and external protection of the market. These activities are accompanied by support to structural changes, alignment of conditions for the development and ensuring a fair standard of living for the rural population, which constitutes the second pillar of the CAP. These support mechanisms provided for in the two pillars of the CAP should be linked and more consistent. In view of the above, it was suggested to make transfers of funds between the pillars. According to the proposal of the European Commission, *Member States may decide to make available as additional support for measures under rural development programming financed under the EAFRD, up to 10% of their annual national ceilings for calendar years from 2014 to 2019*.

The European Parliament proposes (Amendment 43), that the Member States may add the unallocated funds under the greening (i.e. thirty percent of the annual national ceiling for financing agricultural practices beneficial for the climate and the environment – Article 33) to funds transferred for the

development of rural areas in the form of support for agri-environment-climate measures in the rural development programmes financed by the EAFRD. The EP indicates that Member States should be able to transfer unused funds for “greening” to agri-environment-climate measures. The European Parliament also believes that support mechanisms provided for under the two pillars of the CAP should be linked and more consistent. Therefore, the EP is in favour of additional (i.e. *excluding transfer of unused funds under “greening”*) increase of the possibility of transfers from the first to the second pillar, when the amount of financial resources allocated to these pillars varies considerably between Member States. Member States with less favourable financial position with respect to the second pillar should be able to transfer up to 20% of their national envelopes.

3.5. Greening obligation

As previously mentioned, one of the possibilities in the new system of direct payments was the exemption of the smallest farms from the greening obligation. For this reason, a group of beneficiaries of direct payments was determined, who may be exempt from agricultural practices provided for greening.

Maximum size of a farm exempted from the greening obligation (Article 49)

Farmers entitled to payments may participate in the simplified payment system, “the system for small farmers”. After voluntary joining the support, the beneficiary would receive payment replacing direct payments and would be exempt at the same time from the inspection of requirements, as well as from sanctions for non-compliance with greening provisions. As the European Commission proposes that the amount of the annual payment to the system for small producers is set at a level equivalent to the national average payment per hectare multiplied by the number corresponding to the number of hectares, but no more than three, hence it can be assumed that this opportunity will benefit all farms with an area of up to 3 ha.

Other criteria for exemption (greening by definition) (Article 29)

In addition, exemption from greening would apply to farmers who meet the requirements (as defined in Article 29(1) of the Regulation (EC) No 834/2007) in relation to organic farming.

The European Parliament proposes (Amendment 69) to extend the definition of beneficiaries who would be exempt from the obligation to comply with the guidelines on greening, if they are beneficiaries of agri-environment-climate payments. This is justified by the fact (*Draft report...*) that *Double payments under both the greening and agri-environment-climate measure in*

rural development programmes shall be excluded. It is guaranteed that all agri-environment-climate measures go beyond the greening requirements.

Also farmers whose farms have been certified under the national or regional systems of ecological certification would be exempt from compliance with the guidelines on greening. This refers to a situation in which the farm is covered by a national or regional certification, and does not participate in the agro-environment-climate programmes. In such cases, although very rare, specific provisions determine the compatibility of national legislation with the guidelines set out in the agri-environment-climate programmes.

3.6. Maintaining permanent grassland (Article 31)

The European Commission proposes, but the European Parliament and other organisations do not propose any changes in maintaining permanent grassland. The relevant provisions require farmers to keep the area of permanent grassland which was reported in the application submitted in 2014. *Farmers shall be allowed to convert a maximum of 5% of their reference areas under permanent grassland. That limit shall not apply in the case of force majeure or exceptional circumstances.*

From the point of view of greening, pastures and meadows, in addition to providing roughage, also serve important environmental functions, even in such a way that they are natural habitats for many species of plants and animals. With the ability to store water, grasslands improve hydrographic conditions of soil and retain nutrients and pollutants before flowing to surface waters.

3.7. Diversification of crops (Article 30)

Number of crops

Preservation and systematic improvement of soil fertility, weed reduction, improvement of soil structure and biodiversity also depends on proper rotation. Therefore, the general provisions (Article 29) on direct payments determine that *farmers entitled to a payment under the basic payment scheme (...) shall observe on their eligible hectares (...) to have three different crops on their arable land where the arable land of the farmer covers more than 3 hectares and is not entirely used for grass production⁴⁸ (sown or natural), entirely left fallow or entirely cultivated with crops under water⁴⁹ for a significant part of the year.*

The European Parliament proposes to mitigate these guidelines (Amendment 65): *to have two different crops on their arable land where the arable land of the farmer covers between five and 20 hectares, and three*

⁴⁸ in this case, the literal translation of the *Proposal for a Regulation...* (2011) can be understood as: growing grass on agricultural land

⁴⁹ in this case, the literal translation of the *Proposal for a Regulation...* (2011) can be understood as: crops on overflow land

different crops where the arable land of the farmer covers more than 20 hectares. Therefore, this proposal can be summarized in the following manner:

- farms ranging in size from 1 to 3 hectares of agricultural land are excluded from greening,
- farms ranging from 3 to 5 ha of arable land are exempt from the diversification of crops,
- farms with area from 5 to 20 ha of arable land are required to maintain at least two crops,
- farms with area above 20 ha of arable land are required to maintain at least three crops.

The justification is that if the measure does not apply to farmers whose arable land is less than five ha, a distinction is made between farms larger than twenty ha and farms with an area of less than twenty ha of arable land.

Proportion of the crop in the crop structure

In addition to the minimum number of crops also the minimum area of a crop is defined (Article 30). *Where the arable land of the farmer covers more than 3 hectares and is not entirely used for grass production (sown or natural), entirely left fallow or entirely cultivated with crops under water⁵⁰ for a significant part of the year, cultivation on the arable land shall consist of at least three different crops. None of those three crops shall cover less than 5% of the arable land and the main one shall not exceed 70% of the arable land.*

The European Parliament proposes (Amendments 73 and 74):

Where the arable land of the farmer covers more than 5 hectares and up to 20 hectares, cultivation on the arable land shall consist of at least two different crops. None of those crops shall cover less than 10% of the arable land.

Where the arable land of the farmer covers more than 20 hectares, cultivation on the arable land shall consist of at least three different crops. The main crop shall not cover more than 70% of the arable land and the 2 main crops together shall not cover more than 95% of the arable land.

The first paragraph shall not apply to farms:

– *where the arable land is entirely used for grass production or other forage, entirely left fallow, entirely cultivated with crops under water⁵¹ for a significant part of the year or a combination of these,*

or

– *where the arable land of the farmer covers up to 50 hectares and more than 80% of the eligible agricultural area of the holding is covered by permanent grassland and pastures, or permanent crops.*

⁵⁰ explanation as above

⁵¹ explanation as above

In the impact assessment, the European Commission suggests that only 2% of agricultural land will be under the influence of this action and approximately 8% of farms will incur quite significant costs. In addition, “some states argue that the threshold of 70% may be raised to 85% for example, without loss of environmental benefits”⁵². The European Court of Auditors⁵³ is of the opinion that consideration should be given to revise upward the threshold of 3 hectares for the obligation to cultivate three different crops, because in some Member States, the threshold may be lower than the minimum number of hectares that farmers have at their disposal in order to be eligible for payment.

Definition of crop

The definition of crop is an element that will decide about complying with the diversification of crops. The effect of these provisions is dependent on the definition of crop (Matthews 2012). In the original proposal on the provisions of greening the European Commission did not specify the definition. The European Parliament (Amendment 75) proposes that for the purpose of crop diversification, a “crop” shall mean any culture (listed under Annex Va), i.e. see table 3.3.

Table 3.3

Categories of crops in the European Parliament's amendment to the greening proposal

Description of crops			
spring wheat or meslin, or spelt	winter wheat or meslin, or spelt	durum wheat	spring rye
winter rye	spring barley	winter barley	spring oats
winter oats	maize	rice	sorghum grain
buckwheat or millet or canary grass	cassava or arrowroot, or salep, or Jerusalem artichoke, or sweet potatoes	rape or colza	sunflower
soybeans	peanuts	linseed	other oilseeds and oleaginous fruits
alfalfa or sainfoin or clover or lupine or vetch, or melilot, or pea and bird's-foot trefoils	peas or chickpeas or beans, or lentils or other legumes	potatoes	sugar beet
sugarcane	sweet maize	hop	linen
hemp	tobacco	tomatoes	onion or shallots, or garlic, or leek, or any other bulb vegetables

⁵² A. Matthews, *Environmental public goods in the new CAP: impact of greening proposals and possible alternatives*. Committee on Agriculture and Rural Development, European Parliament, 2012, Brussels.

⁵³ Opinion No 1/2012 on certain proposals for regulations relating to the common agricultural policy for the period 2014-2020. The Court of Auditors of the European Union. www.eca.europa.eu.

Table 3.3

Categories of crops in the European Parliament's amendment to the greening proposal: cont.

Description of crops			
cabbage or cauliflower, or turnips, or Savoy cabbage, or similar edible brassicas	lettuce	chicory	carrots or turnips, or salad beets, or salsify, or celery, or radishes, or similar edible roots
cucumbers and gherkins	legumes	avocado	melon or papaya
saffron	thyme or basil, or lemon balm or mint, or oregano, or rosemary, or sage	carob pods	cotton

Source: Own study based on: *Proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the Common Agricultural Policy*, COM/2011/0625 final/3. *Draft report on the proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy* (COM(2011)0625final/2 – C7-0336/2011 – 2011/0280(COD)). *The Common Agricultural Policy after 2013*. The reaction of EU Farmers and Agri-Cooperatives to the Commission's Legislative Proposals. Copa-Cogeca - European Farmers European Agri-Cooperatives. PAC(12)4958:4 – SM], 2012.

Copa-Cogeca gives an identical list in specifying Commission's records. In addition, the list may be modified, because as proposed by the Parliament (Amendment 76):

The Commission shall be empowered to adopt delegated acts (...) in order to add other crops (...), and to establish the rules concerning the application of the precise calculation of shares of different crops.

3.8. Ecological focus areas (Article 32)

Proportion of ecological focus area

Individual guidance on greening will have different impact on the farms. It seems that the most important element is to determine the minimum area that must be excluded from use as an ecological focus area. The Commission proposes that 7% of eligible hectares of a farm was assigned to ecological focus areas. In accordance with Article 32 of the Commission proposal, *farmers shall ensure that at least 7% of their eligible hectares (...) is ecological focus area.*

The European Parliament proposes an exception (Amendment 84) so that, *the minimum percentage indicated in paragraph 1 is reduced to at least 5% in cases of joint undertakings of groups of farmers putting in place continuous, adjacent ecological focus areas.* The reason for this exception is to support the cooperation of farmers in order to create biodiversity corridors. One has to be aware of the fact that in regions with fragmented agrarian structure the required rate of 7% of ecological setting-aside will create small, spatially incoherent

areas isolated quite accidentally. The incentive in the form of diminishing the ecological focus areas by 2 percentage points in the case of joint establishment of increased area in farms organised for this purpose will improve environmental effectiveness of this mechanism.

Identifying farms required to isolate ecological focus area

Provision of the European Commission that *farmers shall ensure that at least 7% (...) means the inclusion of all farmers under the obligation to isolate the ecological focus area. The European Parliament proposes (Amendment 83) changes in provisions to: Where the eligible agricultural area covers more than 20 hectares farmers shall ensure (...).*

The rapporteur therefore proposes that these provisions apply only to farms over 20 hectares.

Due to the production and income effects of this provision, the proposal by Copa-Cogeca⁵⁴ is much further reaching. The provision on excluding 7% of area to ecological focus area should be replaced by the option (for farmers) to maintain at least 3% of the farm area as ecological area, except:

- pastures, meadows or land temporarily withdrawn from production,
- farms belonging to farmers engaged in agri-environmental activities, which should be considered “green by definition”, if their agri-environmental programme goes beyond greening,
- farms recognised as “green by definition”, if they meet the requirements of certified production that goes beyond cross-compliance in the field of environmental protection and climate change, and includes at least all agricultural land on the farm.

Development of excluded area (Article 32)

In its proposal, the European Commission defines a destination of the excluded area: *farmers shall ensure that at least 7% of their eligible hectares as defined in Article 25(2), excluding areas under permanent grassland, is ecological focus area such as land left fallow, terraces, landscape features, buffer strips and afforested areas.*

The European Parliament proposes a broader definition of ecological focus area (Amendment 83): *(...) - excluding areas under permanent grassland and pastures and permanent crops as defined in Article 31a(1), is ecological focus area such as land left fallow, terraces, landscape features like hedges or stone walls, buffer strips, land planted with nitrogen-fixing crops and afforested areas.*

⁵⁴ *The Common Agricultural Policy after 2013. The reaction of EU Farmers and Agri-Cooperatives to the Commission's Legislative Proposals.* Copa-Cogeca - European Farmers European Agri-Cooperatives. PAC(12)4958:4 – SMJ, 2012.

3.9. Other elements affecting the direct payments

Gradual reduction and limiting of payments (Article 11)

Redistribution of direct payments led to criticism of a very high concentration of support in the largest and usually most prosperous entities. It was necessary to develop a concept to reduce the support of major players and thus make a shift of assistance in favour of the smallest entities. The Commission's proposal suggests a gradual reduction of received support:

- by 20% for the tranche of EUR 150,000 to EUR 200,000;
- by 40% for the tranche of EUR 200,000 to EUR 250,000;
- by 70% for the tranche of EUR 250,000 to EUR 300,000;
- by 100% for the tranche of EUR 300,000 and more;

However, the proposal of the European Parliament contains a small change:

- by 20% for the tranche of EUR 150,000 to EUR 200,000;
 - by 40% for the tranche of EUR 200,000 to EUR 250,000;
 - by 80% for the tranche of EUR 250,000 and more;
- amount received after the application of these reductions is limited to EUR 300,000.

– System for small farmers (Article 49)

Pool of funds that will be earmarked for direct payments to most farms is determined by the amount of support potentially used in the voluntary system for small farmers. The original design of the Commission defined the scope of the mechanism: “the amount (...) cannot be lower than EUR 500 and more than EUR 1,000. According to the Parliament's amendment (Amendment 104) the upper limit is set at EUR 1,500”.

3.10. Summary

Direct payments are currently the basic instrument of the EU Common Agricultural Policy, which is used by the vast majority of farmers, greatly affecting the economic performance of individual entities, as well as the potential for development of the sector. Therefore, the shape of the direct support scheme, including in particular the amount earmarked for this purpose, the method of allocation to each state and farm, as well as the related obligations of beneficiaries, is of interest to both, the decision-making bodies and the farmers and their organisations. Numerous controversies generated by the proposals of the European Commission, regarding direct payments after 2013, contributed to the articulation of a number of alternatives, standing more or less opposed to the Commission's idea. The most important counter-proposals are summarised in Table 4. The methods of calculating national allocations raised concerns, but general accord was expressed in relation to the total EU-wide amount earmarked for direct payments. Taking into account the deepening

integration and the resulting price convergence, the proposed amendments were going in the direction of gradually reducing the difference between the rates of payments in individual EU countries. In addition, a lot of controversy was sparked by demands put forward by the European Commission on the shape of the “greening” of the system. The proposal to link 30% of the payment amount with ecological focus measures resulted in a number of comments mostly related to the obligation to diversify crops, the need for the designation of ecological focus areas and specifying the entities that meet the “greening” assumptions by definition. In case of the number of cultivated plants, it is proposed to move away from rigid rules and make it dependant on the area of agricultural land, which is all the more reasonable that in territorially smaller farms it is possible to use correct rotation without growing three crops a year. In the context of diversification it was proposed to clearly define what is a crop. A number of proposed amendments also apply to the most controversial point relating to the “greening”, which is to designate ecological focus areas. The furthest going proposals are those of agricultural organisations (Copa-Cogeca), which assume the reduction from seven to three per cent. The European Parliament calls in this field for “promoting” cooperation between farmers, through the possibility to reduce the proportion of ecological focus area to 5% in the case of joint ventures. This approach is justified since it gives the ability to create larger areas and thus better fulfilling the ecological focus function. In addition, the European Parliament's proposals fill in an important gap in the European Commission's original proposal, namely they add permanent crops and traditional meadows and pastures to the land not included in the areas excluded from production. In terms of recognising farms that meet “greening” assumptions by definition, the European Parliament goes further than the Commission, calling for the recognition of all those involved in agri-environmental programmes and not just applying organic farming systems. This approach of the EP appears to be justified, because not only organic farmers use environment-friendly practices.

Table 3.4

Selected proposals for changes to the system of direct payments after 2013

Object	Original proposal of the European Commission	Proposed amendments of the European Parliament and of the Council and other
1. Financial issues		
National payment envelope [EUR]	Poland 3,038,969,000	Poland 3,079,652,000
Rate [EUR / ha of total agricultural land]	Poland 196.6	Poland 199.2
	Recital 21 of the Preamble, Annex No. 2	Amendment 107 of the EP

Table 3.4

Selected proposals for changes to the system of direct payments after 2013:cont.

Object	Original proposal of the European Commission	Proposed amendments of the European Parliament and of the Council and other
1. Financial issues		
National payment envelope [EUR]	Poland 3,038,969,000	Poland 3,229,150,000
Rate [EUR / ha of total agricultural land]	Poland 196.6	Poland 208.9
	Recital 21 of the Preamble, Annex No. 2	Justification of the EP Draft Report - national ceilings
Rate of payment for farms with area of more than 3 ha, taking into account payments to small producers	Individual rates contained in Table 1	
	Recital 21 of the Preamble, Annex No. 2	Amendment 107 of the EP; Explanatory Memorandum of the EP Draft Report - national ceilings
Division of the envelope to base rate and greening [%]	30 Article 33	no change
Flexibility between pillars	Possibility of transferring up to 10% of funds from the first pillar to the second Article 14	Transfer of funds unallocated to greening to be used for agri-environment-climate measures in the second pillar for up to 20% of the national envelope of payments in the first pillar. Amendment 43 of the EP
2. Issues related to "greening"		
Meeting the requirements of greening "by definition"	Certified organic farms Article 29	Beneficiaries of agri-environment-climate programmes and certified organic farms (also in accordance with national certification procedure) Amendment 69 of the EP
Permanent grassland	Obligation to maintain an area of permanent grassland with a possibility to re-qualify up to 5% Article 31	no change
Diversification of crops	Obligation to grow three different crops on arable land in farms with area of more than 3 ha; none of those three crops covers less than 5% of the arable land and the main crop does not exceed 70% of the arable land	3 ha - 5 ha: no obligation of diversification; 5 ha - 20 ha: obligation to grow two different crops, none of these crops covers less than 10% of the arable land; above 20 ha: obligation to grow three different crops; main crop may not cover more than 70% of the arable land, and the two major crops do not cover more than 95% of cultivated land
	Article 29 and Article 30	Amendment 65 and Amendment 73 of the EP

Table 3.4

Selected proposals for changes to the system of direct payments after 2013:cont.

Object	Original proposal of the European Commission	Proposed amendments of the European Parliament and of the Council and other
Permanent grassland	Obligation to maintain an area of permanent grassland with a possibility to re-qualify up to 5% Article 31	no change
Diversification of crops	Obligation to grow three different crops on arable land in farms with area of more than 3 ha; none of those three crops covers less than 5% of the arable land and the main crop does not exceed 70% of the arable land	3 ha - 5 ha: no obligation of diversification; 5 ha - 20 ha: obligation to grow two different crops, none of these crops covers less than 10% of the arable land; above 20 ha: obligation to grow three different crops; main crop may not cover more than 70% of the arable land, and the two major crops do not cover more than 95% of cultivated land
	<u>Article 29 and Article 30</u>	Amendment 65 and Amendment 73 of the EP
Diversification of crops	there is no provision	no obligation of diversification: - if arable land is entirely used for production of grass or other forage plants, or it is left fallow or - if arable land covers up to 50 ha and more than 80% of the agricultural land is permanent grassland or permanent crops
	<u>Article 30</u>	Amendment 74 of the EP
Definition of crop	Absence of a list of crops, the Commission's power to adopt delegated acts that define "crop"	List of crops on page 16
	<u>Article 30</u>	Amendment 75 and Amendment 109 of the EP
Determination of farms required to comply with the obligation to designate the ecological focus area	All farmers participating in the system of direct payments except for small farms up to 3 ha	Farms with area above 20 ha of agricultural land
	Article 32	Amendment 83 of the EP
Designation of ecological focus area	Lack of exceptions - at least 7% of eligible hectares	possibility to reduce to at least 5% in the case of joint ventures by groups of farmers forming permanent adjacent ecological focus areas
	Article 32	Amendment 84 of the EP

Table 3.4

Selected proposals for changes to the system of direct payments after 2013:cont.

Object	Original proposal of the European Commission	Proposed amendments of the European Parliament and of the Council and other
Designation of ecological focus area	maintaining at least 7% of eligible hectares	maintaining at least 3% of the area of the farm as an ecological focus area, with the exception of pastures, meadows or land temporarily withdrawn from production
	Article 32	Copa-Cogeca
Designation of ecological focus area	exemption from the obligation to maintain ecological focus area of permanent grassland	exemption from the obligation to maintain ecological focus area of permanent grassland and pastures, areas of permanent crops and land planted with nitrogen-fixing crops
	Article 32	Amendment 83 of the EP
Gradual reduction and limiting of payments	<ul style="list-style-type: none"> – by 20% for the tranche of EUR 150,000 to EUR 200,000; – by 40% for the tranche of EUR 200,000 to EUR 250,000; – by 70% for the tranche of EUR 250,000 to EUR 300,000; – by 100% for the tranche of EUR 300,000 and more; 	<ul style="list-style-type: none"> – by 20% for the tranche of EUR 150,000 to EUR 200,000; – by 40% for the tranche of EUR 200,000 to EUR 250,000; – by 80% for the tranche of EUR 250,000 and more; – amount received after the application of these reductions is limited to EUR 300,000.
	Article 11	Amendments 35-37 of the EP

Source: Own study based on: Proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the Common Agricultural Policy, COM/2011/0625 final/3. Draft report on the proposal for a regulation of the European Parliament and of the Council establishing rules for direct payments to farmers under support schemes within the framework of the common agricultural policy (COM(2011)0625final/2 – C7-0336/2011 – 2011/0280(COD)). The Common Agricultural Policy after 2013. The reaction of EU Farmers and Agri-Cooperatives to the Commission's Legislative Proposals. Copa-Cogeca - European Farmers European Agri-Cooperatives. PAC(12)4958:4 – SMJ, 2012.

4. Subsidies and financial standing of commercial agricultural holdings

Adam Kagan

4.1. Theoretical introduction

The most commonly used instrument to assess the financial standing of a business entity, while providing a comprehensive knowledge to all the stakeholders, is a ratio analysis. The measurement of financial standing of a farm usually comes down to the evaluation of two main aspects of its functionality, namely the security level of its activities and the size of benefits achieved by the owners – a group of the closest stakeholders⁵⁵. Both areas are considered most often in parallel, but separately. In addition, taking into account the time factor allows to enlarge the field of analysis (Table 4.1).

Table 4.1

The main financial aspects of agricultural holdings and the plane of their measurement

Main aspects	Time factors	
	a short-term perspective	long-term perspective
Financial security	<p>Liquidity analysis</p> <p>It helps to establish the ability to regulate the most pressing financial obligations</p>	<p>Analysis of a long-term solvency</p> <p>It gives an opportunity to evaluate the ability of the entity to regulate obligations in a long term</p>
Benefits for owners	<p>Profitability analysis</p> <p>It gives the opportunity to evaluate what are the financial benefits of farming and production factors</p>	<p>Investment analysis</p> <p>It allows to determine whether the potential of a farm will be preserved/extended or limited in the future</p>

Source: Own study based on: D. Wędzki, Analiza wskaźnikowa sprawozdania finansowego, Wolters Kluwer, Kraków 2006; L. Bednarski, Analiza finansowa w przedsiębiorstwie, Wydawnictwo Naukowe, PWN, Warszawa 2007.

Farm owners under the influence of external factors and taking into account available production resources and current economic performance of their entity, have to choose an appropriate structure of the investment capital and the funding sources (capital employed). The optimal structure should ensure the financial security and resource operation of the unit on the one hand, and on the other, it should provide the highest amount of profit and income. There may, in

⁵⁵ E. Nowak, *Analiza sprawozdań finansowych*, Polskie Wydawnictwo Ekonomiczne, Warsaw 2008.

fact, be some contradictions between the actions to improve or provide financial security and the desire to increase the performance benefits of an agricultural holding⁵⁶. With the increase of short-term financial security, freedom and independence of the conducted business grow. Excessive liquidity ratios for agricultural holdings may, however, indicate a mismanagement of resources, which follows from maintaining higher than the necessary amount of working capital and cash. Limitation of liquidity in the situation of exceeding the needs of the farm significantly contributes to reduction of actual financial costs (in the case of financing current assets with credits and loans) or opportunity costs (in the case of financing with equity, trade credit)⁵⁷.

The financial security should be considered in slightly different terms when we extend the time horizon from the current to a longer perspective. Using an oversimplification, it is conditioned by the degree of external financing of the activity.

In households, for which the main source of capital are own funds – recognised as the safest source of funding – there is no need to generate income to cover the cost of debt capital and its repayment in the future. Such an entity does not benefit from positive effects of the leverage in the situation when adjusted return of assets is higher than the interest on borrowed capital used. In this situation, there is no possibility to extend the scale of operations (or to maintain it), and thus to generate additional financial surplus⁵⁸.

Profitability analysis provides information on what benefits the current farm owner acquired from its possession or what benefits it brought to other stakeholders. Agricultural holding profitability, however, may be lower than the potential one, not only because of cautious strategy of action aimed at ensuring a high financial security of the entity (current and long-term), but also from the fact of the implementation of the investment, including those consisting in the acquisition and major renovation of fixed assets. One of the next areas of strategic decisions is the replacement scope of production assets, which determines the future profits from the agricultural holding. Implementation of the investment brings not only the resignation of consumption (reinvest surpluses), or liquidity constraints (reduction in the size of current assets), but typically it generates additional financial costs, such as raised debt-capital service cost on financing the investment, or increased depreciation cost.

Investments in agricultural holdings must be seen not only in terms of real capital analysis. Because of the nature of agricultural activity, important non-

⁵⁶ G. Gołębiowski, P. Szczepankowski, *Analiza wartości przedsiębiorstwa*, Difin, Warsaw 2007.

⁵⁷ G. Hawawini, C. Viallet, *Finanse menadżerskie*, PWE, Warsaw 2007.

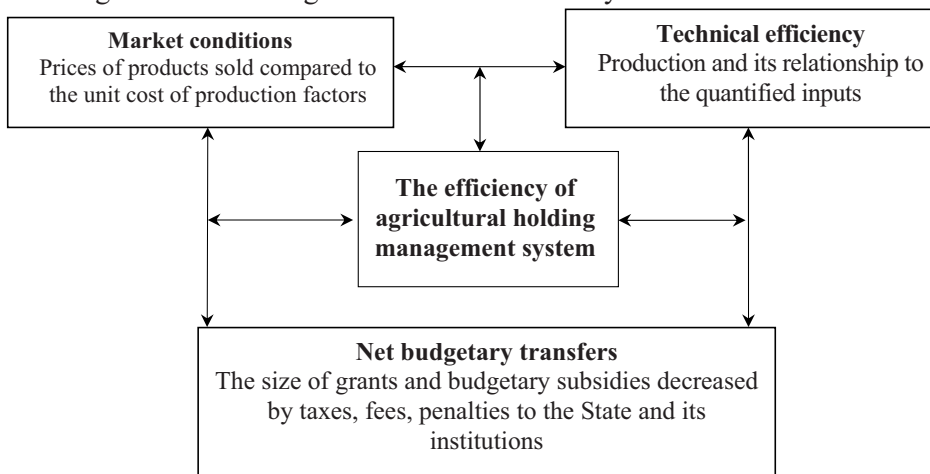
⁵⁸ M. Sierpińska, T. Jachna, *Metody podejmowania decyzji finansowych. Analiza przykładów i przypadków*, Wydawnictwo Naukowe PWN, Warsaw 2007.

-financial aspect is ability to maintain the natural production potential of the units. Investments in natural capital (content of organic matter in soil, biodiversity, protection against soil erosion, animal health, etc.) may, in fact, limit the current financial benefits from agricultural holding, but they precondition its efficient performance in the future⁵⁹.

The financial standing of an agricultural holding is shaped by a number of elements resulting from the adopted system and management efficiency, but also by the conditions resulting from the environment. The impact of individual components of the environment may be significantly heterogeneous, individual elements may interact in opposite directions, and the relationship of household financial standing can only be perceived indirectly. Assuming a significant simplification, three main groups of factors determining the financial benefits to the owners of the agricultural holding can nonetheless be determined (Diagram 4.1).

Diagram 4.1

Simplified diagram of factors determining the financial standing of agricultural holding and benefits obtained by the owners



Source: Own study.

Budget subsidies transferred in the form of direct State aid to agricultural holdings have become one of the important elements that shape both the current and future financial standing of the agricultural holding after the integration with the European Union. Direct payments, payments coupled to the production, as well as targeted payments have become insignificant as the basic instruments of

⁵⁹ E. Lichtenberg, J. Shortle, J. Wilen, D. Zilberman, *Natural Resource Economics and Conservation: Contributions of Agricultural Economics and Agricultural Economists*, „American Journal of Agricultural Economics”, vol. 92, issue 2, 2010.

state compensation, shaping the desired behaviour of farmers, even against the declared objectives of their pursued production activity⁶⁰. Thus the ability to raise funds under the State aid and direction of their use started to play an important part in the agricultural holding management State aid. Individual subsidy instruments influence the areas determining the financial standing of an agricultural holding to varying degrees and in different directions (Table 4.2).

Table 4.2

The expected impact of selected budget payments and subsidies on the factors determining the financial standing of commercial agricultural holdings after integration with the EU

Selected support instruments	Areas of agricultural holdings financial standing			
	Liquidity	Long-term solvency	Profitability	Investments
Direct payments (basic and complementary)	↑↑	↑↑	↑↑	↑↑
Payments to LFA	↑↑	↑	↑	↑↑
Agri-environmental payments	↑↑	↑↑	↑↑	↔
Sugar payment	↑	↑↑	↑↑↑	↑
Investment subsidy				↑↑↑↑
In total EU funds	↑↑	↑↑	↑	↑↑
The fuel excise tax return	↑	↔	↑	↔
Certified seed payments	↑	↔	↑	↔
Interest rate of investment loans subsidies	↓	↓	↓	↑↑↑
In total state instruments	↑	↔	↑	↑↑
In total subsidies	↑	↑↑	↑↑	↑↑

⁶⁰ The arrow up (↑) talks about the positive effect of the phenomenon, down (↓) about the negative, and the symbol ↔ indicates lack of association. Number of arrows indicates the strength of the relationship, with a maximum estimated amount of five arrows represents a very strong impact, and one – weak or very weak. Dependencies have been considered only in the short term, the effects expected in the long term were omitted because of their complexity and various interactions.

Source: Own study.

The effect, however, depends not only on the support instrument, the conditions for State aid and the size of the stream of resources to entities. Interaction effects are in fact determined by the financial situation of the entity, adopted system of management and vulnerability to the intervention of the given

⁶⁰ R.J.F.Burton, G.A. Wilson, *Injecting social psychology theory into conceptualisations of agricultural agency: Towards a post-productivist farmer self-identity?*, „Journal of Rural Studies”, vol. 22, issue 1, 2006.

type of an agricultural holding⁶¹. The conducted research analysed only highly commercial agricultural holdings focused on market activities, which allowed to determine the probable direction of the impact of the various support instruments on a rather homogeneous population of units. However, even within the groups analysed the impact of individual subsidies may be different due to: adopted development strategy, accessibility of production resources, administrative restrictions on activity, especially affecting the production scale, the same scale of activity and limiting the State aid.

The specific administrative requirements to be met by individual agricultural holdings in order to use a given form of payments and budget subsidies constitute an important factor. In general, they limit the benefits for the individual agricultural holding from the subsidies because of transaction and adjustment costs that have to be paid to get the support. Conditions for the granting of payments and subsidies generally generate not only differentiated transaction costs associated with their acquisition, but also the need to incur expenditures to comply with the imposed standards of production safety for consumers and the environment, such as cross compliance rules⁶².

The individual budget support instruments interact also with other factors that determine the financial standing of agricultural holdings, and these relationships are often contradictory (Table 4.3).

Budgetary payments and subsidies affect the deterioration in the relative prices of products disposed of in relation to the goods purchased. They also affect the acquisition cost, and in case of holders of subsidiaries (leaseholders) the cost of using another important factor, which is arable land. The current research has confirmed the phenomenon of capitalization of financial support in the form of higher ground rent^{63,64}. The level of capitalization, however, is dependent on the degree of certainty for State aid and linking it with agricultural production⁶⁵. In the case of land owners (relationship between production and land ownership) a capitalization support mechanism in the form of ground rent (price or income) does not cause an outflow of resources from agricultural holding.

⁶¹ W. Józwiak, A. Kagan, Z. Mirkowska, *Innowacje w polskich gospodarstwach rolnych, zakres ich wdrażania i znaczenie*, „Problems of Agricultural Economics”, no. 3, 2012.

⁶² J. Kulawik, *Koszty administracyjne i transakcyjne subsydiowania rolnictwa*, „Problems of Agricultural Economics”, no. 2, 2012.

⁶³ M. Roberts, B. Kirwan, J. Hopkins, *The incidence of government program payments on agricultural land rents: the challenges of identification*, „American Journal of Agricultural Economics”, vol. 85, issue 3, 2003.

⁶⁴ L. Latruffe, C. Le Mouél, *Capitalisation of government support in agricultural land prices: What do we know?* „Journal of Economic Surveys”, vol. 23, issue 4, 2009.

⁶⁵ M. Patton, P. Kostov, S. McErlean, J. Moss: *Assessing the influence of direct payments on the rental value of agricultural land*, „Food Policy”, vol. 33, issue 5, 2008.

Table 4.3

The expected impact^{a)} of selected payments and budget subsidies on specific areas of the financial standing of commercial agricultural holdings after EU integration

Selected support instruments	Areas of agricultural holdings financial standing		
	Market conditions	Efficiency in using resources	
		technical (market resources)	Environmental (natural capital)
Direct payments (basic and complementary)	↓↓	↓↓	↑↑
Payments to LFA	↔↓	↓↓	↑↑
Agri-environmental payments	↓	↓↓↓	↑↑↑↑
Sugar payment	↓	↑	↔
Investment subsidy	↓	↑	↑
In total EU funds	↓	↓↓	↑↑↑
The fuel excise tax return	↔↓	↔	↔
Certified seed payments	↔↓	↑	↑
Interest rate of investment loans subsidies	↔↓	↑	↔↑
In total state instruments	↔↓	↑	↔
In total subsidies	↓	↓↓	↑↑↑

^{a)} ↔↓ means there is no relationship or very weak negative correlation is expected ↔↑ means there is no relationship or very weak positive correlation is expected

Source and other indications as in Table 4.2.

The impact of the State aid on improving the use of productive resources towards more environment friendly is not questioned. Especially agri-environmental programmes to promote investments in natural capital, to increase production capacity and to protect agricultural holdings and provide for more environment friendly attitudes.

An important issue is the impact of budget subsidies and payments for technical use of productive resources in agriculture. Results of current researches show that the aid from public funds, including direct payments, has a negative impact on technical efficiency and productivity of agricultural holdings^{66,67}. It is also assumed that in Poland on account of the applied payment system, both in the form of direct payments (single area payment and supplementary payments) and LFA, the payments negatively affect the efficiency of resources use. However, they encourage farmers to keep the production on marginal soil and even to conduct apparent farming in order to obtain budget subsidies. In principle, the agri-environmental payments are to reduce the intensity of agricultural

⁶⁶ H. Guyomard, L. Latruffe, C. Le Mouël, *Impact of CAP direct payments on French farms' managerial efficiency*, INRA conference materials, Switzerland, France 2007.

⁶⁷ X. Zhu, O.A. Lansink, *Impact of CAP Subsidies on Technical Efficiency of Crop Farms in Germany, the Netherlands and Sweden*, „Journal of Agricultural Economics”, vol. 61, issue 3, 2010.

production, as a compensation for certain production practises. They also lead sometimes to apparent farming and the use of marginal land.

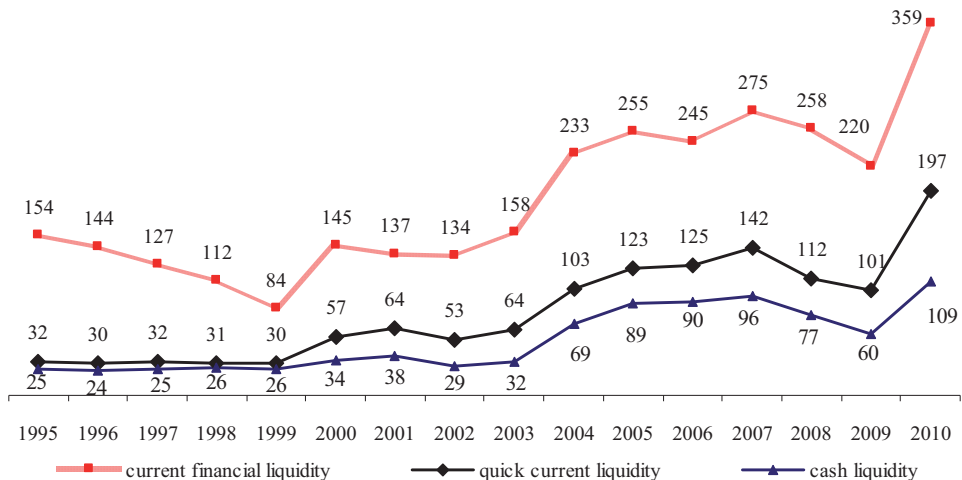
4.2. Financial standing of highly commercial agricultural holdings

Research of financial standing of commercial agricultural holdings was performed both in dynamic terms, using time series, as well as in terms of static analysis of cross-sectional data. For this purpose data collected from farm survey samples numbering from 65 highly commercial agricultural holdings in 1995 to 131 agricultural enterprises in 2010 were used. The cross-section analysis researched agricultural holdings in 2008-2010. The research included only non-cooperative units of the private sector, excluding State-owned companies.

In the dynamic terms the weighted average of the indicator was used for the entire research sample in a given year, so after taking into account the economic potential of the given unit. Whereas, cross-sectional data reflected the financial standing of a particular highly commercial agricultural holding in a given year.

Analysing the distribution level of liquidity ratios in time, three main periods can be distinguished, in which the changes were observed. In the 1995-1999 period the current liquidity ratio steadily decreased, while the quick and cash liquidity remained stable (Figure 4.1). In 2000, the rates increased, but by 2003 fluctuated to a small range. Since 2004, an increasing trend has been observed with the exception of adjustment in 2008-2009.

Figure 4.1
Liquidity ratios for highly-commercial agricultural holdings in 1995-2010

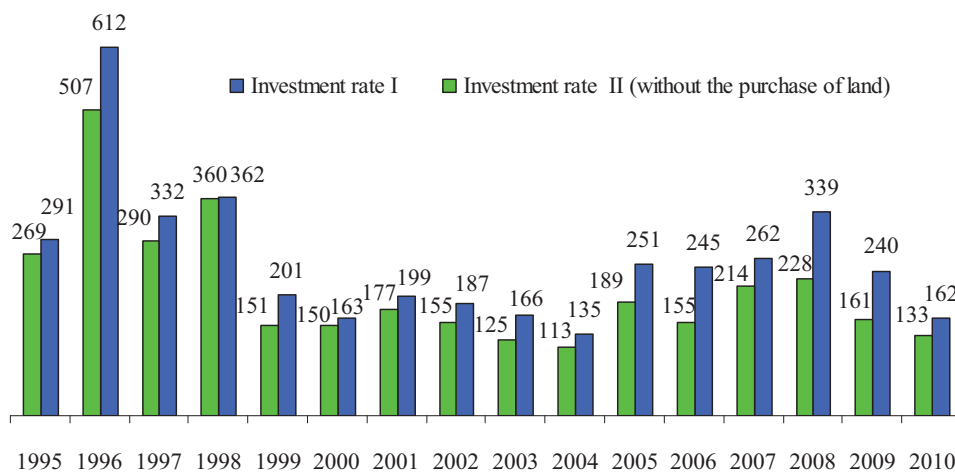


Source: Own research.

Examining the investment in fixed assets, one can see three periods – the formation of cycles in investment rate levels (Figure 4.2).

Figure 4.2

Level of investment of highly commercial agricultural holdings in 1995-2010



Source: Own research.

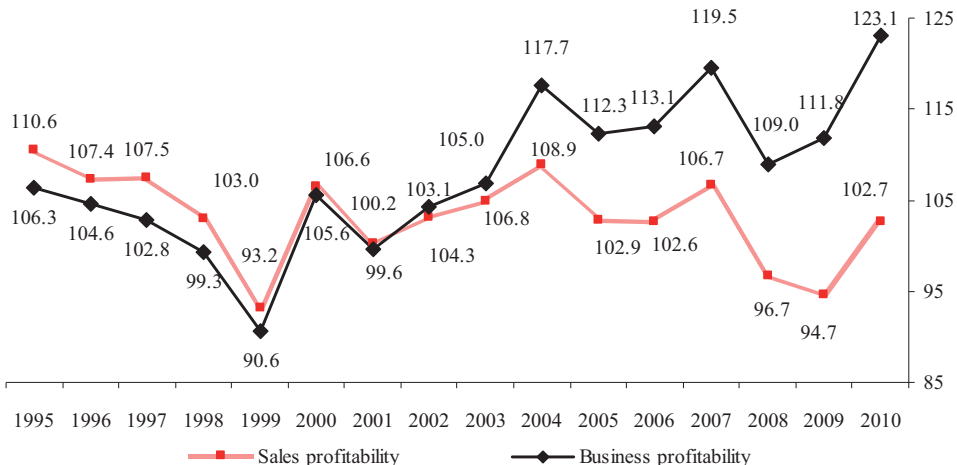
It should be noted that this process is not continuous, and usually every few years the replacement of main machinery and major repairs of farm buildings take place and the rapid investment growth in consequence. The first period covered the years 1995-1998, when significant investment outlays were incurred, which resulted from the acquisition of assets from former State-owned farms and the purchase of movable assets, including machinery, vehicles and equipment. The 1999-2003 period was characterised by significantly lower levels of investment. In 2004 investments allowed only for simple reproduction of fixed assets as a result of waiting for the expected effects of EU integration (increased risk resulting from lack of knowledge as to the final outcome of the integration process in agriculture) and the start or announcement of the start of the process of granting support to investment from structural funds (mainly "SOP – Agriculture" and RDP).

As in the case of liquidity, in examining the sales profitability index three periods can be divided (Figure 4.3).

In 1995-1999 there was a development trend involving the reduction of sales profitability index to the level of 93.2, which means failure to cover the cost of basic activity with operating revenues from sales of products. The collapse of the financial performance of agricultural enterprises was the result of a number of negative factors for agriculture, of which the most important was

the impact of the effects of the financial crisis in Russia. The crisis resulted in a significant reduction in the export of our agricultural food products to this destination and a decline in agricultural commodity prices in the country. In 1999-2004, a development trend was visible which consisted in an increase in the sales profitability index. Since 2004, there has been a change in the direction of the trend, as there was a decline in this indicator.

Figure 4.3
Profitability index: of sales and overall in 1995-2010



Source: Own research.

In contrast to the sales profitability index, overall profitability in 1999 showed a linear increase. An interesting phenomenon in the 1995-2001 period was the development of the sales profitability curve above overall profitability index. This means that agricultural enterprises operate under a lot of pressure of the cost of raising debt capital. During this period, the difference between the two rates was caused primarily by financing activities, which were influenced by the amount of the costs resulting from credits and loans.

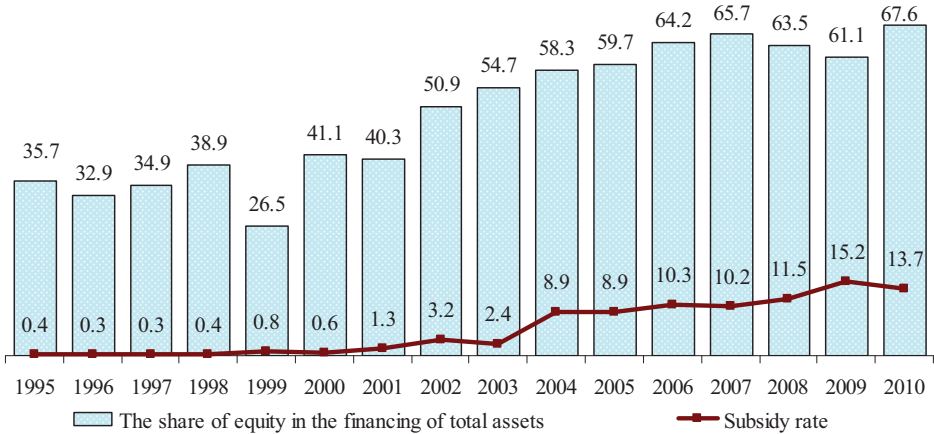
Starting from 2002, an improvement in profitability of the entire economic activity was noted among the population of highly commercial holdings, and the index was shaped above the sales profitability curve. Thus, we observed an increase in the importance of budget support instruments in the form of direct aid, rather than through the price mechanism on the economic results of the surveyed population, which indicates the subsidy rate (the share of subsidies in total revenue) (Figure 4.4).

Since subsidies and payments not related to the price increase the revenue from the other operating activities, it is reflected under the accounting system in

the result of overall economic activity. After the Poland’s integration with the EU in 2004, there was a significant increase in financial performance depending on the level of agricultural enterprises for direct budgetary support. This relationship deepened over time, as evidenced by the gradual alienation of the profitability curve of the entire business from the sales profitability.

Figure 4.4

The share of equity capital in the capital used and subsidy rate in 1995-2010 (%)



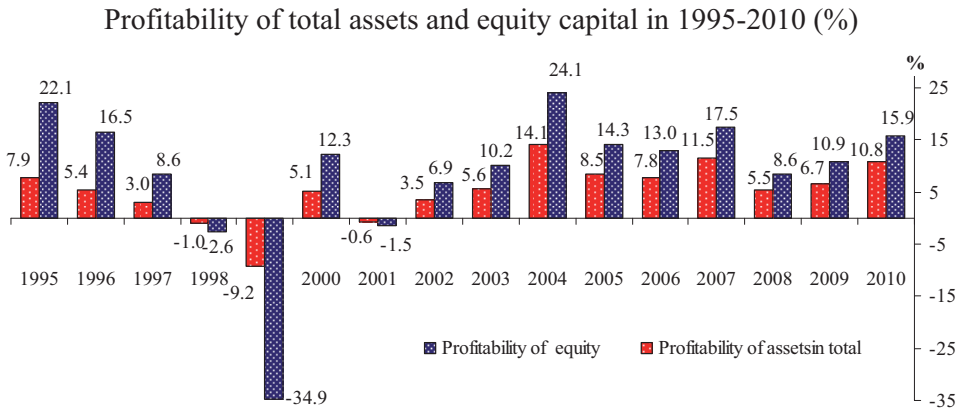
Source: Own research.

Profitability of business also translated into profitability indices of total assets and equity capital (Figure 4.5). However, while these indicators in 1995-1999 declined steadily, and then grew in 1999-2004 (with the exception of a significant deviation in 2000), it is not possible to determine the trend of development in the 2005-2010 period.

Stabilization of the profitability index of total assets was the result of a systematic increase in farm assets. Whereas the profitability of equity capital stabilised due to the increasing share of assets owned by highly commercial agricultural holdings (Figure 4.4).

A rough idea of a full evaluation, what are the financial benefits to owners from agricultural activities and owned production factors is, however, evidenced by the value creation index, which is a relation between the profitability of equity and profitability of 52-week treasury securities (Figure 4.6).

Figure 4.5

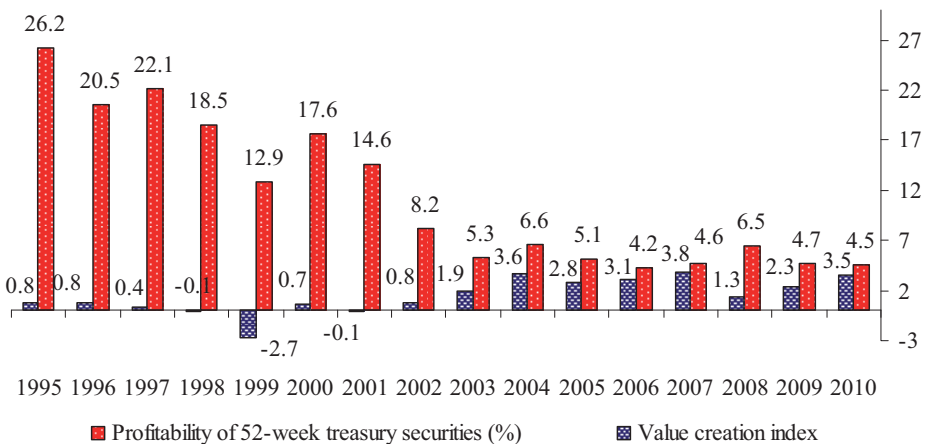


Source: Own research.

Analysing the financial results of highly commercial agricultural holdings, it should be noted that by 2003 on average an investment in their equity capital assets did not allow to obtain attractive rates of return. Treasury security, and thus secure instruments on capital market, provided much higher interest rates. In other words, the treasury securities are more attractive instrument to invest own funds (index rate less than 1). It is important to remember that, agricultural holdings similarly to entities in other industries are exposed to non-diversified risk, but also specific – in the agriculture industry, including the effects of making the production effects dependent on natural conditions.

Figure 4.6

Value creation index and profitability of treasury securities (%) in 1995-2010



Source: Own research.

Since 2003 we observed a high level of value creation index, far exceeding 1. Nonetheless, it was not stated that its level depends on the time factor. It can be assumed that significantly higher profitability index of equity capital than the profitability of treasury securities observed in 2003-2010, was due to increase in the level of direct subsidies to agriculture.

4.3. Factors affecting the financial standing of highly commercial agricultural holdings

In order to determine the effects of various factors on the level of indicators determining the financial standing of highly commercial agricultural holdings, we used the least squares method (KMNK). To estimate the multiple regression models we used a technique known as progressive stepwise regression, which allowed for the optimal choice of explanatory variables. In this method, the problem of estimating the parameters of the model is reduced to the selection of functions of coefficients, so that the sum of squares of the distances between each empirical point and theoretical value is as small as possible⁶⁸.

The data analysis of their change over time as a potential independent variables (explanatory) assumes that:

- ✓ Time factor (t) – represents the process of change in any organisation resulting from the stages of its development over time. In the conducted research it shows the process of “solidification” and going into the next phase of the life cycle of the organisation, from its inception to the development phase or the next one, i.e. the phase of maturity⁶⁹.
- ✓ Price relation ratio (price scissors – X_1) is a coefficient, which stands for the relationship of the dynamics of changes in the prices of products sold by agricultural holdings and the dynamics of prices of goods purchased (means of production, services).
- ✓ The subsidy rate (X_2).
- ✓ X_3 – The period of integration with the EU – binary variable, in which 0 is a code for the years before integration, while 1 – 2004-2010. This ratio showed a very high correlation with the rate of subsidy (Pearson correlation coefficient $K=0.9500$), so the two variables in the models were used interchangeably.
- ✓ The inflation rate in Poland (X_4).

⁶⁸ B. Borkowski, H. Dudek, W. Szczęsny, *Ekonometria. Wybrane zagadnienia*, Wydawnictwo Naukowe PWN, Warsaw 2004.

⁶⁹ A. Kagan, *Efektywność produkcyjno-ekonomiczna przedsiębiorstw rolnych, ze szczególnym uwzględnieniem spółek, w których prawa z udziałów wykonuje Agencja na tle procesów restrukturyzacji*, IAFE-NRI, Warsaw 2011.

- ✓ Exchange rate – the price of USD expressed in PLN according to quotation of the NBP (X_5).
- ✓ Gross Domestic Product (X_6) as a decisive factor in the demand for food products.
- ✓ Unemployment rate (X_7) as macroeconomic factor determining the possibility of finding employees, or changing job by the owner (migration from agriculture).

Studying the statistical correctness of generated models, we analysed the residuals that form a difference between the theoretical value obtained by putting in the model the values of explanatory variables and their corresponding observed (empirical) value. The Shapiro-Wilk test was conducted for the distribution of residuals for the verification of the hypothesis of normal distribution of the random factor⁷⁰.

Measuring the effectiveness of the structural parameters estimates were made by examining the presence of autocorrelation of the residuals. For this purpose, we used Durbin-Watson test. The verification of the model was completed with checking its homoscedasticity. In order to verify it we used the Breusch-Pagan test to detect heteroscedasticity, i.e. the inequality of the two extreme subgroups of observation⁷¹.

The resulting multiple regression models for liquidity ratios were described with the linear function and they explained almost 90% of the variability in the variance of the current safety indicators (Table 4.5).

Table 4.5

Coefficients of multiple regression models estimated for indicators of liquidity^{a)}

Dependent variables Independent variables	The current financial liquidity (W_{bp})	Quick liquidity (W_{sp})	Cash liquidity (W_{gp})
Intercept	-253.152 *	-242.194 **	-85.914 *
The price relation ratio (X_1)	4.013 ***	2.904 ***	1.192 ***
The subsidy rate (X_2)		6.922 ***	
Integration with the EU (X_3)	112.418 ***		50.013 ***
Coefficient of determination R^2	0.8859	0.8890	0.9080
Shapiro-Wilk test	W = 0.964 p = 0.74	W = 0.952 p = 0.53	W = 0.922 p = 0.18
Durbin-Watson test	D=2.252 p = 0.60	D=2.252 p = 0.72	D=2.252 p = 0.69
Breusch-Pagan test	LM = 4.507 p=0.11	LM = 6.002 p=0.11	LM = 4.051 p=0.11
Coefficient of variation	14.29%	22.03%	18.8%

Note: The significance of the parameters in Student's test was determined as follows: For $0.01 < \alpha < 0.1$; ** $0.001 < \alpha < 0.01$, *** for $\alpha < 0.001$.

^{a)} Presenting the obtained model parameters, the explanatory variables were omitted that were not statistically significant.

Source: Own research.

⁷⁰ R. Czyżycki, R. Klóska, *Ekonometria i prognozowanie zjawisk ekonomicznych w przykładach i zadaniach*, *ECONOMIKUS*, Szczecin 2011.

⁷¹ G.S. Maddala, *Ekonometria*, Wydawnictwo Naukowe PWN, Warsaw 2006.

The statistically significant variables in the models include: price scissors ratio (all three models), binary variable – integration with the EU (the current and cash liquidity) and the subsidy rate (quick ratio). The models were successfully validated in statistical terms, also a satisfactory result of random variation coefficient was achieved, which indicates the high predictive quality of the constructed models. It should be noted that the current financial security of highly commercial agricultural holdings was largely dependent on the level of subsidization. In the case of rapid liquidity the effect was observed directly in the form of the dependence of the ratio on the share of obtained payments and subsidies in total revenues. In the case of cash flow the dependency was reinforced with the reduction in inflation (decrease in opportunity cost of holding cash), which followed the Polish integration with the EU. The change in the level of the current liquidity ratio was also affected by inventory management in the studied population, especially in the case of cereals. Changing the intervention system for cereal market, which took place after 2005, that is resigning from buying grain in a calendar year in which it was harvested, encouraged manufacturers to invest in warehouse space. More farmers started to store grain on their farms for the next calendar year, obtaining generally higher prices in the spring-summer period⁷².

The model estimated for the ratio of equity capital participation in the financing of the balance sheet assets the only statistically significant variable was the time factor (Table 4.6). The longer the highly commercial agricultural holdings operated on the market the more they reinvested profits in production assets, thereby increasing the degree of self-financing. The increase in the level of subsidization after Polish integration with the EU did not accelerate this process significantly, but allowed to continue the development trend.

The linear dependence of sales profitability and two independent variables, i.e. price scissors ratio and subsidies ratio, have created an effective model of a very high coefficient of determination, and also a low coefficient of random variation (standard error relation to the average value of the indicator). The resulting equation confirmed the negative correlation between the rate of subsidy and sales profitability. The increase in the level of the revenue in the form of subsidies or direct subsidies by 1% resulted in a reduction in the reference population of sales profitability index by more than 6.6% on average. During the study period, however, this resulted from a decrease in technical efficiency, since the correlation index of subsidization rate and price relationships in 1995-2010 was positive, though not statistically significant ($K = 0.3596$ at a significance level of $p = 0.17$).

⁷² A. Kagan, *Korzyści i straty producentów zbóż w sezonie 2004/2005 spowodowane zmianą systemu interwencji rynkowej w Polsce*, „Problems of Agricultural Economics”, no. 4, Warsaw 2005.

Table 4.6

Coefficients of multiple regression models assessed for indicators of the share of equity capital, sales profitability and overall profitability

Dependent variables \ Independent variables	The share of equity capital (W_{ukw})	Sales profitability (W_{os})	Overall profitability (W_{oo})
Intercept	27.031 ***		
Time factors	2.673 ***		
The price relation ratio (X_1)		1.080 ***	1.054 ***
The subsidy rate (X_2)		-6.613 ***	0.789 ***
Coefficient of determination R^2	0.8894	0.9980	0.9989
Shapiro-Wilk test	W = 0.889 p = 0.054	W = 0.911 p = 0.12	W = 0.949 p = 0.48
Durbin-Watson test	W = 1.383 p = 0.053	W = 1.421 p = 0.07	W = 1.769 p = 0.22
Breusch-Pagan test	LM = 0.611 p = 0.11	LM = 0.546 p = 0.11	LM = 0.766 p = 0.11
Coefficient of variation	10.71%	4.78%	3.45%

Source and markings as in Table 4.5.

In contrast to the sales profitability index in the model explaining the variability of the overall profitability index, the increase in subsidies caused an increase in the value of the explanatory variable. It is important to emphasize the positive impact of the sales profitability index on overall profitability, and this to a certain extent means that the impact of subsidies on financial performance of agricultural holdings is being removed. However, despite the deterioration in the sales profitability, subsidies improved the overall profitability index.

The attempts to establish econometric models for profitability indicators of assets, own capital and value creation index (VCI) were unsuccessful. The relationship of these variables were obtained only from the change in subsidies ratio (in Table 4.7 there is an example for VCI). It should be noted, however, that the ROA indicator is determined by profitability of economic activity and the turnover of assets (the value of total revenue attributable to total assets), which is used as the setting of the DuPont's indicator system. ROA ratio stochastic interrelation with the rate of subsidy is thus the derivative of deterministic interrelation with total operating profitability. Equity capital profitability is in turn determined by ROA ratio and the share of equity capital, and in the value creation index the cost of capital is additionally used. It is difficult to find a variable allowing for differentiation of these indicators using time series.

It was also impossible to obtain fully effective models for indicators reflecting the level of investment (Table 4.7).

In the case of investment rates using multiple regression model a statistically significant model was constructed, but the estimators were not effective due to the phenomenon of heteroscedasticity. Results of Breusch-

Pagan test indicated no homoscedasticity and attempts at corrections led to a significant deterioration in the accuracy of the model, which was low anyway (high rate of random variation).

Table 4.7

Coefficients of multiple regression models estimated the index of the value and investment rate

Dependent variables \ Independent variables	Value creation index (VCI)	Investment rate (S_{ii})	Adjusted investment rate (S_{iii})
Intercept		-684.35 *	
Time factors			-9.418 **
The subsidy rate (X_2).	2.92***		
The level of inflation (X_4)		8.782 **	2.718 ***
Coefficient of determination R^2	0.7667	0.3380	0.8918
Shapiro-Wilk test	W = 0.089 p = 0.051	W = 0.947 p = 0.44	W = 0.914 p = 0.136
Durbin-Watson test	W = 1.634 p = 0.23	W = 2.030 p = 0.42	W = 1.818 p = 0.25
Breusch-Pagan test	NO	LM = 9.632 p = 0.11	LM = 4.925 p = 0.11
Coefficient of variation	81.42%	37.78%	38.9%

Source and markings as in Table 4.5.

Although the resulting equation was not the right prognostic tool, one should pay attention to the factors affecting the level of investment. As time passed, the adjusted investment rate was decreased, due to the base effect (the larger the value of assets, the higher level of depreciation, and thus the denominator of the ratio), as well as the decreasing needs of households in improving the status of fixed assets. A positive correlation with the rate of inflation indicates an apparent correlation, resulting from the high level of cost of capital in 1995-1998 (including inflation), when the most intense acquisition of the assets of the former state-owned farms and large capital expenditure took place.

4.4. Summary

1. Subsidies in the form of different payments as State intervention instruments in agriculture from the period of Polish integration with the EU have become important factors determining the financial standing of highly commercial agricultural holdings. This results primarily from an increase in the stream of resources transferred to agriculture. At the same time, however, the components of the stream affect different areas of economic activity of the surveyed population, including the financial one. It is not enough, therefore,

to analyse the total dimension of support, but also each time it has to be reasonably disaggregated.

2. Based on the graphical distribution of indicators over time which are used to measure financial performance and performed estimations of several multiple regression models it was stated that the level of subsidization had a positive effect on the current financial safety of highly commercial agricultural holdings (liquidity ratios). Long-term safety, however, was more dependant on the duration of activity of the holding on the market, and therefore the phase of its development.
3. The level of subsidies and payments, however, reflected in the decline in sales profitability index, mainly by reducing the technical efficiency of the resources used in production, and to a lesser extent due to the deterioration of price relations of products sold and goods purchased. Profitability of sales was higher in holdings characterised by a greater share of investment subsidies in the total value of financial support. On this basis, it can be said that this form of assistance has a positive effect on the profitability of the total business, but at the same time it makes financial results dependent on budget support to the smallest extent. Public funds targeted at highly commercial agricultural holdings in 2004-2010 have not had a statistically significant impact on the increase of the level of investment in the group, however, they were important from the point of view of the direction of investment, including the introduction of modern technology.
4. Support of rural development from the European Agricultural Fund for Rural Development in the new programming period offers great opportunities to improve the efficiency of the use of budgetary resources by encouraging appropriate behaviour and desired activities among farmers. Policymakers identifying priorities, tasks, and detailed solutions of Common Agricultural Policy at the EU and national level can actively contribute, therefore, to the increase in financial efficiency, and thus the competitiveness of our agriculture, including highly commercial agricultural holdings. Effective instrument in this regard should be the measure “Investments in fixed assets”, and thus a shift in the focus of the support to agricultural holdings in Poland in the direction of this activity by even reducing funding for direct payments. Investments, especially in innovative solutions, have a long-term positive impact on the improvement of the financial standing of highly commercial agricultural holdings since they stimulate growth of technical efficiency of production. Support of the process of investing in fixed assets may also significantly contribute to improving the use of natural capital (natural) through the use of the natural environment-friendly technologies.

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