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BARRIERS TO THE IMPLEMENTATION OF INSTRUMENTS ASSISTING SUSTAINABLE DEVELOPMENT OF AGRICULTURE

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Abstract

This paper provides identification and assessment of barriers to the implementation of the instruments of the Common Agricultural Policy (CAP) that support sustainable development of agriculture. This issue has been studied on the example of individual farms of south-eastern Poland, which benefited from programs to support sustainable agriculture in 2004-2013. The introduction of agriculture on the path of sustainable development depends on institutional factors (including political), which can induce farmers to take into account the environment and future generations in their microeconomic decisions. It has been shown that the most important barriers to the efficient and effective implementation of programs in support of sustainable agriculture are financial and information and education constraints.

Key words**:** *sustainable agriculture, sustainable development, farms, Common Agricultural Policy*

INTRODUCTION

The issue of sustainable agriculture is widely addressed in economic literature, but the main emphasis is put on the need to care for the natural environment resources, as well as on the necessity of balancing economic, social and environmental governance [28]. Much attention is paid to the theoretical aspects of sustainable agriculture and practical difficulties in its implementation [25, 26, 28], as well as the global (ecological and demographic) and regional challenges of the process [1, 9, 11, 15]. Also continues an uninterrupted debate on the role of the Common Agricultural Policy (CAP) and its various instruments in the sustainable development of agriculture [7, 10, 13, 14, 16, 22]. Interdisciplinarity and multifaceted concept of sustainable agriculture causes appearance of different problems in the evaluation of its implementation, because such an assessment requires the use of metrics that allow to specify the scale and scope of the implementation of sustainable development, taking into account each of the spheres, and also - at different levels - from single farm to the agriculture as a sector of the national and the global economy [2, 16, 27, 28]. The literature addresses the problem of barriers in the implementation of agricultural practices for sustainable agriculture [20, 24], while relatively little research touches barriers to implementation of CAP instruments in support of sustainable development at farm level [8, 12, 19].

Sustainable development of agriculture should be seen as an ongoing process of finding the optimum balance between the economic, social and environmental targets [16, 17, 21]. Agriculture is on the path of sustainable development, if these objectives are achieved relatively seamlessly (simultaneously and harmoniously) and at the appropriate level, i.e. above a certain threshold requirements for the economic, social and environmental governance. Sustainability is also related to a specific, relatively homogenous agro-system whose balance consists of micro balances achieved at farm level.

A key role in the introduction and maintenance of agriculture on the path of sustainable development is played by a state (government policy, Common Agricultural Policy) and the institutional system of agriculture shaped by the state. We can refer

to the model with the induced development and innovation (Fig. 1).

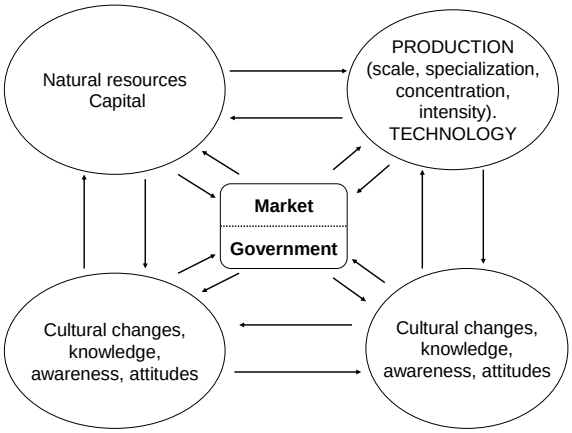

Fig. 1. Location of the state policy in the system of relationships that shape the development of agriculture
Source: author's own based on [4]

In this model, the state (government) and the market are in the center of the chain of links and interactions with elements like natural resources, capital, production and technology, cultural changes and other informal and formal institutions (regulations, organizations, etc.). Changes take place in accordance with the logic of the market, which forces manufacturers to be driven by the imperative of economic efficiency and competitiveness. The problem is that externalities are not valued by the market, and many of the benefits of sustainable agriculture is postponed, and often related to future generations. Therefore, securing the interests of the "dumb" market participants, i.e. the nature and future generations can only be made by a political factor (government) [28]. It is the government (state policy more broadly, in the EU - CAP) who has the ability to correct decisions of market participants and influence the scale and way of use of natural resources, scale and concentration of production, or the type of applied technologies (e.g. in the direction of intensification in agriculture).This is done among others, by the impact on the factor capital and formal and informal institutions (creating cultural change, knowledge, increase of environmental awareness). But here comes the problem of scale and ability of the state to influence these processes, the hierarchisation of objectives, selection of instruments, and the effectiveness of their targeting and implementation. This issue is very broad and complex. One of the topics that deserve special attention are the barriers and constraints faced by the implementation of tools (programs, activities) to support the sustainable development of agriculture.

MATERIALS AND METHODS

The aim of the study is to determine the farmers' barriers to the implementation of the activities supported from CAP funds, and leading to the sustainability of farms. CAP instruments include not only financial support, which has to reward farmers for their services to the environment and society, but also to support by information and advisory services, carried out by different institutions in agriculture environment. Recognizing the limitations and barriers to implementation of CAP instruments extends knowledge of the sustainable development of agriculture, and can also be used to modify the support system of agriculture.

The empirical material was gathered through questionnaires of farms in the Podkarpackie Region (South-Eastern Poland), using different CAP instruments that support sustainable development of agriculture in 2004-2013. The study was conducted in 2014 on a sample of 131 randomly selected individual farms.

Podkarpackie region is rich in natural surroundings (protected areas, landscapes), it is characterized by difficult business conditions in many areas (foothill and mountain areas), the fragmentation of the agrarian structure, characteristic social conditions in rural areas (overpopulation, unemployment and labor migration, and on the other hand a relatively favorable age structure and educational structure of the agricultural population) and the predominance of family farms. Similar structural and social conditions in agriculture are found in other parts of the EU, hence the findings may be of interest from the perspective of other regions of the EU.

RESULTS AND DISCUSSIONS

In the examined group of farms with agri-environmental programmes (AEP) a total of 72 farms (55%) benefited in 2004-2013. Frequently farmers chose package 8 - Protection of soil and water, which was used by 26% of households, then package 1- Sustainable Agriculture and package 2 - Organic farming (Table 1). The support structure of households according to the amount of funds was similar to the total in the country (Fig. 2).

Table 1. Characteristics of the surveyed households by the use of CAP instruments that support sustainable development of agriculture in 2004-2013

Packages of the agri-environmental programme (AEP)	% farms	Other instruments	% farms
1. Sustainable farming	11.5	- Afforestation of agricultural land	6.8
2. Organic farming	10.7	- Afforestation of non-agricultural land	3.0
3. Extensive permanent grasslands	6.1	- Support in less-favoured areas (LFA)	37.4
4. Protection of endangered birds species and natural habitats outside Natura 2000 areas	8.4	- Diversification into non-agricultural activities	2.3
5. Protection of endangered birds species and natural habitats in Natura 2000 areas	3.8	- Establishment and development of micro-enterprises	1.5
6. Preservation of endangered genetic plant resources in agriculture	-	- Participation of farmers in food quality schemes	1.5
7. Maintenance of genetic resources of endangered animal species in agriculture	2.3	- Advisory and consulting services for farmers	8.4
8. Water and soil protection	26.0	- Other (support for environmental investments)	5.3
9. Buffer zones	3.1	Total farms	51.1
Total farms benefiting from AEP	55.0	- Including the use of more than one instrument	9.2
- Including the use of more than one package	14.5		

Source: own research

Relatively more funding went to farmers under the package 2 - organic farming, and package 4, and 9, which is related to the abundance of protected areas and fragmented and ribbon-shaped structure of the fields in the region. In contrast, relatively less funds was acquired by farmers as part of the package 8, as a result of country area lower than average in the of the surveyed households, and thus a smaller agricultural area (UAA) covered by support. 14.5% of the surveyed farmers benefited from two or more AEP packages, combining, for example, a package of 2 - Organic farming and package 3 - Extensive permanent grassland. The surveyed farms (67 units, ie. 51.1%) also benefited from other activities in support of sustainable development of agriculture (Table 1). Some farmers (6.1%) were using at the same time AEP and other activities to promote sustainable agriculture, while a total of 22.9% of the units have benefited from more than one support instrument.

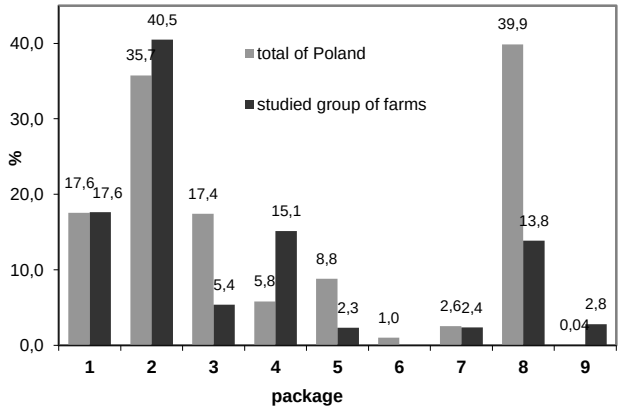

Fig. 2. Structure of financial support farmers under the AEP (2004-2013)
Source: own research and statistics of Agency for Restructuring and Modernization of Agriculture

The implementation of the concept of sustainable agriculture at the farm level is influenced by a number of internal (characteristics of farmers and their farms) and external factors (economic and institutional environment, the characteristics of agricultural production space, the instruments used to promote sustainable agriculture). These features can stimulate farmers to implement steps to balance the farms, but also can create barriers. These barriers affect dysfunction of incentive mechanism for sustainable development, which consists of: the right knowledge and information, which further translates to the perception of the concept of sustainable development, openness to good practice, the right attitude of the farmer and the tendency to change towards sustainable management (Fig. 3).

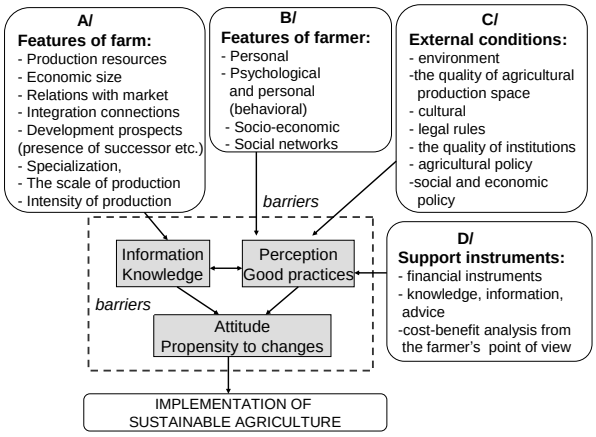

Fig. 3. Effect of endogenous factors (A, B) and exogenous (C, D) for the implementation of sustainable agriculture for farmers
Source: own study based on [3, 18]

Research shows that the implementation of sustainable agriculture takes place in a large-area units and those that use the possibility to increase the resources of the earth by way of lease (Table 2). These farms have more diversified production than the average farm in Podkarpackie province, as evidenced by a lower proportion of cereals in crop structure and a higher proportion of households engaged in plant and animal production. At the same time the tested units, against the background of agriculture of the region are characterized by greater intensity of agricultural production, as evidenced by animal density per 100 ha of arable land, and the use of mineral fertilizers (Table 2).

Both stocking and the dose of mineral and organic fertilizers, together with plant protection products in the vast majority of households, however, do not exceed the standards in sustainability analysis of farms [27] (the average rate of livestock in SD/ha was 0.7, and nitrogen efficiency standards were exceeded only by 4.5% of households).

It should be emphasized that, as in the whole region, including in the sample, there is a high percentage of households having permanent grassland and they do not conduct animal production (39.7% and 45.8% without ruminants), which violates one of the basic criteria of sustainable agriculture.

The surveyed farmers are younger compared to the average age of the users of holdings in the Podkarpackie province.

For the most part, they have a lot of experience in running the farm (the average length of service is 19 years) and have a good preparation for the profession (57% of them have agricultural education). In addition, at least 3/4 of farmers had secondary education, while in the region the result was 38.1% (Table 2).

Table 2. The selected features of the surveyed units on a background of the total farms in Podkarpacie

Specification	Investigated farms:		Total Podkarpacie region*
	total	implementing AEP	
Average area of arable land per farm (ha)	17.9	26.6	4.1
The share of permanent grassland in area of agricultural land (%)	26.2	30.1	30.3
Percentage share of cereals in cropping area	70.5	69.2	73.6
Agricultural holdings which lease land (%)	47.3	65.6	11.2
Average livestock units per 100 ha of AL	56.4	51.1	17.6
Cattle stock in head per 100 ha of AL	33.5	26.3	17.5
Agricultural holdings applying:			
- Mineral fertilization (%)	71.8	68.7	66.5
- Organic fertilization (%)	60.3	68.7	53.8
- Plant protection products (%)	79.4	82.8	68.2
The average level of mineral fertilizer NPK kg/ha AL	110.2	72.5	61.0
The average age of head of farms (years)	45	47	52
At least secondary education (% of farmers)	76.3	78.1	38.1

* Data from the *Agricultural Census* 2010 for farms > 1 ha of AL
Source: own research.

These characteristics of farmers and their farms can be considered as favorable to implementation of sustainable agriculture, while their opposite variants (eg. a small area of the farm, the farmer's advanced age, poor education, lack of animal products), it should be considered as barriers to this process.

In view of the multiplicity of factors affecting the implementation of the concept of sustainable development by farmers (Fig. 3),

we want to focus further on the barriers that hinder the effective interaction of CAP instruments in support of sustainable agriculture (part D in Fig. 3). When asked about this, farmers recognized financial barriers as the most important (Table 3), but this category of restrictions includes:

- too low - in the opinion of farmers - subsidies that do not fully compensate for the loss of financial benefits (lower revenues, higher production costs) resulting from the conduct of extensive, ecological production;
- lack of own funds for the implementation of investment projects related to the sustainable development of the farm;
- liquidity problems arising from periodic delays in obtaining payments and expenses associated with the implementation of pro-environmental actions.

Financial barriers were indicated by 45% of respondents in the first place, and generally up to 91.6% of the respondents (farmers could point to the 3 barriers defining the rank of importance). These results are different compared to studies conducted in north-eastern Poland in the years 2006-2007 by M. Mickiewicz et al. [19] and in the years 2008-2011 by J. Kaminski [12]. These studies have shown that at the stage of implementation of agri-environmental program of the first edition (2004-2006), and in the early years of the second edition of the AEP (2007-2013) farmers faced the problem of insufficient knowledge of the program, which resulted in their distrust of the potential benefits of the pro-environmental actions. They lacked a fito-sociological knowledge , qualifications required in grassland to the appropriate package and a variant of AEP. The problem was also limited access to agri-environmental advisors and experts, for example ornithologists and botanists, necessary for the implementation of the package and bird habitat. Complicated and time-consuming process of joining AEP was made worse by frequent changes in the rules on the packages and changes in the methodology for compiling a nature [12]. Farmers indicated as the most important barriers and bureaucracy, therefore, the lack of adequate (detailed) information and consultancy packages AEP. Research in 2014 shows that still bureaucratic barriers and issues related to certification and expertise are up to date, but financial constraints are the most important for farmers. The problem of too low payments was indicated by nearly 3/5 of the respondents (58.8%), in particular those who implemented AEP action. In contrast, the lack of own resources was pointed out as a barrier by farmers who benefited from the support of pro-environmental investments and investments to improve the quality of production or its diversification and the search for alternative sources of income (diversification of agricultural activities, the creation and development of micro-enterprises). As we know, EU grants only cover part of the cost of eligible projects of this type (50% or slightly more), and the financial outlay for their implementation are usually high. In view of the lack of capital, farmers have to resort to bank loans or other return financing instruments (e.g. lease), the cost of which (despite a fall in interest rates) are still high. A lack of equity was also indicated by many farmers who implement AEP package (25%) or other pro-environmental actions. These activities are not directly related to support investment in the farm. However, organic production, implementation of agrotechnical processes, ensuring animal welfare, afforestation etc., requires expenditures for equipment, repairs, purchase of livestock, plants, sometimes hiring foreign labor or third party services. Therefore, financial constraints are important in the implementation of such projects.

The significance of bureaucratic barriers in the implementation of activities in support of sustainable development of agriculture is pointed out by many researchers [8, 19]. Also, in these studies, they occupied a prominent place in the hierarchy of constraints (including 3/4 of them pointed to farmers). These barriers were divided into 3 different groups, according to the stage of the action (Table 3). At the application stage, respondents pointed out that "the application forms are too large and complex and require professional help from outside". They also

raised the problem of prolonging the application procedures and the uncertainty of obtaining support, which "blocks the implementation of specific projects."

Table 3. Barriers in implementing activities in support of sustainable development of agriculture

A kind of barrier (problem)	Response rate of farmers (%):		The restrictions hierarchy indicator W_{ho} for farms:	
	in first place	total	implementing AEP	other
Financial constraints (low payments, lack of own financial resources for realization of tasks)	45.0	91.6	1.00	1.00
Bureaucracy - at the application stage	19.1	68.7	0.75	0.78
Insufficient advice and specialized training	17.6	65.7	0.77	0.74
Bureaucracy - implementation of the action (project)	12.2	62.6	0.71	0.67
Bureaucracy - control and settlement of project	18.3	58.0	0.92	0.89
Problems with certification and expertise	24.4	52.7	0.86	0.78
None (deficiency) relevant knowledge and information	9.9	50.4	0.61	0.74
No visible effects of measures	8.4	49.6	0.50	0.71
Agrotechnical problems	17.6	42.1	0.74	0.68
Limiting the flexibility and freedom of action	9.2	40.5	0.64	0.65
Inefficient use of resources	11.5	32.1	0.64	0.69
Unfavorable balance of non-financial outlays /effects	6.1	29.8	0.61	0.74
Others	0.8	1.6	0.02	0.01

Source: own research

At the stage of implementation of activities, respondents pointed to difficulties such as:
- strict rules for the implementation of many agronomic and environmental activities,
- discrepancies between the beneficiary and the institution of control in terms of the accuracy of the tasks, the area covered by the support, etc.,
- too detailed checks,
- unclear rules for the many activities,
- nuisance of agri-environmental performance records,
- the need to involve too much time to complete all the formalities.

Bureaucratic barriers at the stage of ex-post and settlement mean in turn:
- ambiguity and variability of the control and billing,
- excessive control and billing accuracy,
- disparity of sanctions for any misconduct,
- excessive number (frequency) of controls.

Nearly 2/3 of the farmers could see the barrier of lack or scarcity of specialist advice and training, in particular on the ecological production systems, unconventional - environmentally-friendly technology, and on instruments to support the sustainable development of agriculture.

Barriers in obtaining the relevant certification of farm or an ornithological expertise or botanical were pointed to by respondents leading organic production, farmers who participated in food quality schemes and implementing habitat and bird AEP packages. Among others, the limited number of certification bodies and experts, nuisance and protraction of procedures, and their complexity, as well as the constant changes in regulations was pointed out.

Further barriers and restrictions apply to agricultural technology (Table 3). Farmers complained about the increase in expenditure of labor and objectified related to the implementation of the required agrotechnical (especially for package - soil and water protection and the necessary secondary crops sowing here), which was associated with an increase in the cost of agricultural production. It was pointed out that the sowing catch crops that need to leave for the winter and plowed until after March 1, cause, especially on soils located in humid, late spring sowing the next crop. In addition, climatic and soil conditions often make it difficult for the timely implementation of the required agrotechnical, resulting in the risk of failures and troubles in the event of control.

Farmers also raised the problem of reducing the flexibility and freedom of action (Table

3). It is associated with agrotechnical requirements, but also the requirements for the protection of plants and fertilization, stocking and maintenance of animals (including breeding specific breeds) or afforestation. These requirements (rules) are a natural consequence of attending a given program (package), but in the opinion of farmers are sometimes too "stiff" (e.g. in terms of deadlines of agrotechnical activities). In the context of multiple AEP packages, the farmer is obliged to carry out specific procedures, maintain a constant permanent grassland surface, or agricultural land on the farm for at least five years. Such an obligation cannot be changed during the implementation, which raises certain production and economic risk (changes on the market, natural disasters, etc.). Farmers do not interpret the balance of costs/benefits of the implementation of the principles of sustainable agriculture only as monetary value. Being aware of the specific benefits of halting soil erosion processes, and improving soil fertility, they see also some drawbacks, e.g. the danger of dehydration (as a result of an excessive number of agrotechnical activities). Also, greater workload (not only directly related to the production, but also with the "red tape") and the aforementioned risk are an important element of the calculation of costs / benefits. As a result, some of the farmers, at the end of the operation, had not applied for additional support (25.4%).

Yet another limitation identified by the respondents (32.1%) is an inefficient use of resources of the farm. Such statements were voiced by farmers implementing some AEP packages, in which, they undertook to reduce or withdraw from the use of pesticides and fertilizers, reduce the number of cuts or leaving part of the meadows in the non-mowed state. These statements should be combined with other related "no visible effects of individual actions" (Table 3), which often came from the same respondents. It seems that some farmers are not fully aware of the benefits arising from the implementation of environmental actions or are not convinced as to the validity and effectiveness of the treatments. Some believe that the environmental benefits do not correspond to the scale associated with a package of treatments and land use restrictions. Farmers have a pro-manufacturing orientation, and pay less attention to the environmental benefits, hence, for example, the extensive use of permanent grassland, which leads to negative - from the point of view of productivity - changes in sward meadows and pastures, is perceived by them as an inefficient use of resources. In this context, it is better than ever to promote the idea of AEP as a tool to safeguard the valuable natural habitats and biodiversity supporting tool [12]. As you can see, this awareness is not common even among farmers implementing actions for the environment. Producers' interest in certain variants of agricultural AEP (bird or habitat) is motivated mainly by the amount of financial support.

Another barrier, exalted in the hierarchy, is the lack of adequate knowledge and information about the application to AEP and implementation of specific actions. This problem is closely related to the bureaucratic barriers, the more complex application procedures and the rules of the program, the greater the need for adequate information. As shown, the problem of the quality of information - it is a challenge for the advisory bodies and others - also applies to the nature and effects of actions in support of sustainable development of agriculture.

To illustrate the differences in the weight of individual barriers in implementing the cross-holdings of AEP and implementing other forms of sustainable agriculture, were used synthetic indicator of hierarchy restrictions W_{ho}. Therefore, each variable (barriers) was assigned point values depending on the position in the ranking of barriers indicated by the respondents (first - 3 points, the second - 2 points, etc.). By adding up the points for each variable the normalization transformation of these values using classical unitarisation has been made [23]. Its general the formula takes the form:

$$z_{ij} = \frac{x_{ij} - \min\limits_{i}\{x_{ij}\}}{\max\limits_{i}\{x_{ij}\} - \min\limits_{i}\{x_{ij}\}}; i = 1,2,...,n; j = 1,2,...,m$$

where $z_i = W_{ho}$ - a measure that specifies the significance of a given variable (barriers) in the hierarchy of barriers.

As a result of the normalization formula variable values belonging to the interval [0; 1] were obtained. W_{ho} ratio equal to 1 is the value of a variable that has gained the highest position (weight) in the hierarchy of respondents.

W_{ho} indicator values show that farmers using AEP bit more than the others felt the bureaucratic barriers at the stage of the operation and its settlement and control, as well as the barriers associated with obtaining certificates and expertise (Table 3).

This shows that especially in this program, it would be desirable to simplify the application procedures and other administrative requirements (reporting, documentation).

It would also be needed to facilitate farmers' access to expert and nature bodies. In turn, farmers pursuing other activities in support of sustainable development (e.g. diversification, environmental investments) felt strongly bureaucratic difficulties at the application stage, as well as barriers to information and education (Table 3).

They were also more skeptical in the context of the effects of these measures and more negatively perceived non-financial balance of the cost/benefit of pro-environmental actions.

If they are to effectively and efficiently implement the principles of sustainable development, farmers must be aware of the essence of this process. Therefore, respondents were asked to assess the meaning and effectiveness of policies for sustainable development of agriculture, not in terms of costs and benefits to the farms, but objectively in the context of general social objectives. Farmers' statements indicate that every second of them assesses support to sustainable agriculture as a necessary and effective (including 49.7% of the total population), but only 9.2% of the midst of them declare that nothing should be changed in this policy (Table 4). In contrast, 40.5% of respondents, despite a positive opinion in the context of the desirability and effectiveness of support believes that modifications are needed.

The group of farmers calling for major changes, also includes those who perceive the meaning of the policy, but they low-evaluated its effectiveness in its present form (3.1%).

It is significant that 45.6% of farmers have no opinion on the matter, so eagerly benefit from financial support from the various instruments of the CAP, but it cannot determine their usefulness and effectiveness in the context of general social interest.

These results indicate the great challenge facing institutions that should acquaint the public with nature and the desirability of promoting the sustainable development of agriculture.

Since the direct beneficiaries of instruments of this policy do not quite see it a social sense, so how effectively can taxpayers and consumers be convinced about the legitimacy of agricultural support?

Table 4. Evaluation of the effectiveness of the meaning of actions that support sustainable development of agriculture - in the opinion of the respondents

Type of response:	The percentage of farmers:		
	Total	Implementing AEP	Benefiting from other activities
There is no sense of such activities	1.6	-	3.0
I rate a low efficiency and effectiveness of such activities	3.1	1.6	4.5
Actions are necessary and effective, but must be modified, because they are not very efficient	40.5	62.5	19.4
Do not change anything	9.2	15.6	3.0
I do not have opinion on the subject	45.6	20.3	70.1
Most often mentioned proposals for change: 1/ increase financial incentives for farmers (compensation for lost profits and costs); 2/ simplify procedures and documentation; 3/ simplify the conditions for implementation of the program; 4/ better information and advisory support from the institutions.			

Source: own research

CONCLUSIONS

Key players in sustainable agriculture policies are agricultural producers, since they are directly involved in the processes that determine the effectiveness and efficiency of the implementation of this concept. Among the various instruments of influence of political factor (the European Union, the national government) on the evolution of agriculture towards the direction proximal to the model of sustainable development, financial instruments are crucial.

They can most effectively modify the system of farmer's objectives by affecting the level and structure of income distribution and thus affecting the correction of the internal balance of cost/benefit from the application of the principles of sustainable agriculture.

The financial incentive is a key stimulant for farmers to undertake pro-environmental actions, while financial factors constitute the most important barriers to the implementation of sustainable development of agriculture. Apart from them, important factors are those located on the side of knowledge and information, not only on the principles of sustainable agriculture and conditions for access to the various instruments in support, but also on the idea of sustainable development.

A very big problem for the farmers are still all kinds of bureaucratic barriers that impede access to the instruments of the CAP, as well as the efficient and effective implementation of pro-environmental actions and the principles of sustainable agriculture.

They prove that sustainable development of agriculture requires a certain institutional order.

It is the institutional system (organizations, instruments, regulations and rules of operation), which could correct market failures and state policy, which are obstacles to achieving economic, social and environmental.

The effectiveness of such a system will depend on overcoming or mitigating barriers that come from the external environment or directly from the farm, affect the incentive mechanism for farmers to take actions that lead to balancing farms.

The elements of this mechanism include information and knowledge, awareness of the objectives of sustainable development of agriculture and willingness to change in this direction.

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