

EVALUATION OF AGRI-ENVIRONMENTAL PROGRAMS USED BY FARMERS IN SOUTH-EASTERN POLAND

Barbara Sawicka¹, Talal Seead Hameed², Ali Hulail Noaema³,
Barbara Krochmal-Marczak⁴

¹ University of Life Sciences in Lublin

² University of Mosul, Iraq

³ Al-Muthana University, Iraq

⁴ State Higher Vocational School named Stanislaw Pigoń in Krosno

Abstract. The aim of the study was to evaluate the use of agri-environment schemes in the years 2004-2006 and 2007-2013 by farmers south-eastern Poland. In this region are more implemented these packages sciences, which are less onerous. Most of the agri-environmental programs implemented by farmers, puts great emphasis on the conservation and preservation of the rural landscape. Agri-environmental program increased environmental awareness among farmers who implement it and helps to inhibit the development of intensive agriculture. Simplification of the documentation related to the agri-environmental program, may affect the increase in the number of new farmers willing to implement these programs. In south-eastern region of Poland, the natural packages are realized more willingly, and receiving payments is the main incentive that convinces farmers to join agri-environment program. Implementing the agri-environmental program on farms in this region of Poland contributed both to improvement of water quality, reduction of soil erosion on a farm, and on the other hand to reduction of the livestock population. Increased employment of agri-environment advisor, especially botanists and ornithologists, would facilitate farmer participation in environmental programs.

Key words: agri-environmental programs, farm subsidies, farming systems, nature protections, sustainable agriculture

Corresponding author: prof. dr hab. Barbara Sawicka, Department of Plant Production Technology and Commodity of University of Life Sciences in Lublin, Akademicka 15, 20-950 Lublin, e-mail: barbara.sawicka@up.lublin.pl

© Copyright by Wydawnictwa Uczelniane Uniwersytetu Technologiczno-Przyrodniczego w Bydgoszczy, Bydgoszcz 2016

INTRODUCTION

Agri-environmental program is one of the forms of financial help provided to farmers by the European Union and aims at preserving the beauty of nature and the landscape of the countryside [Commission Regulation EC No 796/2004, 1698/2006, 247/2006, 73/2009, 363/2009, Council Regulation EEC 2078/92, Council Regulation (EC) No 73/2009, rozporządzenia Ministra Rolnictwa i Rozwoju Wsi z dnia 7 maja 2008 r. oraz z dnia 26 lutego 2009 r.]. The agri-environmental measures (AEP) are the result of over 30 years' experience in Europe [Matzdorf and Lorenz 2010, Burton and Schwarz 2013, Troost *et al.* 2015]. One quarter of the agricultural area in the European Union is registered in agri-environmental programs. At the level of the individual farmer, participation in an AEP is voluntary [Laukkanen and Nauges 2014]. Their implementation, initiated by the Council Regulation (EEC) No 797/85 from 1985, has extended and refined their content. The implementation of AEM became compulsory for Member States, however, remained voluntary for farmers. The main objective of the programs, introduced by Council Regulation 2078/92/EC [Laukkanen and Nauges 2014, Camarsa *et al.* 2014], is the promotion of agricultural production systems that are environmentally friendly, and the protection of natural and cultural values of rural areas. The first agri-environmental program was realized in Poland in 2004-2006, the following in 2007-2013. Currently, the program 2014-2020 is being implemented. It is expected that there will be more programs to be implemented in the subsequent years. Agri-environmental programs offer a chance to the environment, are needed in the present and in the future. They allow farmers to receive compensation for their losses and encourage them to the nature conservation. Their implementation is very popular among Polish farmers, since in 2004-2009 more than 100 thousand farmers joined for implementation of the environmental program [Laukkanen and Nauges 2014]. Packages of this program play the role of nature protection by forcing the farmers to be more careful about nature and its resources, for which they receive cash benefits [Bereźnicka 2007, Schönharta *et al.* 2011, Burton and Schwarz 2013]. Agri-environmental program is a mandatory instrument for the environmental protection for all EU countries [Burton and Schwarz 2013, Troost *et al.* 2015]. It is a form of financial assistance to farmers who farm in the traditional and friendly manner for rural environment. Every farmer voluntarily undertakes to implement the package and wills for a minimum five years to implement the assumptions of his chosen options, which are carried out according to the principles of agri-environmental program [Staniak and Feledyn-Szewczyk 2006, Mroczek *et al.* 2013]. Agri-environmental program consists of four sub-programs: "Protection of biodiversity in rural areas", "Protection of the natural environment and landscape", "Organic farming", "The protection of genetic resources" [Camarsa *et al.* 2014]. Each of them includes two operations: the first is related to good agricultural practice in the farm. However, farmers do not receive any financial benefit for this. They must nevertheless adhere to good agricultural practice, because it is the basis for paid action. The latter goes beyond good agricultural practice and the farmer receives payments for such action that compensate his losses for the activities within agri-environmental program. In new AEP program for 2014-2020, a farmer, provided that it meets the requirements, can practically implement any number of packets. However, there are some changes, as a number of new requirements that force a formal confirmation, are introduced [Borusiewicz and Kapela 2014, Camarsa *et al.* 2014, Toorse *et al.* 2015]. The special nature of agriculture determines the nature of

conducting production, eg. Open space is closely related to the terms of the agro-natural of the region or country. It is essential, therefore, for financial support of agriculture, which should be dependent on the level of economic development in the country. Therefore, the aim of this paper is to provide an assessment of the use of agri-environment schemes for farmers south-eastern Polish and determine their participation in individual agri-environmental programs. In addition, the work is intended to draw attention to the opportunities of implementation of agri-environment schemes to farmers.

MATERIAL AND METHODS

The survey among farmers in south-eastern Poland was conducted, the aim of which was to evaluate the use of agri-environment programs. Questionnaire was the research tool. The sample consisted of 300 farmers aged 25-65 years from the districts: bieszczadzki, brzozowski, jasielski, krośnieński, przemyski and strzyżowski. Assessment of the AEP packets implementation for 2004-2006 and 2007-2013 was divided into two parts, due to the fact that some respondents realized only the "old" or the "new" agri-environmental program. Some of the respondents realized the old program, completed it and gone on the new one being in force. Respondents were selected to the survey by means of Babbie method [2003]. The survey was conducted in April-May 2013. Half of the respondents was aged 50-59 years old, 25% – 30-39 years old, 20% – the age of 40-49 years, and only 4% aged > 60 years. Of the respondents, 56% were farmers with secondary, 28% – with professional, and only 16% – with higher education. Among respondents implementing the agri-environmental program, the largest share constituted of farms with an area of 5-15 ha (36%), 34% of farms with an area of 15-30 hectares, 20% – farms of 30-100 ha, 2% – 3-5 ha, and 4 % – farms of the area 1-3 ha or 100 ha. Only 16% of respondents were farmers, who realized the agri-environmental program AEP 2004-2006; 52% of respondents chose the AEP program 2007-2013, and 32% – AEP 2004-2006, while and went to the current program 2007-2013. The latter expanded the area of applications by one or two packages in relation to the "old" program. Data on the implementation of the AEP were taken from the Regional Office of the Agency for Restructuring and Modernization of Agriculture in Rzeszow. The obtained data were processed using descriptive statistics [StatSoft Inc. 2014].

RESULTS

In 2004-2006, more than 3200 applications for more than 16 million PLN were realized in the south-eastern region of Poland. Within the program for 2007-2013, their number increased by approximately 31% by 2012 (Table 1).

The descriptive statistics of numerical data for both agri-environment programs allowed for their comparison. The average number of applications in the first agri-environmental program was 403.4, while in the second – 468.9. Also the asymmetry of the studied traits was determined using the median. Its size may indicate a symmetrical distribution, the right, or left asymmetry. For RDP1 (2004-2006) and RDP2 (2007-2012), the distribution is characterized by the right asymmetry pattern. Kurtosis, which

is measure of focusing of the evaluated feature around the average was 3.57 for RDP2, which indicates more slender than normal distribution, and for RDP1 -1.20, i.e. flattened distribution as compared to the normal one. Another value is the variation coefficient amounting to 135.0% and 128.8%, respectively. This means a very strong differentiation of both programs, with greater variability in the number of applications in the packages for RDP1 than RDP2 (Table 2).

Table 1. The number of packages realized in the years 2007-2012 in the Podkarpackie Province

No	Name of Package	Number of realized applications in 2004-2006	Number of realized applications in 2007-2012
1	Sustainable agriculture	117	318
2	Organic farming	717	886
3	Extensive sustained arable land	1083	1874
4	Endangered bird species protection and the protection of natural nesting grounds outside of the NATURA 2000 areas	0	128
5	Endangered bird species protection and the protection of natural nesting grounds in the "NATURA 2000" areas	0	118
6	Maintaining the threatened genetic resources of plants in agriculture	0	141
7	Maintaining the threatened genetic resources of animals in agriculture	14	84
8	Water and soil protection/buffer zones	1295	663
9	Buffer zones	1	8
Total		3227	4220
Total amount of payment, PLN		6 893 023	21 096 640

Source: own elaboration on the basis of data from the Rzeszow Regional Office of the Agency for Agriculture Restructuring and Modernization

Table 2. Descriptive statistics packages PROW1 (2004-2006) and PROW2 (2007-2012)

Statistical indicators	Package	PROW1	PROW2
Mean	5.00	403.38	468.89
Standard error	0.91	192.55	201.25
Median	5.00	65.50	141.00
Standard deviation	2.74	544.61	603.76
Kurtosis	-1.20	-1.14	3.57
Slant	0.00	0.91	1.88
Range	8.00	1295.00	1866.00
Minimum	1.00	0.00	8.00
Maximum	9.00	1295.00	1874.00
Coefficient of variation, %	54.77	135.01	128.76

It should be noted that in the first edition of RDP, only 6 packets was carried out, while in the second – 9. In the survey conducted as part of the RDP 2004-2006, package 6 "Soil and water protection" was the most commonly implemented (34%), rarely package 3 "Maintenance of extensive meadows" (24%), 17% of the respondents participated in packages 1 and 4, each: "Sustainable agriculture" and "maintenance of extensive pastures", only 7% of respondents declared that they were involved in the package "organic farming", while the remaining packets were not implemented (Fig. 1).

In the agri-environmental program for 2007-2013, package 6 “Extensive permanent pasture” was the most popular and carried out in 32% of the surveyed farms. Following programs were less frequently chosen: “Sustainable agriculture” and “Soil and water protection” (23% each), 11% of respondents participated in the package 2 “Organic farming”, 8% in the package 5 “Protection of endangered birds and habitats within the Natura 2000”, 3% in package 7 “Preservation of endangered animal genetic resources”, and only 1% chose the package 6 “Preservation of endangered plant genetic resources”. None of the respondents had made packages: “Protection of endangered birds and habitats outside Natura 2000” and “Creating the buffer zones” (Fig. 2). The implementation of agri-environmental program should affect the improvement of the environment by reducing the number of actions. For 52% of respondents, the fertilizers use in the farm declined, for 42% of them, it remained unchanged, and 6% said that during the implementation of agri-environmental program, the use of fertilizers increased. As many as 52% of the respondents claimed that the fuel consumption increased, 36% said that it remained unchanged, and only 12% concluded that it decreased. For 68% of respondents, the use of plant protection means remained unchanged, for 28%, it decreased, while in the case of 6% – increased. It indicates that the use of plant protection means in the majority of subjects had not taken place earlier. For most farmers, the scale of production remained unchanged after the introduction of RDP, for only 14% of farmers, it increased, and for 12% – decreased. In the case of a fallow land, the opinions were divided equally between the decrease in the area and leaving it unchanged (48%), and only 4% of respondents claimed that the area of fallow land increased. In 56% of farmers increased the profitability of production, 28% – remained unchanged, and only 16% – decreased (Fig. 3). Difficulty environmental program was implemented depends on the type of the package, which was dependent on the amount of work which the farmer had to incur to adapt agricultural use. The difficulty of agri-environmental program depended on the type of the package, which in turn was dependent on the amount of work the farmer had to put to adapt the arable land. For half of the respondents, implementation of agri-environmental programs was slightly difficult, 22% of them stated that they had no problems with the implementation of commitments contained within the program, while 18% said that implementation of agri-environmental programs helps them in production, and only for 8%, its realization was a very large problem (Fig. 4). Production profitability for the half of the respondents helped in the implementation of agri-environmental program, and for only 20% of them – it disturbed. Bureaucracy posed the most problems, because it hindered as many as 72% of respondents. Climatic conditions hampered the operation of half of the respondents, 16% – helped, and 34% had no opinion on the subject. High productivity disturbed 36% of surveyed, 26% – helped, and 38% of them had no opinion on this (Fig. 5). All respondents were satisfied with the implementation of agri-environmental program at their farms, which was the merit of subsidies farmers received from the execution of agri-environmental packages. According to 38% of the respondents, to introduce the principles of agri-environmental program did not change the amount of rare species of plants and animals, 32% felt that the implementation of the program increased their occurrence, and 30% of them had no opinion on the subject (Fig. 6). The imposition by a program the good agricultural practice is conducive to maintaining the clean water and a proper securing of agricultural-origin substances that could contaminate local water bodies. Majority of respondents (55%) considered that the introduction of agri-environmental program to their farms improved water quality in

the area covered by the program, 37% – that water quality was not changed, 2% – quality of water deteriorated, and 6% had no opinion on this matter (Fig. 7). Most farmers (52%) claimed that through the introduction of agri-environment program, the soil erosion on the farm decreased, 36% said that it remained unchanged, and 12% of them had no opinion about this (Fig. 8). The emphasis put on the proper soil cultivation in the agri-environmental programs, favours to observe the principles of cultivation, which in turn does not give reasons for the soil erosion. Agri-environment programs well fulfil one of its functions, i.e. maintaining or improving the rural landscape. As many as 62% of respondents claimed that through the introduction of agri-environmental program, landscape was improved, 24% that it was not changed, and 14% had no opinion on the subject (Fig. 9). The vast majority of farmers (64%) supported the statement that the management in accordance with the principles contained in agri-environmental programs is conducive to maintaining or improving the status of biodiversity and thus it favours to maintain biodiversity on the farm, 4% claimed that such management is not crucial for maintaining the biodiversity, while others were not able to answer this question (Fig. 10). By joining the program, respondents preferred the agri-environmental adviser from the Agricultural Advisory Centre (98%). Employees of the Regional Department or the Office of Agency for Restructuring and Modernization of Agriculture were in second place (36%). Only 2% of respondents used private consulting firms (Fig. 11). Using them is paid, which explains the greater interest in the state institutions in this regard. Advisors helping in the implementation of the program were evaluated in 60% as a very high level, high – 24%, and with sufficient skills – 16% (Fig. 12). As much as 100% of the respondents stated that they would be willing to join the implementation of agri-environmental program once again. So enthusiastic and univocal assessment of agri-environment programs could be due to the farmers' awareness associated with their greater natural and economic knowledge. The amount of financial compensation that will be granted to the farmer plays a large role in joining the agri-environmental program. Almost half of the respondents (46%) declared their interest in agri-environmental program, regardless of the amount of payment, but in turn, 54% of respondents did not declare any interest in the program activities, if the financial compensation would be reduced by any amount (Fig. 13). After joining the program, farmers observed positive changes that occurred as a result of its implementation. The vast majority (96%) claimed that the agri-environmental programs fulfilled their function, only 2% that it did not, and 2% had no opinion on the subject (Fig. 14). The majority of respondents (68%) manifested a positive attitude to agri-environmental programs, 30% – neutral, and only 2% of the farmers – negative one (Fig. 15). The most common causes of environmental threats resulting from agricultural activities, according to the respondents, was bad management of liquid or solid manure (77.5%), inappropriate management of garbage and waste (60%), the use of large amounts of plant protection means and fertilizers (57.5%), (Fig. 16).

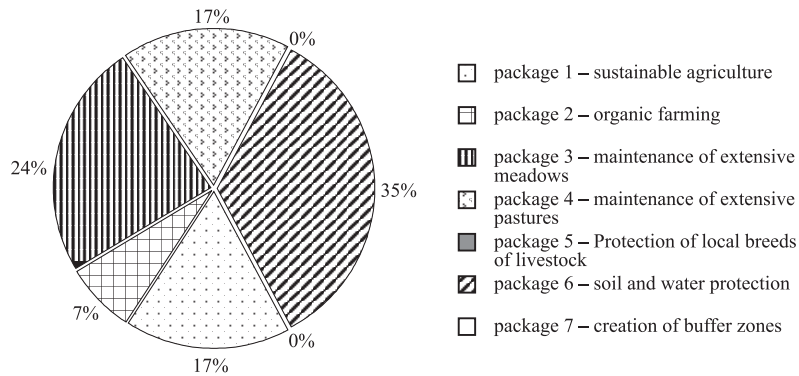


Fig. 1. The implementation of agri-environmental packages under AEP 2004-2006

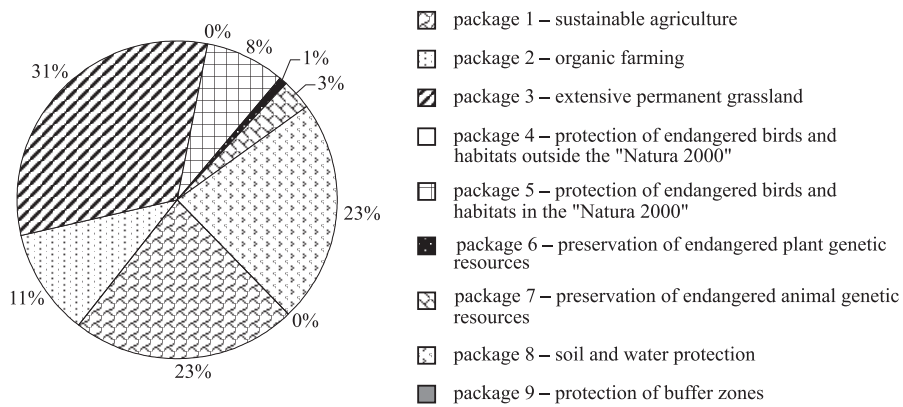


Fig. 2. The implementation of agri-environmental packages contained in the AEP 2007-2013

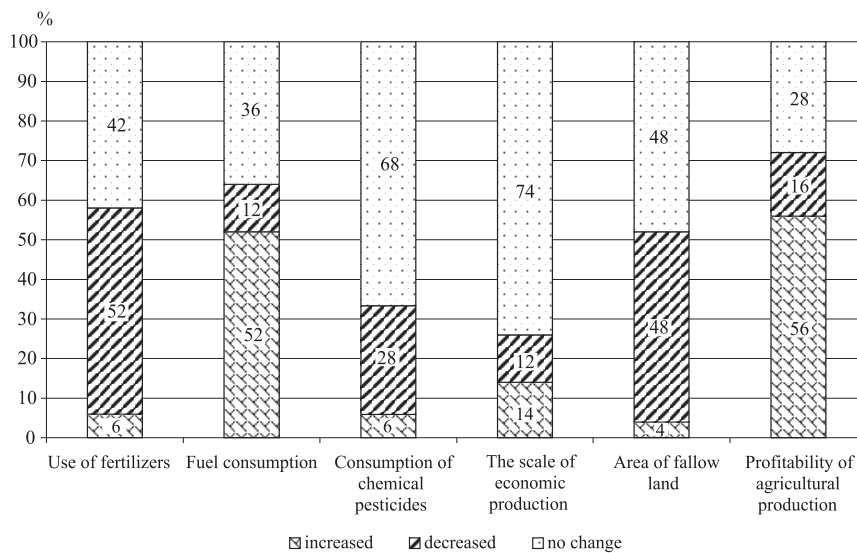


Fig. 3. Evaluation of changes in the farm during the implementation of agri-environmental program

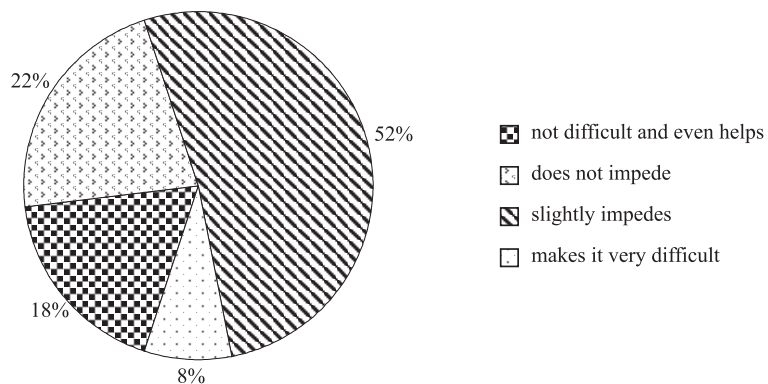


Fig. 4. Level of difficulty in implementing the agri-environmental program

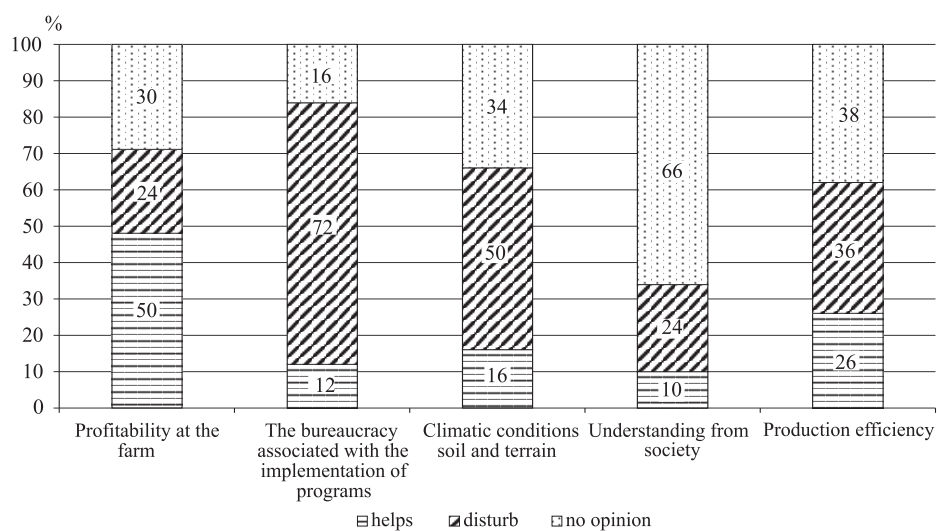


Fig. 5. Evaluation of factors assisting or interfering in the agri-environmental program

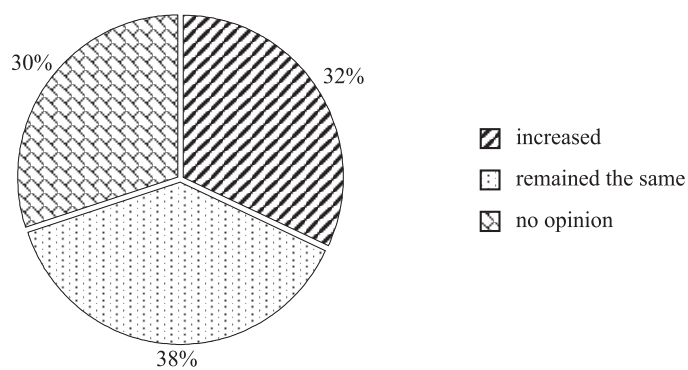


Fig. 6. Score as many valuable species of farm implements agri-environmental program

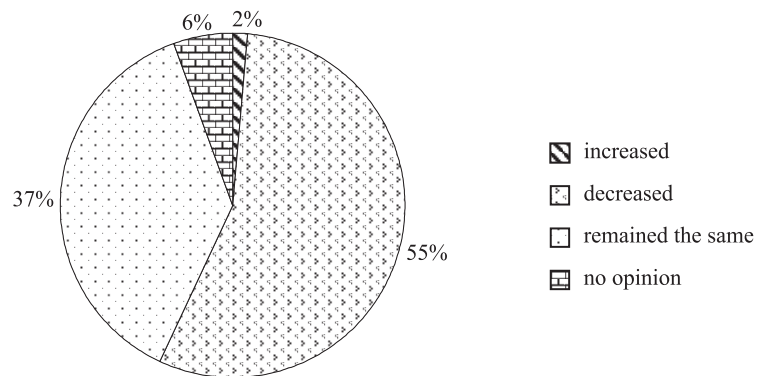


Fig. 7. Evaluation of water pollution in farm implements agri-environmental program

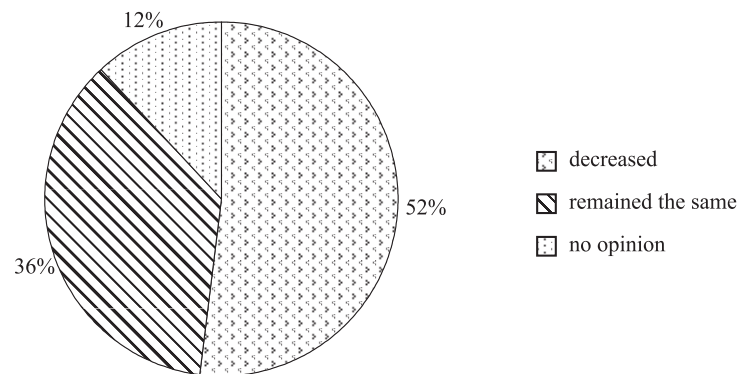


Fig. 8. Evaluation of soil erosion on farm implements agri-environmental program

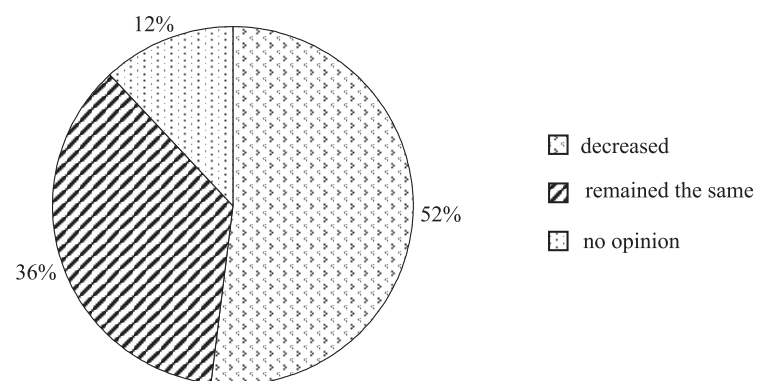


Fig. 9. Evaluation of landscape in farm implements agri-environmental program

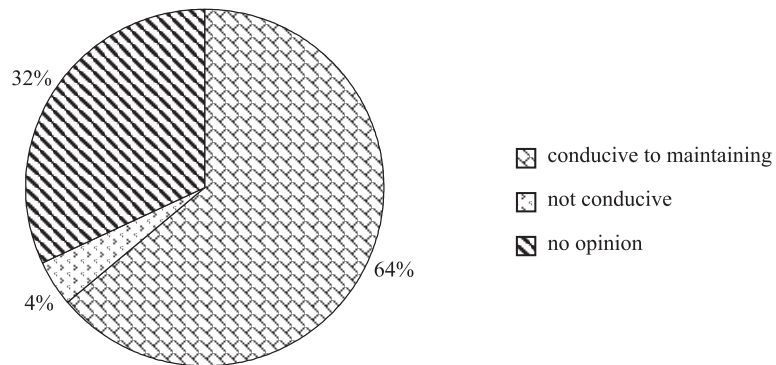
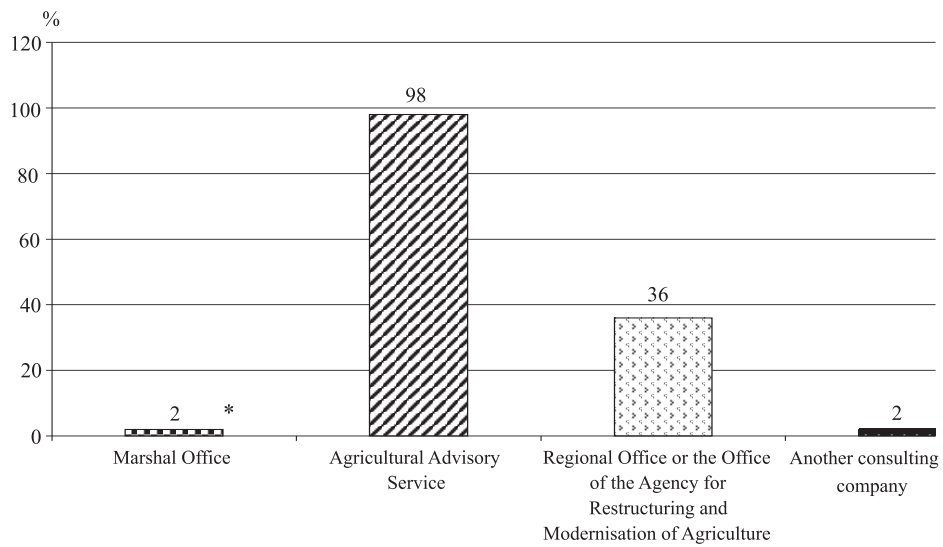


Fig. 10. Influence of management on biodiversity



* sum of answers does not give 100% because respondents could choose more than one answer

Fig. 11. Support institutions in the agri-environmental programs

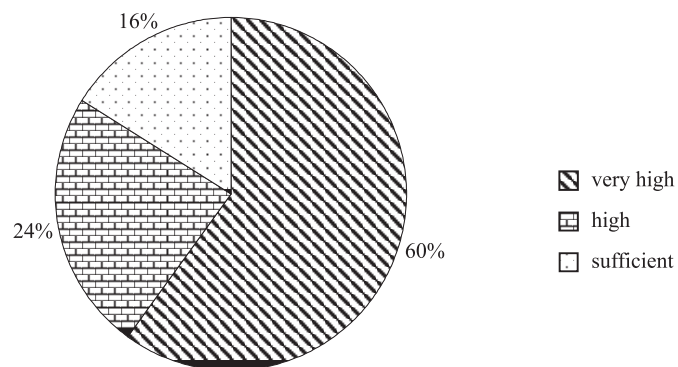


Fig. 12. Competence of agri-environmental advisors

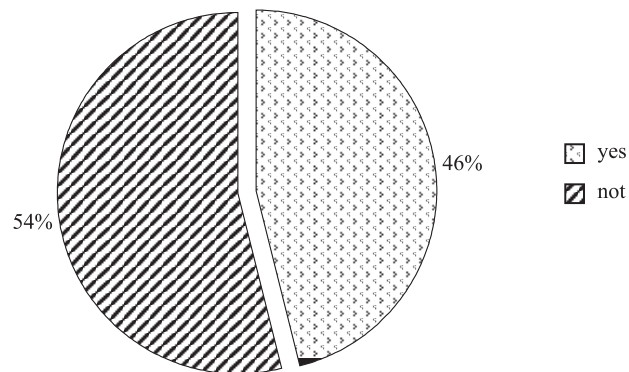


Fig. 13. Reduction of payments under the agri-environmental program

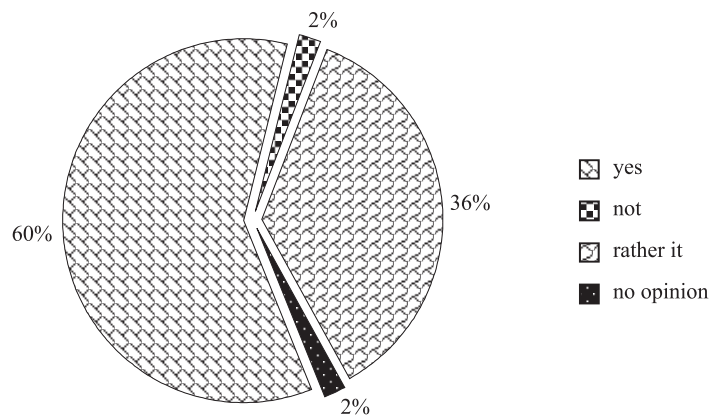


Fig. 14. Functionality of agri-environmental programs

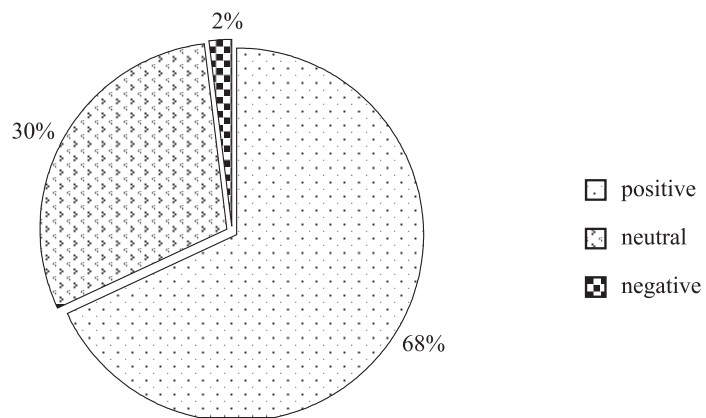


Fig. 15. The ratio of respondents to the agri-environmental programs

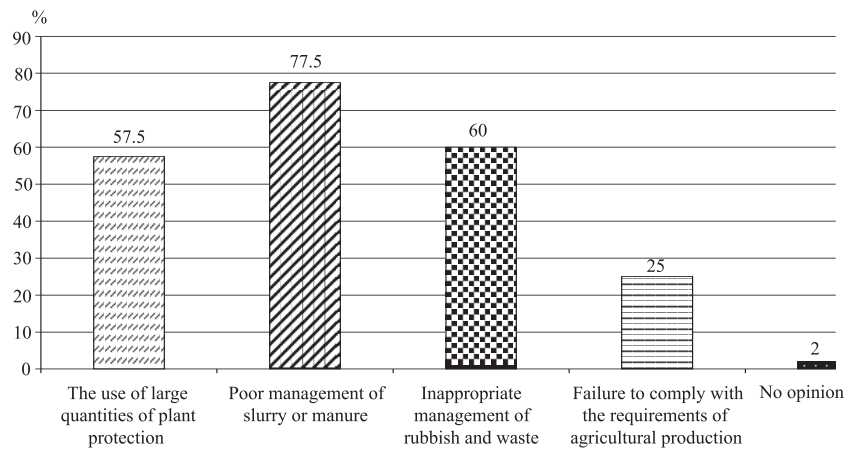


Fig. 16. Reasons for environmental risk

DISCUSSION

Assessing the feasibility of agri-environment program in south-eastern Poland was made taking into account the natural and socioeconomic conditions of agriculture in the region. Farmers in the vast majority (68%) evinced a positive attitude to agri-environmental programs, 30% of farmers were indifferent attitude towards them, and only 2% of farmers were adverse. Mainly large farms were little interested in participating in these programs, because intensive agricultural production brings them higher income. In the opinion of Schönhart *et al.* [2011] and Mroczek *et al.* [2013], little interest in agri-environment package results from the low awareness of farmers and ignorance of the benefits from joining any program. Barrier is often associated with the procedure of filling necessary documentation and distrust of bureaucracy. In recent years, however, there are more and more trained counsellors, who assist farmers in completing applications and creation of agri-environmental plan.

Implementation of agri-environmental programs is important for social reasons [Heckeman 2010, Lacroix and Thomas 2011, Mroczek *et al.* 2013]. The realization of these projects allows farmers to obtain additional financial benefits. This is particularly important in poor regions, where every opportunity to obtain an additional source of income is important. In opinion of Camarsa *et al.* [2014], the experience with the implementation of agri-environment programs in other EU countries have positive environmental effects. Their immediate effect is reduction in the use of mineral fertilizers, maintaining the natural habitats, and popularization of good agricultural practice. Through the implementation of programs, farmer must reduce the use of mineral fertilizers in his farm, due to which damages that they cause are reduced as well. This helps to decrease pollution of groundwater, as well as minimize the effect of soil over-fertilization. The study confirmed this view.

In the south-eastern Poland, among farms implementing the agri-environmental programs, farms with an area of 5-15 hectares dominate, followed by the area of 15-30 hectares, and the smallest share are those of the area > 100 ha. Bereźnicka [2006], when performing such survey in two years after the start of agri-environmental program,

concluded that among farmers who reported their lands to carry out this program, there were mostly those with acreage to 10 hectares. Farmers owning farms with acreage of over 100 ha, did not join the program, because profitability to participate in this program was then unprofitable. The nature packets enjoyed the greatest interest among farmers, which is associated with a large number of permanent grasslands (meadows and pastures) in the region, which make up approximately 35% AL. In the first agri-environmental program for 2004-2006, the most often selected were packages: "soil and water protection" and "maintenance of extensive meadows", while in the RDP 2007-2013: "sustainable agriculture", "extensive permanent grassland", and "soil and water protection". This package is the easiest, both in terms of management, as well as the possibility of funds obtaining. No-one chose, in both programs, the package "creating buffer zones". Similar results were obtained by Mroczek *et al.* [2013]: the least frequently chosen package was "the creation of buffer zones" and the most often "soil and water protection". Changes in the selection of packages can be seen in a longer period of time, not after a few years. The agri-environmental program is aimed at maintaining or improving the environment. In this study, farmers argued that aspects such as: number of valuable species, preserved or improved landscape, and soil erosion, increased or remained unchanged, while rarely deteriorated. In contrast, the majority of respondents felt that the introduction of agri-environmental program into their farms improved water quality. This is an important information, because pollution from agricultural production of 1 ha of agricultural land, can be discharged with waters up to 0.4-28.3 kg N-NO₃, 0.1-0.7 kg N-NH₄, 0.2-0.6 kg P, 1.4-10.5 kg K and pose a significant threat to the environment [Staniak and Feledyn-Szewczyk 2006].

According to Staniak and Feledyn-Szewczyk [2006], agri-environmental program is to encourage farmers to pay more attention to the protection of nature and its resources. The threat posed by the intensification of agricultural development is associated with environmental pollution and extinction of some species of plants and animals. This process should be stopped. It is assumed that a farmer, who gets the cash equivalent for actions that prevent the destruction of nature, will deliver more efforts and show a greater desire and attention to activities that preserve natural values. Surveyed farmers noticed the adverse effects, most commonly in the form of mismanagement of liquid or solid manure, inadequate garbage and waste management, and use of large amounts of plant protection means and fertilizers. Through the introduction of agri-environmental program, farmers contribute to improving the storage and management of liquid and solid manure. Almost every household began to segregate garbage and waste, which is beneficial for the environment. Positive Mathematical Programming (PMP) has become a popular method for regional production models in US [Röhm and Dabbert 2003]. The standard approach estimates production (or cost) functions for each land-use activity separately from each other. This means that the same crop grown under two technologies is treated as if it were two separate crops, which may lead to unsatisfying results, for example, if agri-environmental programs are modelled.

The most common motif of the farmer, who undertakes the implementation of agri-environmental program, in the opinion of Heckman [2010] and Mroczek *et al.* [2013], Troost *et al.* [2015] is the prospect of receiving additional financial means and the ease in implementing the most frequently chosen package, such as e.g. "protection of soil and water". In this study, most farmers would not realize this program if they could not receive financial compensation, or if these measures were significantly reduced. It follows that economic considerations are the main reason and argument attracting

farmers to the program. In the study of Laukkanen and Nauges [2014] used a structural econometric model to evaluate the impacts of agri-environmental support provided through the Finnish Agri-Environmental Program, whose primary goal is to reduce nutrient pollution from agricultural land.

Although all farmers claimed that they comply with the Code of Good Agricultural Practice, they did not notice a threat to biodiversity. 32% of them felt that the implementation of the program contributed to the increase in biodiversity of species, and 38% said that the introduction of agri-environment program rules did not change the amount of rare species of plants and animals, and 30% had no opinion on the subject. Similar observations were made by Lacroix and Thomas, [2011], Laukkanen and Mroczek *et al.* [2013] and Nauges [2014]. It should be noted, however, that such changes can be observed over a longer period of time.

Not all actions that are assumed in the agri-environmental programs bring positive results. For instance, accession to packages that are realized for TUZ encourages a reduction of livestock populations. Imposing on farmer's obligations such as limitation of mowing grass to a maximum 1 or 2 cuts during the year, regulation of grazing terms in the meadows, or livestock density not exceeding $1 \text{ DJP} \cdot \text{ha}^{-1}$, favoured to reduce the number of livestock. The farmer cannot, in fact afford to breeding more animals because of the limitation of obtained feed. Therefore, farmers, mainly dealing with livestock breeding, avoid accession to these packages. According to Staniak and Feledyn-Szewczyk [2006], Kazimierczyk *et al.* [2010], Schönharta *et al.* [2011], a farmer receives compensation for any losses incurred by the implementation of a given package, which is only partially cover these losses.

In view of the fact that the monitoring system of AEP, within RDP framework at the European level, does not provide, in the case of certain types of measures, sufficiently precise elements to allow the assessment of the measures by the nature or direction of the impact on the environment, AEP's were analyzed by creating a series of evaluation indicators. It remains unclear from the literature whether there is a difference between agri-environment programmes and schemes in the German federal states. For example, the Marktentlastungs- und Kulturlandschaftsausgleich (MEKA) in the federal state of Baden-Württemberg is described both as an agri-environment programme [Matzdorf and Lorenz 2010] and an agri-environment scheme [Troost *et al.* 2015]. Research [Adamowicz 2006, Mroczek *et al.* 2013, Scheper *et al.* 2013] indicate a positive influence of AEP on protection of existing and creation of new habitats. Some of the measures have a very positive impact, and in particular they contribute to:

- reduction of agricultural inputs, as there is an adversely proportional correlation between the level of investment and diversity of perennial species as well as the impact on the population abundance of rare species [Adamowicz 2006],
- creation and protection of ecological infrastructure or fallow lands, because these practices favor the biodiversity [Dostatny 2013, Borusiewicz and Kapela 2014],
- diversification of crop rotation, maintenance of grass fields, conversion the croplands into grass fields and increasing the extensiveness of crops. Grazing, properly established mowing dates, especially late mowing or centrifugal mowing, are the key elements on management that can help to improve the functioning and diversity of grassland habitats fields [Bereznicka 2007, Dostatny 2013, Mroczek *et al.* 2013],
- maintaining stubble and cultivating winter crops, which have a beneficial effect on some populations of birds, as it has a positive impact on some invertebrate

- populations [Kleijn and Sutherland 2003, Kazimierczyk *et al.* 2010, Scheper *et al.* 2013],
- promotes biodiversity and increasing species abundance, especially organic farming [Journal of Laws, 2007, 2009, Kazimierczyk *et al.* 2010],
 - improvement in water quality, which is a priority in Finland, Sweden, Greece, Ireland, France, and Denmark. Due to AEP, an actual reduction of substances introduced into the water occurred [Chabé-Ferret and Subervie 2012, Mroczek *et al.* 2013].

The main aim of agri-environmental programs is to promote methods for agricultural production that are environmentally friendly, which is important for the maintenance of biological diversity – large as compared to Europe [Kazimierczyk *et al.* 2010, Burton *et al.* 2013, Scheper *et al.* 2013, Troost *et al.* 2015]. The impact of agri-environmental programs on endangered domestic breeds and cultivated plant species is not univocal in the EU. With the exception of Denmark and the United Kingdom, all Member States have programs for the protection of local breeds. The research shows a worrying situation in many countries, where existing measures proved to be insufficient in preventing the decline of endangered breeds. More optimistic development in some Member States (e.g. Austria, Germany, Greece) indicates a significant effect of AEP's, that help to stabilize or increase the number of animal breeds [Heckman 2010, Chabé-Ferret and Subervie 2012, Troost *et al.* 2015]. Laukkanen and Nauges [2014] found that estimate the payments have reduced the damage costs associated with nutrient pollution from farming grain by 11 to 12 percent.

The study showed that the majority of farmers decided to participate in agri-environmental measures mainly for economic reasons. Schönhart *et al.* [2011] were stated, that the cost-effectiveness of AEP measures can be improved by spatial targeting. The integrated modelling framework was applied to 20 farms in the Austrian 'Mostviertel' region, which are selected from the Integrated Administration and Control System (IACS) of the European Union. The cost-effectiveness of AEP measures were assessed under different premium levels. The implementation of the AEP significantly affects environmental quality in a positive way. Nitrogen rates were reduced, landscape elements can be sustained, and the landscape becomes more diverse.. Effects can be sustained, and the landscape were becomes more diverse. The program also increases farm gross margins on average. However, the cost-effectiveness ratios (CER) were declining with increasing premium levels [Schönhart *et al.* 2011]. Mroczek *et al.* [2013] have similar opinion on this subject arguing that farmers from Podkarpacie, in terms of their knowledge and perception of environmental issues, do not differ from those who do not participate in agri-environmental programs. Positive attitude to agri-environmental programs by farmers was mainly associated with receiving support through subsidies, as well as the positive effects on the improvement of natural environment. Neutral, or negative attitude in relation to programs was presented by those farmers, who claimed that in order to get a grant, a lot of time should be devote to completing and submitting an application and meet all the formal requirements, as well as farmers owning large commercial farms, which is largely due to the poor education of the respondents. Therefore, the efforts to expand environmental awareness should be more intensive. Strengthening the ecological culture among farmers is one of the necessary conditions for building a sustainable rural development. The role of agri-environmental programs in nature conservation will grow along with the inputs for

their realization and their implementation is important mainly for social reasons, because it allows farmers to get many-year financial benefits and it shapes the new features of rural areas. A simulation of the effects of diffuse pollution reduction measures by Fezzi and Bateman [2011] illustrates how approach can be applied for agro-environmental policy appraisal.

CONCLUSIONS

1. South-eastern Poland, due to its location away from the industry and due to the natural specificity, is very attractive for implementing the agri-environmental programs.

2. Most of agri-environmental programs implemented by farmers, puts a great emphasis on the conservation of nature and preservation of the rural landscape, increasing environmental awareness among farmers, who implement them and helps to inhibit the development of intensive agriculture.

3. In south-eastern region of Poland, the natural packages are realized more willingly, which are less burdensome, and receiving payments is the main incentive that convinces farmers to join agri-environment program.

4. Implementing the agri-environmental program on farms in the south-eastern region of Poland contributed both to improvement of water quality, reduction of soil erosion on a farm, and on the other hand (in packages carried out for Persistent Grassland) – reduction of the livestock population in the region.

5. Increasing employment of agri-environmental advisors, especially botanists and ornithologists, would facilitate farmers' joining to environmental programs, and simplification of documents related to the agri-environmental program could help to the increase in the number of farmers willing to implement these programs.

REFERENCES

- Adamowicz, M. (2006). Koncepcja trwałego i zrównoważonego rozwoju wobec wsi i rolnictwa. [W:] M. Adamowicz (red.), *Zrównoważony i trwały rozwój wsi i rolnictwa*, Prace Naukowe, 38, SGGW Warszawa.
- Babbie, E. (2003). *Badania społeczne w praktyce*. Przekł. Witold Betkiewicz, Wyd. Nauk. PWN Warszawa.
- Bereźnicka, J. (2006). Ochrona środowiska w gospodarstwie rolnym – nowe wyzwanie dla rolników. *Roczniki Naukowe SERiA*, 8(4), 37-41.
- Borusiewicz, A., Kapela, K. (2014). Application of Plano RS software in a farm. *Agricultural Engineering*, 2(150), 23-29.
- Burton, R.J., Schwarz, G. (2013). Result-oriented agri-environmental schemes in Europe and their potential for promoting behavioural change. *Land Use Policy*, 30(1), 628-641.
- Camarsa, C., Sliva, J., Toland, J., Hudson, T., Nottingham, S., Roskopf, N., Thévignot, Ch., Martin, H., Goss, S., O'Brien, V. (2014). *Life Environment. Life and soil protection*. Managing Editor: M.H. Luxembourg: Publications Office of the European Union, ISBN 978-92-79-34664-4, ISSN 2314-9329, doi: 10.2779/64447.
- Chabé-Ferret, S., Subervie, J. (2012). How much green for the buck? Estimating additional and windfall effects of the French agro-environmental schemes by DID-matching. Working Paper, Toulouse School of Economics.
- Commission Regulation (EC) No 796/2004 of 21 April 2004. Laying down detailed rules for the implementation of cross-compliance, modulation and the integrated administration and

- control system provided for in Council Regulation (EC) No 1782/2003 establishing common rules for direct support schemes in the field of common agricultural policy and establishing certain support schemes for farmers.
- Commission Regulation (EC) No 1974/2006 of 15 December 2006. Laying down detailed rules for the application of Council Regulation (EC) No 1698/2005 on support for Rural Development by the European Agricultural Fund for Rural Development (EAFRD).
- Commission Regulation (EC) No 363/2009 of 4 May 2009. Amending Regulation (EC) No 1974/2006 laying down detailed rules for the application of Council Regulation (EC) No 1698/2005 on support for rural development by the European Agricultural Fund for Rural Development (EAFRD) (Official Journal of the EU L 111 of 05.05. 2009).
- Council Regulation EEC 2078/92 of 30 June 1992. On agricultural production methods compatible with the requirements of environmental protection and landscape.
- Council Regulation (EC) No 73/2009 of 19 January 2009. Establishing common rules for direct support schemes for farmers under the common agricultural policy and establishing certain support schemes for farmers and amending Regulation (EC) No 1290/2005, (EC) No 247/2006, (EC) No 378/2007 and repealing Regulation (EC) No 1782/2003 (EU Official Journal L 30, 31.01.2009).
- Fezzi, C., Bateman, I.J. (2011). Structural agricultural land use modelling for spatial agro-environmental Policy Analysis. *Am. J. Agr. Econ.*, 93(4), 1168-1188.
- Heckman, J. (2010). Building bridges between structural and program evaluation approaches to evaluating policy. *Journal of Economic Literature* 48(2), 356-386.
- Dostatny, D.F. (2013). The role of small farms in maintaining a balance in agroecosystems. 19th International Farm Management Congress, Small & Green Vol. 1, July 2013, ISBN 978-92-990062-1-4
- Kleijn, D., Sutherland, W.J. (2003). How effective are European agri-environment schemes in conserving and promoting biodiversity? *J. Appl. Ecol.*, 40, 947-969.
- Kazimierczyk, B., Skąpska, W., Rembiałkowska, E. (2010). Evaluation of environmental awareness and pro-environmental attitudes among organic and conventional farmers in the district grajewski. *J. Res. Appl. Agric. Engng.*, 55(3), 171-178.
- Lacroix, A., Thomas, A. (2011). Estimating the Environmental Impact of Land and Production Decisions with Multivariate Selection Rules and Panel Data. *Am. J. Agr. Econ.*, 93(3), 784-802.
- Laukkanen, M., Nauges, C. (2014). Evaluating Greening Farm Policies: A Structural Model for Assessing Agri-environmental Subsidies. *Land Economics*, 90(3), 458-481.
- Matzdorf, B., Lorenz, J. (2010). How cost-effective are result-oriented agri-environmental measures? An empirical analysis in Germany. *Land Use Policy*, 27(2), 535-544.
- Mroczek, J.R., Kostecka, J., Korczyńska, M. (2013). Ocena roli programu rolnośrodowiskowego w postrzeganiu przez rolników wybranych aspektów problematyki środowiskowej. *Inżynieria Ekologiczna* 34, 189-197.
- Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 7 maja 2008 r. w sprawie szkoleń dla podmiotów, których dotyczą działania objęte Programem Rozwoju Obszarów Wiejskich na lata 2007-2013 oraz doradzania odnośnie do sporządzania dokumentacji niezbędnej do uzyskania pomocy finansowej (Dz.U. 2008 nr 89 poz. 545 z dn. 23.05.2008 r.).
- Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 26 lutego 2009 r. w sprawie szczegółowych warunków i trybu przyznawania pomocy finansowej w ramach działania „Program rolnośrodowiskowy” objętego Programem Rozwoju Obszarów Wiejskich na lata 2007-2013 (Dz.U. 2009 nr 33 poz. 262 z dn. 26.02.2009 r.).
- Rozporządzenie Ministra Rolnictwa i Rozwoju Wsi z dnia 13 marca 2013 r. w sprawie szczegółowych warunków i trybu przyznawania pomocy finansowej w ramach działania „Program rolnośrodowiskowy” objętego Programem Rozwoju Obszarów Wiejskich na lata 2007-2013 (Dz.U. 2013 poz. 361 z dn. 15.03.2013 r.).
- Röhm, O., Dabbert, S. (2003). Integrating Agri-Environmental Programs into Regional Production Models: An Extension of Positive Mathematical Programming. *Am. J. Agr. Econ.*, 85(1), 254-265. doi: 10.1111/1467-8276.00117.

- Scheper, J., Holzschuh, A., Kuussaari, M. *et al.* (2013) Environmental factors driving the effectiveness of European agri-environmental measures in mitigating pollinator loss – a meta-analysis. *Ecology Letters*, 16(7), 912-920.
- Schönhart, M., Schauppenlehner, T., Schmida, E., Muhr, E. (2011). Integration of biophysical and economic models to analyze management intensity and landscape structure effects at farm and landscape level. *Agricultural Systems*, 104(2), 122-134.
- Staniak, M., Feledyn-Szewczyk, B. (2006). Program rolnośrodowiskowy jako czynnik ekorozwoju obszarów wiejskich. *Zesz. Nauk. AR Wrocław, Agricultura*, 540, 489-493.
- StatSoft Inc (2014). Statistica (data analysis Software system), version 10 PL, Tulsa.
- The Law of 7 March 2007. On support for rural development with the participation of the European Agricultural Fund for Rural Development (Journal of Laws No. 64, item 427).
- Troost, C., Walter, T., Berger, T. (2015). Climate, energy and environmental policies in agriculture: Simulating likely farmer responses in Southwest Germany. *Land Use Policy*, 46, 50-64.

OCENA PROGRAMÓW ROLNOŚRODOWISKOWYCH WYKORZYSTYWANYCH PRZEZ ROLNIKÓW W POŁUDNIOWO-WSCHODNIEJ POLSCE

Streszczenie. Celem badania była ocena wykorzystania programów rolnośrodowiskowych w latach 2004-2006 i 2007-2013 przez rolników w południowo-wschodniej Polsce. W tym regionie są bardziej realizowane te pakiety przyrodnicze, które są mniej uciążliwe. Większość programów rolnośrodowiskowych, realizowanych przez rolników, kładzie bardzo duży nacisk na ochronę i zachowanie krajobrazu wiejskiego. Program rolnośrodowiskowy zwiększa świadomość ekologiczną wśród rolników, którzy go realizują i pomaga hamować rozwój intensywnego rolnictwa. Uproszczenie dokumentacji związanej z programem rolnośrodowiskowym, może wpłynąć na wzrost liczby nowych rolników chętnych do realizacji tych programów. W południowo-wschodnim regionie Polski naturalne pakiety realizowane są chętniej i otrzymywanie płatności jest głównym bodźcem, który przekonuje rolników, aby dołączyć do programu rolnośrodowiskowego. Realizacja programów rolnośrodowiskowych w gospodarstwach rolnych w tym regionie Polski przyczyniła się z jednej strony do poprawy jakości wód i zmniejszenia erozji gleby w gospodarstwie, natomiast z drugiej – do zmniejszenia populacji zwierząt gospodarskich. Zwiększenie zatrudnienia doradców rolnośrodowiskowych, a w szczególności botaników i ornitologów, ułatwiłoby przystępowanie rolników do pakietów środowiskowych.

Słowa kluczowe: dopłaty rolne, ochrona przyrody, programy rolnośrodowiskowe, systemy rolnictwa, zrównoważone rolnictwo

Accepted for print – Zaakceptowano do druku: 14.03.2016

For citation – Do cytowania:

Sawicka, B., Seead Hameed, T., Hulail Noaema, A., Krochmal-Marczak, B. (2016). Evaluation of agri-environmental programs used by farmers in south-eastern Poland. *Acta Sci. Pol. Agricultura*, 15(3), 37-54.