

## Article

# Analysis of Agri-Environmental Management Practices and Their Implementation in the Agricultural Policies of the Republic of Serbia

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**Abstract:** The subject of the research is focused on the application of agri-environmental management practices in the agricultural policies of the Republic of Serbia. The research, in the first part, addresses the current attitudes of the policymakers in the sector for agricultural policy, sector for rural development, and the department for the IPARD of the Ministry of Agriculture, Forestry and Water Management, regarding the introduction of agri-ecological measures. In the second part, the current attitudes of the agricultural producers and agricultural advisory employees regarding the main economic and structural factors, as determinants of the adoption of agri-environmental management practices, are analyzed. The findings show that the policymakers have put in place an adequate framework, providing the training and education for the introduction of future AE measures. The findings show that the agricultural producers and the agricultural advisory employees consider agri-ecological measures to be a good way to improve the state of the environment and promote the diversity of nature and organisms. The producers have shown a high willingness to adopt the agri-ecological measures. For them, the highest motivation for using the agri-ecological measures is agriculture-oriented training and education, while the potential obstacles are the complexity of measures, implementation of measures, property rights, purpose of land use, and full-time farm workers. The farmers that perceived that the agri-ecological measures treat all farmers equally contributed the most to predicting the willingness of the agricultural producers to adopt agri-ecological measures. On the other hand, the agricultural advisory service employees perceived as the highest motivations the responsibility of farmers towards future generations, previous experience in the application of similar measures, and agriculture-oriented training and education, while the size of agricultural holdings and the property rights were seen as the largest obstacles. The proposed research on the agri-environmental management practices is particularly relevant in the context of discussions on the reform of the Serbian agricultural policy in light of the EU accession process. The findings of the research shall directly contribute to raising knowledge on the agri-environmental management practices in the Republic of Serbia.

**Keywords:** agri-environmental measures; willingness to adopt; agricultural producers; agricultural policy; Republic of Serbia; common agricultural policy



**Citation:** Vapa Tankosić, J.; Prodanović, R.; Medović, V. Analysis of Agri-Environmental Management Practices and Their Implementation in the Agricultural Policies of the Republic of Serbia. *Sustainability* **2023**, *15*, 12476. <https://doi.org/10.3390/su151612476>

Academic Editors: Chanjin Chung and Amy D. Hagerman

Received: 16 May 2023

Revised: 25 July 2023

Accepted: 15 August 2023

Published: 16 August 2023



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## 1. Introduction

The new EU's agricultural policy emphasizes the multifunctionality of agriculture and integrates the environmental component in the form of the environmental management that encourages the sustainable "green agriculture" and the implementation of environmental measures. The agroecological measures are connected with the application of good agricultural practices and link financial support to EU rules on the environment, as well as human, plant, and animal health [1]. Green direct payments introduce mandatory actions

such as maintenance of permanent grasslands, crop diversity, and ecological focus areas, and they are aimed at protecting the environment and combating climate change. The EU rural development policy has evolved from a policy that deals with the structural problems of the agricultural sector to a policy that sees agriculture as multifunctional, with all the challenges we face in the wider rural context [2]. The rural development policy supports the investments and the agricultural activities that contribute to climate actions and sustainable management of natural resources.

In the Republic of Serbia, the process of integration into the EU requires the gradual introduction of further agri-environmental practices and the conditions for the introduction of this type of support. The main goal of agri-ecological payments is to help agricultural producers in the process of protection and improvement in the quality of the environment [3]. In the light of the opening of negotiations in Chapter 11, the Republic of Serbia plans to continue the process of transposition of the acquis of the EU in the field of agriculture and rural development, which is carried out through the adjustment of the national agricultural policy. The National Rural Development Program for the period 2022–2024 contributes to the achievement of the strategic goals established by the Strategy for the Development of Agriculture and Rural Development of the Republic of Serbia for the period 2014–2024, representing a multi-year plan with an aim of harmonizing domestic regulations with the EU [4].

Despite the relatively good supply of natural, primarily land resources, the level of development of agriculture in the Republic of Serbia is below the European average. “Funds of agricultural budget are not sufficient for more dynamic agriculture development. Development of agriculture requires increasing the agricultural budget and allocation of resources to investments and rural development programs” [4] (p. 527). Still, the Republic of Serbia must set its medium- and long-term frameworks in order to strengthen its rural support measures, in line with the EU, and allocate additional funds [5]. In 2017, with the assistance of the funds of the European Union, the Republic of Serbia implemented four measures within the IPARD II program. The Ministry of Agriculture, Forestry and Water Management has announced new opportunities for agricultural producers in the program period from 2021 to 2027, within the IPARD III program. The main focus of the IPARD III program shall be young farmers, organic agriculture, and all investments that are in line with the Green Agenda, which, to some extent, is reflected as an additional intensity of support for investments by young farmers, investments in mountain areas, investments in the field of organic agriculture, and investments in the circular economy [6].

According to the report of the European Commission for the year 2021 [7], the Republic of Serbia should also make progress in the implementation of the action plan for alignment with the EU acquis in agriculture and rural development. The experience gained during the IPARD II period is of great importance for the development of the IPARD III program in Serbia, as well as the practical experience in the implementation of EU-funded projects, while the recommendation of the European Commission is to speed up the establishment of an integrated system of administration and control, to extend the land parcel identification system on the whole territory, and to ensure the separation of payments from production and the linking of area-based payments with cross-compliance standards.

The Decision of the European Commission No. C (2022) 1537 of 9 March 2022 approved the IPARD III program of the Republic of Serbia for the period 2021–2027 [8], while the financial contribution of the European Union for the IPARD III program has increased compared to the previous programming period and amounts to EUR 288 million. By becoming a candidate for membership in the European Union, the country acquired the formal right to use pre-accession funds intended for agriculture and rural development [9].

The IPARD III program envisages a number of changes compared to the existing one, including an increase in the volume of available funds, the amount of minimum available support, greater intensity of incentives, and the introduction of new measures. In addition to the existing measures for the agri-environment—climate and organic farming measure, within the new Measure 4: agri-ecological climatic measures and measurement of organic production, funding shall be provided for (1) crop rotation on arable land; (2) weeding the

inter-row space in perennial plantings; (3) establishment and maintenance of pollinator strips; and (4) sustainable management of meadows and pastures.

The review of the previous empirical research in the Republic of Serbia has shown that there are important unexplored questions regarding the farmers' perceptions and their willingness to participate in the agri-environmental management practices that should be looked at in more detail in a comprehensive study. Modelled on the study [10] analyzing whether the design of environmental measures in the Common Agricultural Policy reflects current knowledge about farmers' decision-making, by the comprehensive review of literature and interviews with policymakers, advisors, and farmers in seven EU countries, we aim to explore these phenomena and create an opportunity for our research. In the light of the above-mentioned conditions, as no previous research work in the Republic of Serbia has tried to reveal the attitudes of the policymakers, agricultural producers, and advisory services on the preparedness and willingness to participate in agri-environmental management practices, the subject of the research is the analysis of the current attitudes regarding the introduction and application of the agri-environmental management practices.

The research focuses on the importance of different groups of agri-environmental management factors and addresses the current attitudes on introduction of support for the agri-ecological measures, good agricultural practices, and other environmental protection and preservation policies. The research shall be conducted, on the basis of interviews, with the policymakers from the sector for agricultural policy; sector for rural development; and department for the IPARD of the Ministry of Agriculture, Forestry and Water Management. In the second part of the research, the main economic and structural factors as determinants of the agricultural producers' adoption of environmental management practices are identified by surveying the agricultural producers, and on the other hand, and the agricultural advisory employees.

The paper is structured as follows. Following the Introduction, the next section, Literature Overview, analyzes the academic sources related to our specific research question. The Material and Methods section elaborates on the study subjects investigated, methods, and procedures that we carried out in the research. In the Results section, the main findings of our research are presented. Following the Discussion, the main ideas are summarized in the Conclusion.

## 2. Literature Overview

The Common Agricultural Policy (CAP) has clear environmental goals, each of which is specified in the European Green Deal [11], aiming to implement green strategies and goals in the circular economic model [12]. In terms of sustainability and in the Farm to Fork Strategy [13], a longer term achievement can occur in terms of input factor reallocation, increasing the production and allocation efficiency of the agriculture in the EU [14]. The measures of these key policies range from ambitious reductions in harmful gas emissions, to investment in research and innovation, to the preservation of Europe's natural environment. The investments in green technologies and sustainability should spur easier transitioning to a clean, circular economy and halt climate change, reverse biodiversity loss, and reduce pollution. Each of these goals is supported also by the organic agriculture and the responsible management of inputs, such as pesticides and fertilizers.

There is a wide range of agri-ecological practices in the European Union that reflect the complexity and interconnectedness of agricultural systems and ecosystems. Some of them are organic farming, integrated production, reducing the intake of fertilizers and/or pesticides, crop rotation on arable land, weeding the inter-row space in perennial plantings, establishment and maintenance of flower strips and sustainable management of meadows and pastures, improving wildlife habitat, introducing a buffer strip, livestock management to ensure adequate grazing pressure and avoid the risk of soil erosion, and the preservation of genetic resources of plant and animal species that are threatened by genetic erosion.

The agri-environmental management practices are determined by the economic and structural factors that are connected to the farmers' adoption of environmental management

practices. The strong involvement of the policy actors as well as agricultural producers, and all the actors in the supply chain, is crucial for “creating stronger markets for agri ecologically grown foods, developing social solidarity economies, pushing for agri ecological procurement by institutions, shifting public awareness and developing inclusive governance mechanisms that support an agri ecological transition” [15].

Zimmermann and Britz (2014) have pointed out that less intensive production activities, larger farm sizes and location in a less favored area are associated with agri-environmental measure adoption [16]. Large farms with young farmers who made their living out of agriculture were willing to accept and implement new agri-environmental policies oriented toward results if the compensation was high enough, but on the other hand, part-time farmers opted to maintain the status quo in regard to existing policy changes [17]. Also, best management practices (BMPs) for reducing agricultural non-point source pollution point out the factors that influence the BMP adoption by farmers. The access to credible information, government subsidies, environmental consciousness, and profitability of practices have a positive effect on BMP [18]. Kalcic et al. (2014) stress that the importance of an adaptive targeting approach on BMPs can overcome concerns on the objectives of targeting, aversion to a one-size-fits-all approach, as well as a lack of trust between the targeting entity and farmers [19].

For example, the ecological focus area (EFA) scheme offered in member states have had the fewest environmental benefits (e.g., cash crops, nitrogen-fixing crops, and short rotation coppice), did not deliver significant environmental benefits such as the curtailment of EFA, and limited farmers’ options for environmentally-beneficial land management [6]. On the other hand, the absorption of the agri-environmental program (AEP) funds in new member states, such as Poland, shows that the share of expenditures on the AEP in Polish RDP (in 2004–2006, in 2007–2013, and in 2014–2020) has been seen as relatively low if compared to other EU member states. The author Kociszewski (2016) states that one of the possible reasons for low effectiveness may be the unpreparedness of the Polish agencies and other agriculture and with environment protection institutions to implement AEP pilot version [20].

However, the agri-environmental measures can have a positive impact on cost-effectiveness, but the concrete design and the implementation process of the agri-environmental measures play a crucial role for their successful application [21]. The key factors influencing the farmers’ participation in agri-environmental schemes (AESs) are the fair payments, the lower household dependency on agricultural incomes, the age and education levels, the presence of a successor, and the changes not directly connected with agri-environmental schemes [22]. Espinosa et al. (2010) point out that farmers are willing to participate for lower compensation in the programs that allow for the maintenance of the agricultural activity and do not impose stringent restrictions on the farm management, while the provision of the compulsory technical assistance and monitoring can also be used to secure participation [23]. Full-time farmers are more likely than part-time farmers to choose the “greening” alternative for the reasons of higher opportunity cost of labor on fulltime farms, while farmers with land in a nature reserve or those participating in agri-environmental schemes are less likely to choose the “greening” alternative because of management constraints on their land [24]. Ruto and Garrod (2009) point out that when attempting to understand farmers’ preferences for key elements of agri-environment scheme design, farmers were found to require greater financial incentives to join schemes with longer contracts, or those that offer less flexibility or higher levels of paperwork [25].

### 3. Materials and Methods

This research, in the first part, addresses the current attitudes of the policymakers in the sector for agricultural policy, sector for rural development, and department for the IPARD of the Ministry of Agriculture, Forestry and Water Management on the introduction of agri-ecological measures, good agricultural practice, and other environmental protection and preservation policies in the agricultural policy of the Republic of Serbia. The research has been conducted on the basis of interviews with the policymakers. The interviewers

had the opportunity to clarify any questions asked by the respondents. The respondents were representatives in the management functions of the sector for agricultural policy, sector for rural development, and department for the IPARD of the Ministry of Agriculture, Forestry and Water Management that hold management or independent advisor functions (in total, 8 respondents). The questionnaire contained 10 open-ended questions that were clear and concise. Criterion sampling was used to select the subjects for the study. These employees were chosen because they work in the government instruction for agriculture and are involved in European accession process. We asked them their opinions regarding the incentives for the preservation and improvement of the environment and natural resources applied in the Republic of Serbia. The data were elaborated on by a qualitative research design, and therefore the data were unable to be reduced to numbers or elaborated by means of the statistical procedure. The set of interview question for policymakers is presented in the Appendix A.

In the second part of the research, the main economic and structural factor determinants of agricultural producers' adoption of environmental management practices were analyzed by conducting a survey of the organic agricultural producers and also of agricultural advisory experts of the AP Vojvodina. The advisory experts of the AP Vojvodina provide professional assistance in the application of new technologies, professional advice and services, introduction of good agricultural practice to agricultural producers with information on IPARD incentives, and assistance in the preparation of project approval requests opinions' related to the potential application of agri-environmental management practices.

The research design was modelled according to the previous empirical literature [6,22,26]. An anonymous survey was conducted in 2022 and was sent to the organization Serbia Organica publicly listed members with e-mail addresses (100 e-mail addresses) and the organic producers with whom the faculty has good cooperation (50 e-mail addresses). The total number of the organic producers in 2021 was 616 organic producers according to the database of the Ministry of Agriculture, Forestry and Water Management—group for organic production [27]; therefore, the sample of 82 respondents was considered valid. The answers received in full from agricultural producers were 82 (55% response rate) in total. Firstly, the socio-economic characteristics of agricultural producers and agricultural advisory employees were collected, and in the second part of the survey, the respondents rated the claims regarding their attitudes on the willingness of the agricultural producers to adopt the additional agri-ecological measures, the existing incentives for the preservation and improvement of the environment and natural resources (8 claims), and the perceptions of obstacles and motivations for using agri-ecological measures (17 claims), which were measured by a five-point Likert scale. Subsequently, we performed a correlation analysis of the farmers' attitudes on the existing incentives for the preservation and improvement of the environment and natural resources (8 claims) and a regression analysis to identify whether the identified variables of existing incentives for the preservation and improvement of the environment and natural resources (8 claims) had a significant impact on the willingness of the agricultural producers to adopt additional agri-ecological measures. A slightly modified version of the previous anonymous survey was sent to the Agricultural Advisory of Vojvodina (100 e-mail addresses), also in 2022. The agricultural advisory employees that completed the survey in full were 56 respondents (56% response rate). The data were elaborated in SPSS.

#### 4. Results

##### 4.1. Public Policy Officials—Main Findings on the Evaluation of the Incentives for the Preservation and Improvement of the Environment and Natural Resources Applied in the Republic of Serbia

The responses collected in the interview with the policy officials in the sector for agricultural policy, sector for rural development, and department for the IPARD of the Ministry of Agriculture, Forestry and Water Management, on the introduction of agri-ecological measures, good agricultural practice, and other environmental protection and preservation policies in the agricultural policy of the Republic of Serbia are presented in the Table 1.



**Table 1.** Responses collected in the interview with the policy officials.

<p>1. All interviewees agreed that the incentives applied in the Republic of Serbia under the jurisdiction of the Ministry of Agriculture, Forestry and Water Management, and those that can be considered as agri-ecological practices, are the incentives for organic livestock production, organic crop production, conservation of animal genetic resources, and conservation of plant genetic resources. These incentives have been applied for many years and have positive effects. In the Republic of Serbia, which is rich in genetic resources, the support of the program related to the preservation of both indigenous breeds of domestic animals and plant resources was established and represents a significant agri-ecological measure for sustainable rural development and improvement of environmental protection. Thanks to the existence of support for producers engaged in organic production, from year to year, the areas under this production increase.</p> <p>The interviewees point out that, as a part of the IPARD III program, Measure 4—agri-ecological climate measure and organic production, is under development, which includes the agri-ecological operations that will contribute to the sustainable management of natural resources, i.e., the protection and improvement of soil quality. Our interviewees have stressed that the Republic of Serbia has gradually introduced emphasis on the ecological and climate component through the support measures for the preservation and improvement of the environment and natural resources through national measures: sustainable use of agricultural land, sustainable use of forest resources and organic production (3.1 Organic plant production, and 2.3.2 Organic livestock production), and preservation of plant and animal genetic resources (4.1 Conservation of plant genetic resources, 4.2 Conservation of animal genetic resources, 4.3 Preservation of animal genetic resources in the gene bank). Also, they expressed their opinions regarding the contribution to agri-ecological measures that has been provided through the measure of support for investments in physical assets of agricultural farms and through the measure of support for risk management in agricultural production (recourse for insurance premium). They prevalently agreed that the largest effect in the previous period in Serbia was organic production, which has a growing potential, as evidenced by the trend of growing areas under organic production in the previous ten years. In the period of 2010–2020, the total area under organic production increased by as much as 258%. The interviewees further outlined that through IPARD 3 (Measure 4), a new measure shall be introduced, namely, “Agri-ecological-climate measures and measure organic production”. The goal of this measure is incentives for the application of agricultural practices that contribute to the protection and improvement of the environment on agricultural farms. The support is in the form of an annual payment per unit of area (ha), as compensation for loss of income and additional costs, which are the result of compliance with the special conditions that go beyond the baseline and the usual agricultural practice.</p> <p>One of the interviewees stated that in cooperation with the UN Development Program, they had a project entitled “Improvement of medium- and long-term planning of adaptation measures to changed climatic conditions in the Republic of Serbia (NAP GCF)” and the Ministry of Agriculture, together with the Food and Agriculture Organization—FAO, which is implementing the project “Strengthening the resilience of the agricultural sector to natural disasters”. The Ministry of Agriculture, Sector for Agricultural Policy has also formed a new organizational unit in 2019, called the Group for Climate Change in the Sector of Agriculture.</p> <p>All our national policy interviewees are familiar with the CAP agri-ecological principles and the EU’s the CAP requirement of “conditionality”, that is, compliance with the conditions of good agricultural and ecological condition and mandatory management requirements mostly relating to the areas of climate change adaptation, water management, soil protection and quality, biodiversity protection, food safety, plant protection products, and animal welfare. They are aware that in the case of non-compliance with certain requirements, payments to farmers in the EU are reduced by a certain amount.</p> <p>The interviewees have stressed that currently, in the Republic of Serbia, during the implementation of the incentives for the agriculture and rural development, requirements equivalent to the requirements of “conditionality” in the EU are not applied, but, bearing in mind the process of harmonizing the national policy with the Common Agricultural Policy of the EU in the pre-accession period, Serbia is obliged to national support schemes adapt to the requirements of the CAP, including the application of the requirements of “conditionality”. During the pre-accession period, it is planned to gradually introduce the requirement of good agricultural and ecological condition as a condition for exercising the right to payment, in order to establish at a later stage the obligation to apply the mandatory requirements in terms of management, harmonized with the CAP.</p> <p>However, the policymakers have stressed that the incentive measures for supporting the agri-ecological measures, good agricultural practices, and other environmental protection and preservation policies were not implemented in the previous program period of the National Rural Development Program. They are of the opinion that the measures will be further elaborated, and their implementation postponed until the final acquisition of formal and legal conditions for the implementation of the measures (beginning of the system for the identification of land parcel application) and harmonization and demarcation with the IPARD program. In 2019, the ministry started activities to establish the system for identification of land parcels, which is one of the most important prerequisites for the implementation of the measure and one of the components of the Integrated Administration and Control System (IACS) of all direct payments, as well as payments from the measures of rural development related to the area.</p>
<p>2. All the interviewees consider that education and/or training of farmers is necessary for the efficient use of agri-ecological measures. The involvement of competent institutions in the transfer of knowledge is an important form of support, especially when it comes to good agri-ecological practices and their effects, as well as informing farmers about the types of incentives related to these practices. They stress that the main role should be played by the Agricultural Advisory Services. The interviewees consider that adequate training will have to be organized for on-site control and inspection personnel. The interviewees stressed that the professional and advisory assistance to agricultural holdings on the impact of the application of agri-ecological practices shall be provided by the Agricultural Advisory and Expert Services of Serbia, which in their annual training program for advisors with a module related to agri-ecological measures, as part of support for the implementation of Measure 4 of the IPARD III program. The employees of the competent institution who work on approving agri-ecological measures do not have the authority to provide advisory services in terms of implementing activities within the measure.</p>
<p>3. The interviewees consider that it is very important to educate all participants, supplying them with informative and promotional materials that indicate the importance of agri-ecological measures. The interviewees are of the opinion that the active involvement of agricultural producers in the development of an agri-ecological plan is not only desirable but also necessary. In this way, the agricultural producers can provide the necessary data on the way to manage the farm and provide the guidelines for the development of the plan, and their participation in the plan development process enables a better understanding of the proposed measures and individual activities, which lays a good foundation for the successful implementation of the agri-technical measures.</p>
<p>4. The interviewees consider that it is very important to educate all participants and strengthen administrative capacities for support for the implementation of the program of agri-ecological measures. They agree that it is necessary to increase the number of employees who would deal with tasks related to the application of agri-ecological measures. Trainings are an essential part of employee training, especially on this topic. The interviewees outline that the beneficiaries will have to comply with the national rules that are relevant to these measures and that correspond to certain EU standards and conditions (SMR standards and good agricultural and ecological conditions—GAEC) relating to soil, water, landscape management, and relevant minimum requirements for fertilizers and plant protection products.</p>
<p>5. The interviewees agreed that the main specificity of the agri-ecological measures is that they must be implemented continuously, in the case of IPARD Measure 4 (agri-ecological measures), for at least 5 years. The complexity can be reflected in the fact that the agricultural producer must undertake to carry out certain activities within the framework of the agri-ecological measure during that period, while they must know what their rights and obligations are during the entire period.</p>
<p>6. The interviewees stated that the accreditation of IPARD Measure 4 implies that the Republic of Serbia is prepared for the implementation of an agri-ecological measure, with trained personnel and developed procedures for controlling the implementation of the measure by agricultural producers. Until the moment of accreditation, the Ministry of Agriculture, Forestry and Water Management organizes training for its employees, including agricultural advisors, on the topic of implementation and control of agri-ecological measures. They state that the trainings shall continue.</p>
<p>7. The interviewees pointed out that the professional and advisory assistance to agricultural holdings on the impact of the application of agri-ecological practices shall be provided by the Agricultural Advisory and Expert Services of Serbia, which is in their annual training program for advisors with a module related to agri-ecological measures, as part of support for the implementation of Measure 4 of the IPARD III program. The assistance to farmers in preparation for submission of requests and necessary documentation will be provided through the provision of information directly and through media, and the relevant instructions shall be prepared.</p>
<p>8. The interviewees strongly agree that the analysis of effects is important because measures can be further improved and adjusted to real circumstances. The interviewees point out that the feedback on the progress and acceptance of measures, as well as possible administrative problems, should be of importance to local self-government and associations, because in this way information is spread on the application of sustainable agricultural practices, which can increase the number of potential users of these measures and better prepare the agricultural producers for the implementation of the agri-ecological measures. Also, the agricultural producers can share their experiences and opinions regarding the conditions for receiving incentives, and any information about these measures should influence the spread of the population’s awareness of the importance of environmental protection.</p>
<p>9. The prevalent opinion of the interviewees was that the Measure 4 of the IPARD III program can be implemented throughout the territory of the Republic of Serbia, with the same level of payment. They have stressed that, first of all, they need the first experiences in the application of this measure, in terms of fulfilling the prescribed conditions and control of activities, but also to see the interest of the producers to apply this measure. The introduction of the different levels of payment would additionally require the preparation of the studies on the aspects mentioned in the question, additional costs, and the introduction of these specificities of certain regions into the legislation.</p>
<p>10. Through the analysis of the effects of the measures and the impact on the environment, budgets and priorities can be determined over a period of time. According to the Common Monitoring and Evaluation Framework (CMEF), the majority of interviews rated the result indicators with grade 5, basic indicators with 4, impact indicators with 3, input indicators with 2, and product indicators with 1.</p>

#### 4.2. Main Findings from the Survey on the Main Economic and Structural Factors as Determinants of Adoption of the Agri-Environmental Management Practices by the Agricultural Producers and Agricultural Advisory Employees

##### 4.2.1. Main Findings from the Survey on the Main Economic and Structural Factors as Determinants of the Adoption of the Agri-Environmental Management Practices by the Agricultural Producers

In the sample of the agricultural producers, the majority were male producers at 89%, while only 11% were female agricultural producers (Table 2).

**Table 2.** Gender of agricultural producers.

Gender	Frequency	Percentage Share (%)
Male	73	89.02
Female	9	10.98
Total	82	100.00

The majority of the agricultural producers were in the age range of 51–60 (34.15%), followed by the age ranges of 18–30 and 31–40 (both ranges had the same representation of 21.95%), and 41–50 and over 60 (both ranges had the same representation of 10.98%), as shown in Table 3.

**Table 3.** Age of agricultural producers.

Age	Frequency	Percentage Share (%)
18–30	18	21.95
31–40	18	21.95
41–50	9	10.98
51–60	28	34.15
Over 60	9	10.98
Total	82	100.00

The majority of agricultural producers lived in a small household of 1–4 members (89.02%), and a few of them lived in a large household with more than 7 members (10.98%), while those in a medium-sized household of 5–6 members was not represented in the sample (Table 4).

**Table 4.** Household size of agricultural producers.

Household Size	Frequency	Percentage Share (%)
Small household; 1–4 members	73	89.02
Medium-sized household; 5–6 members	0	0.00
Large household; more than 7	9	10.98
Total	82	100.00

The majority of the agricultural producers had obtained a higher education/BA degree at 43.90%, followed by master's and PhD degrees at 34.15%, while 21.95% had high school and/or professional school degrees (Table 5).

**Table 5.** Professional qualification level of agricultural producers.

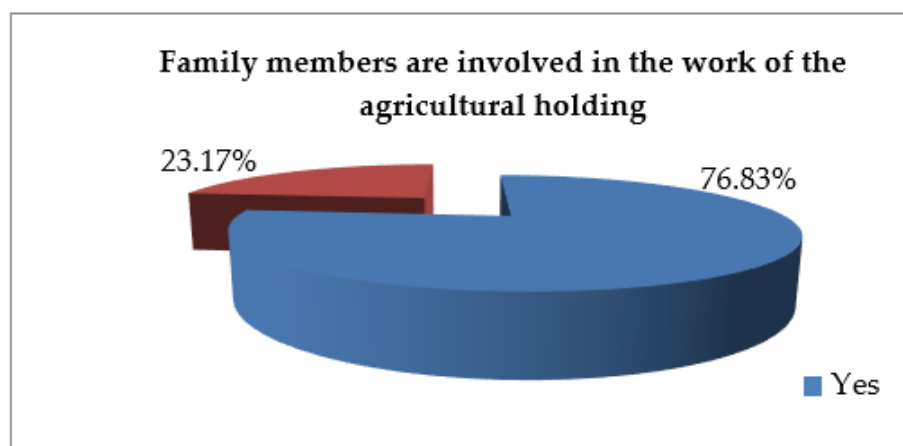
Professional Qualification Level	Frequency	Percentage Share (%)
High school or professional school degree	18	21.95
Higher education/BA degree	36	43.90
Master and PhD degree	28	34.15
Total	82	100.00

The majority of the agricultural producers had a monthly income of the household in the range of EUR 500–1000 (32.93%), followed by EUR 1000 to 2000 (32.93%), and then by an income of more than EUR 2000 (23.17%), and finally EUR 200–500 (10.98%), as shown in Table 6.

**Table 6.** Total monthly income of the household of agricultural producers.

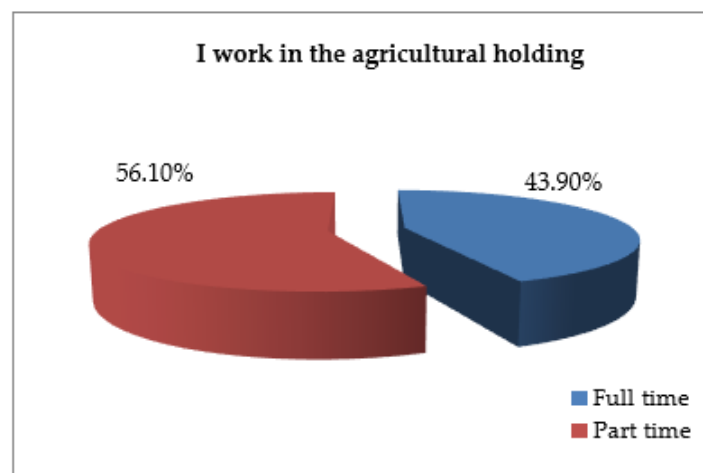
Total Monthly Income of the Household	Frequency	Percentage Share (%)
Up to EUR 200	0	0.00
EUR 200–500	9	10.98
EUR 500–1000	27	32.93
EUR 1000–2000	27	32.93
More than EUR 2000	19	23.17
Total	82	100.00

In the sample, the majority of the family members were involved in the work of their agricultural holding (76.83%), with only 23.17% of those not involved in the work of their agricultural holding (Figure 1).



**Figure 1.** Family members involved in the work in the agricultural holding.

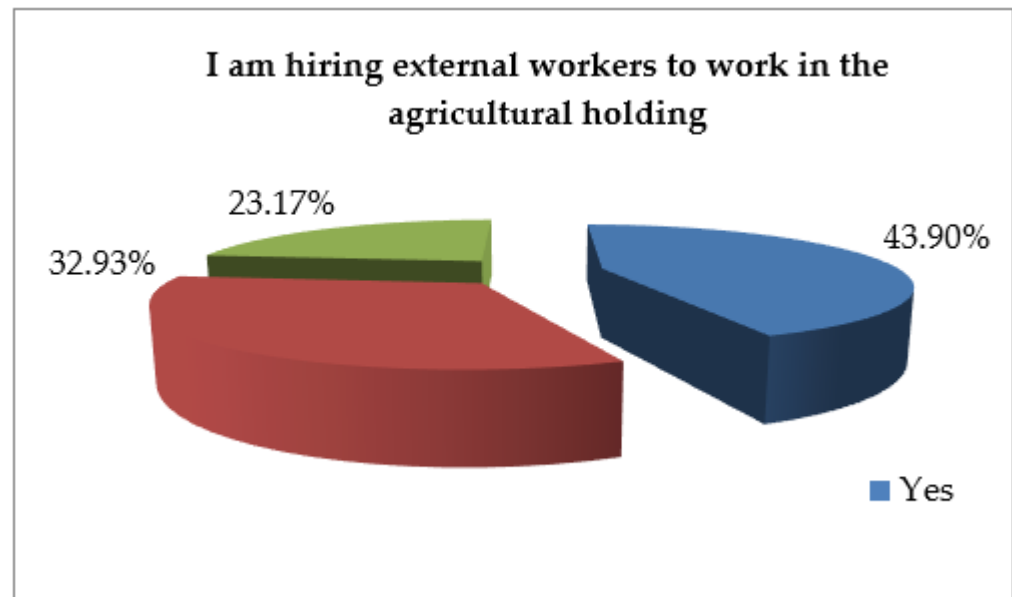
In the sample, the largest percentage of the agricultural producers worked part time (56.10%) in their agricultural holding, while 43.90% of them worked full time in their agricultural holding (Figure 2).



**Figure 2.** The number of hours of work in the agricultural holding.

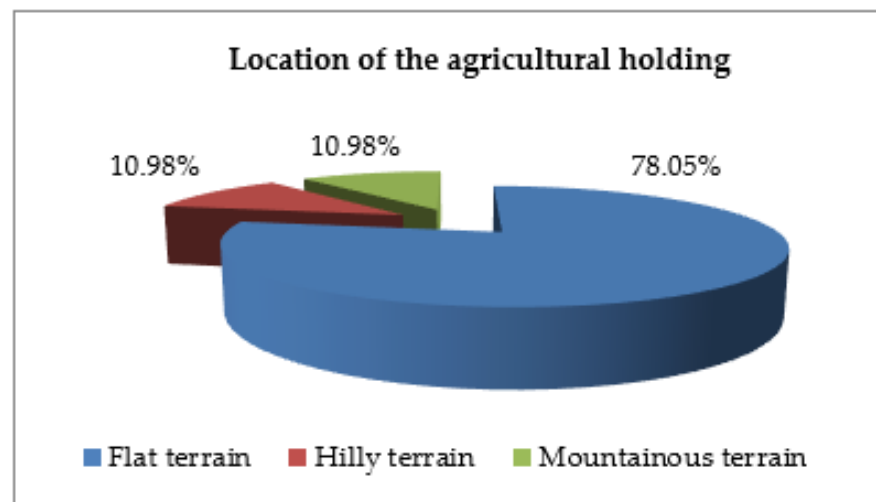


In the sample, the largest percentage of the agricultural producers hired external workers to work on the agricultural holding (43.90%), followed by agricultural producers who did not hire external workers to work in the agricultural holding (32.93%), and the seasonal hire of workers (23.17%), as shown in Figure 3.



**Figure 3.** Hiring of external labor in the agricultural holding.

In the sample, the majority of the agricultural producers had agricultural holdings in flat terrain (78.05%), followed by an equal representation of agricultural holdings in hilly terrain and mountainous terrain (both 10.98%), as shown in Figure 4.



**Figure 4.** Location of the agricultural holding.

In the sample, the majority of the agricultural producers had the agricultural specialization of plant production (89.02%), and only a few of them specialized in livestock production (10.98%), as shown in Figure 5.

In the sample, the majority of the agricultural producers declared that their soil, according to biological, physical, and chemical indicators, was of medium quality (78.05%), followed by an equal representation of excellent and low-quality soil (both 10.98%), as shown in Figure 6.

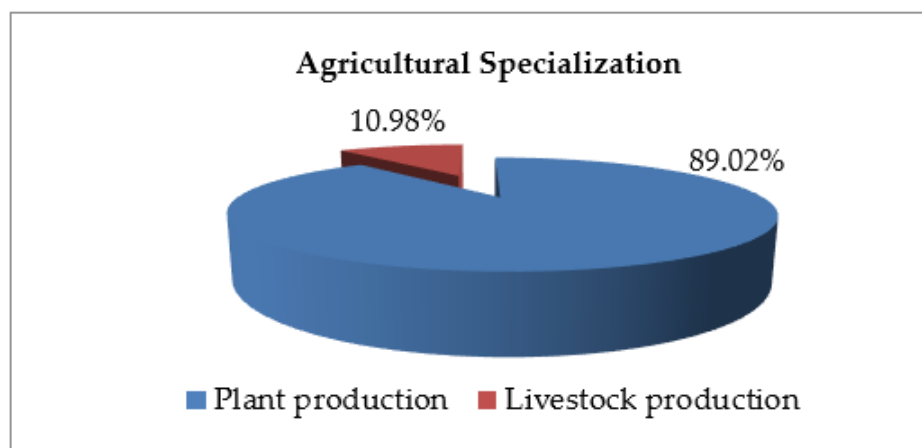


Figure 5. Agricultural specialization.

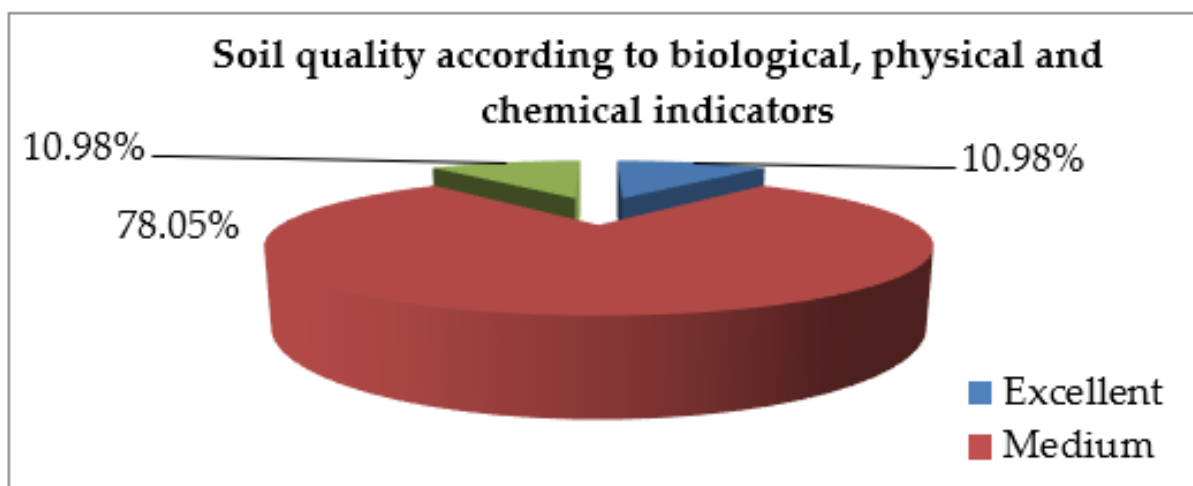


Figure 6. Soil quality according to biological, physical, and chemical indicators.

In the sample, the majority of the agricultural producers owned their agricultural mechanization (89.02%), and only a few of them rented their agricultural mechanization (10.98%), as shown in Figure 7.

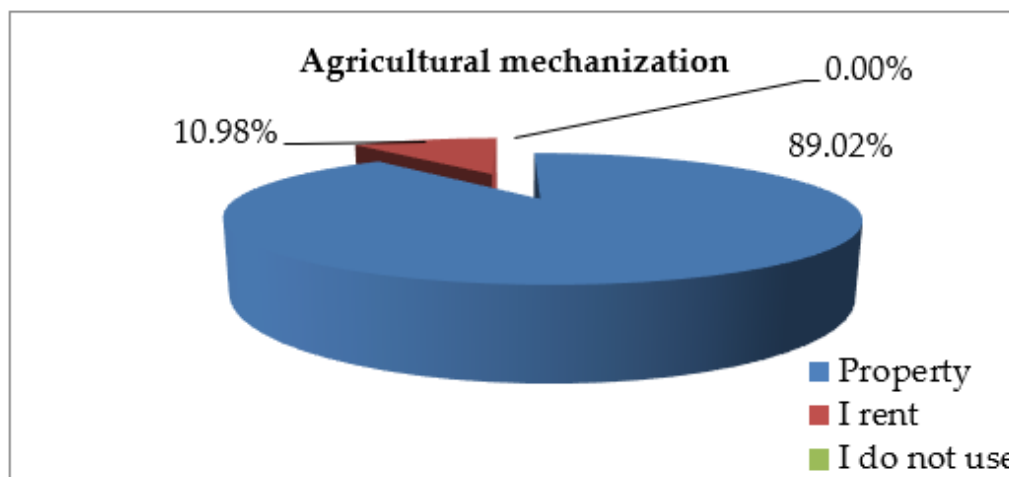
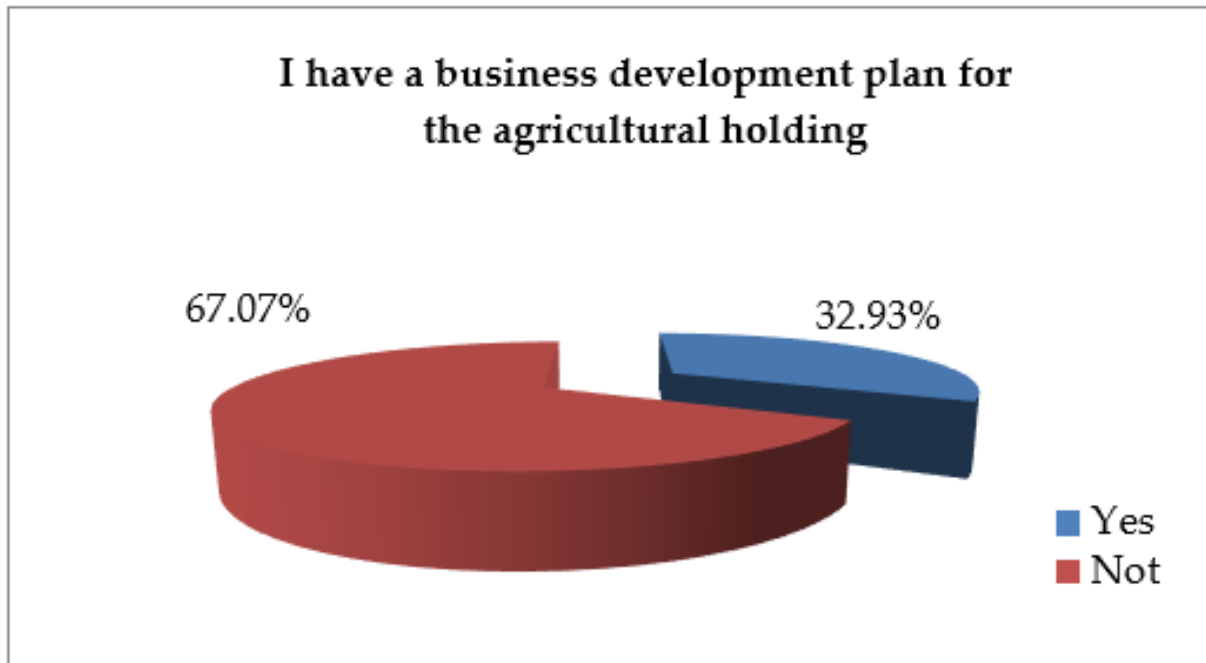


Figure 7. Possession of agricultural mechanization.

In the sample, the majority of the agricultural producers did not have a business development plan for the agricultural holding (67.07%), with only 32.93% of the agricultural producers possessing a business development plan, as shown in Figure 8.



**Figure 8.** Possession of a business development plan for the agricultural holding.

As an important factor in participation in AES schemes, the next question addressed the willingness of the agricultural producers to adopt additional agri-ecological measures, in order to address their future participation in the introduction of additional agri-environmental changes.

As shown in Table 7, the majority of the agricultural producers were willing to adopt additional agri-ecological measures in their agricultural holding, having expressed their willingness with a grade 5 (78.05%), followed by grade 4 (21.95%), and none of them opted for lower grades of 3, 2, or 1.

**Table 7.** Willingness of the agricultural producers to adopt additional agri-ecological measures.

I am Willing to Adopt Additional Agri-Ecological Measures								
			1	2	3	4	5	
	<b>Frequency</b>		0	0	0	18	64	
	<b>Percentage share (%)</b>		0.00	0.00	0.00	21.95	78.05	
<b>N</b>	<b>Min</b>	<b>Max</b>	<b>Average</b>	<b>Std. Dev.</b>	<b>Variance</b>	<b>Skewness</b>	<b>Kurtosis</b>	
82	4	5	4.78	0.416	0.173	−1.381	−0.097	

As shown in Table 8, the agricultural producers best rated the claim of “agri-ecological measures are a good way to improve the state of the environment” with a grade of 4.00, followed by the claim “agri-ecological measures are a good way to promote the diversity of nature and organisms” with a grade of 3.89, and “agri-ecological measures are effective in improving the quality of the environment” with a grade of 3.11.

**Table 8.** Attitudes of the agricultural producers regarding existing incentives for the preservation and improvement of the environment and natural resources of agricultural producers.

Agri-Ecological Measures	N	Average	Std. Dev.	Variance	Skewness	Kurtosis
Are a good way to improve the state of the environment (AM1-1)	82	4.00	1.414	2.000	−1.208	−0.063
Are a good way to promote the diversity of nature and organisms (AM1-2)	82	3.89	1.197	1.432	−0.581	−1.235
Are adequately distributed (AM1-3)	82	2.01	0.949	0.901	−0.025	−1.919
Are effective in improving the quality of the environment (AM1-4)	82	3.11	0.994	0.988	0.471	−0.837
Take into account all interested parties equally (AM1-5)	82	2.21	1.235	1.524	0.319	−1.560
Are contemporary (AM1-6)	82	2.66	0.820	0.672	−0.528	−0.129
Treat all farmers equally (AM1-7)	82	2.33	1.055	1.112	−0.118	−1.376
Are easy to apply (AM1-8)	82	2.33	2.33	0.890	0.103	−0.898
Agri-ecological measure attitudes (AM1)	82	<b>2.82</b>	<b>1.303</b>	<b>1.698</b>	<b>0.151</b>	<b>−0.992</b>

The lowest rated claims were “agri-ecological measures are adequately distributed” with a grade of 2.01, followed with the grade of 2.21 of the claim “agri-ecological measures take into account all interested parties equally”, and the grade of 2.33 of both claims “agri-ecological measures treat all farmers equally” and “agri-ecological measures are easy to apply”.

The Pearson correlation coefficient, shown in Table 9, between the two observed variables of “agri-ecological measures are a good way to improve the state of the environment (AM1-1)” and “agri-ecological measures are a good way to promote the diversity of nature and organisms (AM1-2)” was 0.853 and was statistically significant at the 0.05 level ( $p = 0.000$ ). The sign of the correlation coefficient was positive, and the relationship between the observed variables was strong. The Pearson correlation coefficient, shown in Table 9, between the two observed variables “agri-ecological measures are a good way to improve the state of the environment (AM1-1)” and “agri-ecological measures are effective in improving the quality of the environment (AM1-4)” was 0.632 and was statistically significant at the 0.05 level ( $p = 0.000$ ). The sign of the correlation coefficient was positive, and the relationship between the observed variables was strong. The Pearson correlation coefficient, shown in Table 9, between the two observed variables “agri-ecological measures are a good way to improve the state of the environment (AM1-1)” and “agri-ecological measures are contemporary (AM1-6)” was 0.288 and was statistically significant at the 0.05 level ( $p = 0.009$ ). The sign of the correlation coefficient was positive, and the relationship between the observed variables was weak. The Pearson correlation coefficient, shown in Table 9, between the two observed variables “agri-ecological measures are a good way to improve the state of the environment (AM1-1)” and “treat all farmers equally (AM1-7)” was  $-0.447$  and was statistically significant at the 0.05 level ( $p = 0.000$ ). The sign of the correlation coefficient was negative, and the relationship between the observed variables was moderate.

Consequently, we performed a linear regression analysis to identify whether the variables identified above had a significant impact on the “willingness of the agricultural producers to adopt additional agri-ecological measures”. The model contained eight independent variables (AM1-1-8) and one dependent variable, the “willingness of the agricultural producers to adopt additional agri-ecological measures”. As shown in Table 10, the R value was 0.970, which indicates a high degree of correlation. The dependent variable the “willingness of the agricultural producers to adopt additional agri-ecological measures” can be explained by the independent variables, AM1-1-8. In this case, 94.1% of the model can be explained, which is very high.

**Table 9.** Correlations of attitudes of the agricultural producers regarding existing incentives for the preservation and improvement of the environment and natural resources of agricultural producers.

Agri-Ecological Measures		Are a Good Way to Improve the State of the Environment (AM1-1)	Are a Good Way to Promote the Diversity of Nature and Organisms (AM1-2)	Are Adequately Distributed (AM1-3)	Are Effective in Improving the Quality of the Environment (AM1-4)	Take into Account All Interested Parties Equally (AM1-5)	Are Contemporary (AM1-6)	Treat All Farmers Equally (AM1-7)	Are Easy to Apply (AM1-8)
Are a good way to improve the state of the environment (AM1-1)	Pearson correlation	1	0.853 **	−0.166	0.632 **	0.064	0.288 **	−0.447 **	0.000
	Sig. (2-tailed)		0.000	0.137	0.000	0.570	0.009	0.000	1.000
	N	82	82	82	82	82	82	82	82
Are a good way to promote the diversity of nature and organisms (AM1-2)	Pearson correlation	0.853 **	1	0.099	0.477 **	−0.285 **	0.188	−0.587 **	−0.263 *
	Sig. (2-tailed)	0.000		0.376	0.000	0.009	0.091	0.000	0.017
	N	82	82	82	82	82	82	82	82
Are adequately distributed (AM1-3)	Pearson correlation	−0.166	0.099	1	−0.237 *	−0.013	0.418 **	0.329 **	−0.129
	Sig. (2-tailed)	0.137	0.376		0.032	0.910	0.000	0.003	0.250
	N	82	82	82	82	82	82	82	82
Are effective in improving the quality of the environment (AM1-4)	Pearson correlation	0.632 **	0.477 **	−0.237 *	1	0.162	−0.090	−0.141	−0.157
	Sig. (2-tailed)	0.000	0.000	0.032		0.145	0.422	0.207	0.158
	N	82	82	82	82	82	82	82	82
Take into account all interested parties equally (AM1-5)	Pearson correlation	0.064	−0.285 **	−0.013	0.162	1	0.522 **	0.800 **	0.799 **
	Sig. (2-tailed)	0.570	0.009	0.910	0.145		0.000	0.000	0.000
	N	82	82	82	82	82	82	82	82
Are contemporary (AM1-6)	Pearson correlation	0.288 **	0.188	0.418 **	−0.090	0.522 **	1	0.389 **	0.434 **
	Sig. (2-tailed)	0.009	0.091	0.000	0.422	0.000		0.000	0.000
	N	82	82	82	82	82	82	82	82
Treat all farmers equally (AM1-7)	Pearson correlation	−0.447 **	−0.587 **	0.329 **	−0.141	0.800 **	0.389 **	1	0.560 **
	Sig. (2-tailed)	0.000	0.000	0.003	0.207	0.000	0.000		0.000
	N	82	82	82	82	82	82	82	82
Are easy to apply (AM1-8)	Pearson correlation	0.000	−0.263 *	−0.129	−0.157	0.799 **	0.434 **	0.560 **	1
	Sig. (2-tailed)	1.000	0.017	0.250	0.158	0.000	0.000	0.000	
	N	82	82	82	82	82	82	82	82

\*\* Correlation was significant at the 0.01 level (2-tailed). \* Correlation was significant at the 0.05 level (2-tailed).

**Table 10.** Model summary.

Model Summary				
Model	R	R Squared	Adjusted R Squared	Std. Error of the Estimate
1	0.970	0.941	0.934	0.1067

Table 11 indicates that the regression model predicted the dependent variable significantly well.  $p < 0.0005$ , which indicates that, overall, the regression model statistically significantly predicted the outcome variable. The empirical level of the F-distribution was higher than the critical value of F-significance, and the regression equation can be applicable as  $F(8.73) = 145.144, p < 0.05$ .

**Table 11.** ANOVA results.

	Model	Sum of Squares	df	Mean Square	F	Sig.
1	Regression	13.218	8	1.652	145.144	0.000
	Residual	0.831	73	0.011		
	Total	14.049	81			

Seven independent variables significantly contributed to the prediction. The beta weights, presented in Table 12, suggest that the farmers that perceive that the agri-ecological measures treat all farmers equally contributed the most to predicting the willingness of the agricultural producers to adopt additional agri-ecological measures. The agri-ecological measures being a good way to improve the state of the environment, being effective in improving the quality of the environment, being easy to apply, and being contemporary also contribute to this prediction. The negative beta coefficient of the variables of the agri-ecological measures are a good way to promote the diversity of nature and organisms and take into account all interested parties equally indicate the decrease in the perceptions of the willingness of the agricultural producers to adopt additional agri-ecological measures for a unit change in the two independent variables.

**Table 12.** Linear regression output.

Model	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	Beta		
(Constant)	1.357	0.151		8.956	0.000
Are a good way to improve the state of the environment (AM1-1)	0.807	0.048	2.741	16.826	0.000
Are a good way to promote the diversity of nature and organisms (AM1-2)	−0.556	0.037	−1.596	−15.013	0.000
Are adequately distributed (AM1-3)	−0.010	0.025	−0.023	−0.398	0.692
Are effective in improving the quality of the environment (AM1-4)	0.406	0.024	0.968	16.597	0.000
Take into account all interested parties equally (AM1-5)	−1.491	0.075	−4.419	−19.780	0.000
Are contemporary (AM1-6)	0.186	0.026	0.367	7.063	0.000
Treat all farmers equally (AM1-7)	1.273	0.075	3.225	17.045	0.000
Are easy to apply (AM1-8)	0.405	0.035	0.918	11.729	0.000

As shown in Table 13, for the agricultural producers, the highest motivations for using agri-ecological measures is agriculture-oriented training/education (3.90), previous experience in the application of similar measures (3.79), attitude towards the environment (3.68), the existence of administrative assistance for implementation (3.65), responsibility of farmers towards future generations (3.57), size of agricultural holdings (3.55), farmers' knowledge of the environment/biodiversity (3.46), related agricultural practices (3.33), and profitability of agricultural holdings (3.24). The productivity and soil properties (3.12 each) and young farmers (3.13) do not represent a great motivation for using the agri-ecological measures. The potential obstacles for using the agri-ecological measures for the agricultural producers can be seen in the complexity of measures (2.45), implementation of measures (2.57), property rights (2.88), purpose of land use (3.01), and full-time farm workers (3.02).



**Table 13.** Perceptions of obstacles and motivations of the agricultural producers for using agri-ecological measures.

Agri-Ecological Measures	N	Average	Std. Dev.	Variance	Skewness	Kurtosis
Profitability of agricultural holdings (PAM1-1)	82	3.24	1.823	3.322	−0.247	−1.837
Implementation of measures (PAM1-2)	82	2.57	1.176	1.383	0.473	−0.130
Productivity (PAM1-3)	82	3.12	1.452	1.452	−0.218	−1.277
Size of agricultural holdings (PAM1-4)	82	3.55	1.500	2.251	−0.400	−1.423
Purpose of land use (PAM1-5)	82	3.01	1.338	1.790	−0.308	−1.157
Soil properties (PAM1-6)	82	3.12	1.373	1.886	−0.489	1.197
Property rights (PAM1-7)	82	2.88	1.794	3.220	0.069	−1.819
Related agricultural practices (PAM1-8)	82	3.33	1.564	2.446	−0.389	−1.398
Young farmers (PAM1-9)	82	3.13	1.464	2.142	−0.214	−1.293
Full-time farm workers (PAM1-10)	82	3.02	0.968	0.938	−0.719	−0.079
Farmers with agriculture-oriented training/education (PAM1-11)	82	3.90	1.599	2.558	−1.173	−0.384
Previous experience in the application of similar measures (PAM1-12)	82	3.79	1.322	1.747	−1.087	−0.064
Responsibility of farmers towards future generations (PAM1-13)	82	3.57	1.507	2.272	−0.831	−0.779
Attitude towards the environment (PAM1-14)	82	3.68	1.341	1.799	−0.811	−0.548
Farmers' knowledge of the environment/biodiversity (PAM1-15)	82	3.46	1.779	3.165	−0.599	−1.519
Complexity of measures (PAM1-16)	82	2.45	1.259	1.584	0.456	−0.448
The existence of administrative assistance for implementation (PAM1-17)	82	3.65	1.574	2.478	−0.812	−0.812
Perceptions of obstacles and motivations of agricultural producers (PAM1)	82	<b>3.27</b>	<b>1.522</b>	<b>2.315</b>	<b>0.279</b>	<b>−1.343</b>

#### 4.2.2. Main Findings from the Survey on the Main Economic and Structural Factors as Determinants of the Adoption of the Agri-Environmental Management Practices by the Agricultural Advisory Employees

In the sample of the agricultural advisory services, the majority of the sample was male (64.29%), while female respondents made up 35.71%, as shown in Table 14.

**Table 14.** Gender of the agricultural advisory employees.

Gender	Frequency	Percentage Share (%)
Male	36	64.29
Female	20	35.71
Total	56	100.00

The largest percentage of the agricultural advisory services employees was in the age range of 41–50 (35.71%) and 51–60 years (35.71%), followed by the age range of over 60 (14.29%). The age ranges of the agricultural advisory service employees of 18–30 years and 31–40 years were equally represented in the sample (7.14%), as shown in Table 15.

The largest percent of the agricultural advisory service employees had obtained master's and PhD degrees (57.14%), followed by higher education/BA degrees at 42.86%, as shown in Table 16.

**Table 15.** Age of the agricultural advisory employees.

Age	Frequency	Percentage Share (%)
18–30	4	7.14
31–40	4	7.14
41–50	20	35.71
51–60	20	35.71
Over 60	8	14.29
Total	56	100.00

**Table 16.** Professional qualification level of the agricultural advisory employees.

Professional Qualifications Level	Frequency	Percentage Share (%)
High school and professional school	0	0.00
Higher education/BA	24	42.86
Master's and PhD	32	57.14
Total	56	100.00

The majority of the agricultural advisory service employees had been working in the organization for over 20 years (71.43%), followed by 16–20 years spent in the organization (14.29%). The respondents that had spent 5–10 years in the organization and less than 5 years were equally represented in the sample (7.14%), as shown in Table 17.

**Table 17.** The number of years spent in the organization of the agricultural advisory employees.

The Number of Years Spent in the Organization	Frequency	Percentage Share (%)
Less than 5	4	7.14
5–10	4	7.14
11–15	0	0.00
16–20	8	14.29
Over 20	40	71.43
Total	56	100.00

In the sample, the agricultural advisory service employees best rated the claim that the “agri-ecological measures are a good way to improve the state of the environment” with a grade of 3.86, followed by the claim “agri-ecological measures are a good way to promote the diversity of nature and organisms” with a grade of 3.71, and the claims “agri-ecological measures are effective in improving the quality of the environment” and “agri-ecological measures are contemporary” with the same grade of 3.57.

The claims “agri-ecological measures take into account all interested parties equally” and “agri-ecological measures treat all farmers equally” were both graded at 3.21. The lowest rated claims were “agri-ecological measures are adequately distributed” with the grade of 2.64, followed by the claim “agri-ecological measures are easy to apply” rated with a grade of 3.00, as shown in Table 18.

The agricultural advisory service employees perceive, as the highest motivations for using agri-ecological measures, the responsibility of farmers towards future generations (4.29), previous experience in the application of similar measures (4.21), farmers having agriculture-oriented training/education (4.14), young farmers and attitude towards the environment (4.07), the existence of administrative assistance for implementation (3.93), farmers’ knowledge of the environment/biodiversity and full-time farm workers (both rated 3.86), soil properties (3.71), and the purpose of land use (3.50). Following the above-mentioned information, the profitability of agricultural holdings and complexity of measures were both rated with a grade of 3.21. The implementation of measures and productivity were both rated with a grade of 3.07. The agricultural advisory service employees perceived the size of agricultural holdings and the property rights (both rated with a grade of 3.00) as the largest obstacles for using agri-ecological measures, as shown in Table 19.

**Table 18.** Attitudes of the agricultural advisory employees regarding existing incentives for the preservation and improvement of the environment and natural resources.

Agri-Ecological Measures	N	Average	Std. Dev.	Variance	Skewness	Kurtosis
Are a good way to improve the state of the environment (AM2-1)	56	3.86	1.135	1.288	1.712	1.027
Are a good way to promote the diversity of nature and organisms (AM2-2)	56	3.71	1.171	1.371	1.693	0.049
Are adequately distributed (AM2-3)	56	2.64	0.903	0.816	1.718	−0.491
Are effective in improving the quality of the environment (AM2-4)	56	3.57	0.828	0.686	1.717	0.543
Take into account all interested parties equally (AM2-5)	56	3.21	0.948	0.899	1.729	0.638
are contemporary (AM2-6)	56	3.57	0.912	0.831	1.727	0.638
Treat all farmers equally (AM2-7)	56	3.21	0.780	0.608	1.705	0.271
Are easy to apply (AM2-8)	56	3.00	1.009	1.018	1.732	−0.198
Agri-ecological measures attitudes (AM2)	<b>56</b>	<b>3.35</b>	<b>1.034</b>	<b>1.069</b>	<b>−0.248</b>	<b>−0.233</b>

**Table 19.** Perceptions of the agricultural advisory employees of obstacles and motivations for using agri-ecological measures.

Agri-Ecological Measures and	N	Average	Std. Dev.	Variance	Skewness	Kurtosis
Profitability of agricultural holdings (PAM2-1)	56	3.21	1.091	1.190	1.719	−0.312
Implementation of measures (PAM2-2)	56	3.07	0.892	0.795	1.721	−0.431
Productivity (PAM2-3)	56	3.07	1.042	1.086	1.729	−0.475
Size of agricultural holdings (PAM2-4)	56	3.00	1.144	1.309	1.682	−0.615
Purpose of land use (PAM2-5)	56	3.50	0.915	0.836	1.727	−0.750
Soil properties (PAM2-6)	56	3.71	1.039	1.081	1.731	−1.137
Property rights (PAM2-7)	56	3.00	0.853	0.727	1.713	0.203
Related agricultural practices (PAM2-8)	56	3.57	0.735	0.540	1.706	−0.581
Young farmers (PAM2-9)	56	4.07	0.806	0.649	1.719	1.196
Full-time farm workers (PAM2-10)	56	3.86	0.923	0.852	1.729	−0.837
Farmers with agriculture-oriented training/education (PAM2-11)	56	4.14	0.841	0.706	1.723	0.972
Previous experience in the application of similar measures (PAM2-12)	56	4.21	0.680	0.462	1.711	−0.792
Responsibility of farmers towards future generations (PAM2-13)	56	4.29	1.039	1.081	1.731	−0.542
Attitude towards the environment (PAM2-14)	56	4.07	0.892	0.795	1.727	−1.752
Farmers' knowledge of the environment/biodiversity (PAM2-15)	56	3.86	1.135	1.288	1.712	−1.402
Complexity of measures (PAM2-16)	56	3.21	1.155	1.335	1.684	−0.785
The existence of administrative assistance for implementation (PAM2-17)	56	3.93	1.110	1.231	1.721	1.237
Perceptions of obstacles and motivations farmers professional services (PAM2)	<b>56</b>	<b>3.63</b>	<b>1.060</b>	<b>1.124</b>	<b>−0.291</b>	<b>−0.730</b>

## 5. Discussion

The education in the introduction of the new Measure 4, agri-ecological-climatic measure and organic production of the IPARD III program for the period 2021–2027, has been identified as a crucial factor by national-level interviews. The experiences of the countries that have become members of the European Union confirm that the creation of a favorable institutional environment is the key to success in the use of IPARD funds. The development of IPARD institutions, training of employees in institutions, and farmers themselves are indispensable steps in the process of accession to the European Union and efficient use of its pre-accession funds [28]. “This implies that in order to design effective and efficient policies, knowledge regarding locally existing agri-environmental policies, farming systems and the preferences of farmers is needed” [29] (p. 605). If the agri-ecological measures are designed with just a “one size-fits-all” approach, they shall fail to account for dependencies on local conditions such as soil quality, as in the example of Czechia [10].

For the new and future EU accession member states, the CAP represents the benchmark for setting their future agricultural policy [30]. Users of the new measures will have to comply with the national rules that are relevant to these measures, and which correspond to certain EU standards and conditions (SMR standards and good agricultural and environmental conditions—GAEC) related to land, water, management landscapes, and relevant minimum requirements for fertilizers and plant protection products. The design of such a policy needs to be in a way “to account for the effects of factors such as ecological motivations, farm size, farmer age, or domestic and landscape-level diversity and governance arrangements on farmer decision-making, as individual characteristics and as interacting elements of decision contexts” [10] (p. 9).

We can conclude that the relationships between the education of all participants and strengthening administrative capacities for the support for the implementation of the program of agri-ecological measures are in progress. The interviewees from the ministry have identified the sustainable use of agricultural land, sustainable use of forest resources and organic production, and preservation of plant and animal genetic resources as the existing agri-ecological measures that have been implemented until now in the Republic of Serbia. The largest effect of these measures in the previous period in Serbia was organic production, which has a growing potential, seen in the period of 2010–2020, where the total area under organic production increased by as much as 258%.

The relationship between agri-ecological-climatic obligations and relevant elements of the usual methods of agricultural production must be presented within each operation. The involvement of the competent institutions in the transfer of knowledge is an important form of support, especially when it comes to good agri-ecological practices and their effects and the main role is taken up by the Agricultural Advisory Services. Some authors also point out that “it is expected that two equal advisory sectors will eventually be formed in Serbia as well. The state advisory service, which does not charge for its services, will be the pivot of knowledge and information for small low-income agricultural holdings. On the other hand, large commercial holdings will turn to private consultants, whose advisory work is completely commercialized” [31] (p. 104). Agricultural advisory services also need to adapt to different needs of the beneficiaries.

The high willingness coincides with the growing demand for organic produce in the last ten years and the consumer willingness to pay more for such produce [32], even in times of the COVID-19 pandemic [33]. The findings have shown that wineries in the Republic of Serbia are aware of the importance of the environmentally responsible production and of the effects that can be achieved [34].

The findings confirm that the small households are more ready to take up such measures [35]. Small farms’ probabilities of participating in AEMs are greater with increasing land productivity, and AEMs are aimed more at highly productive small farms [36]. On the contrary Ruto and Garrod (2009) found that higher education, higher

environmental consciousness, and large farms are more likely to participate in agri-environmental schemes [25].

We can conclude that the existing agricultural producers using measures for organic farming can be further educated through training for new AE measures. The findings point out that more effort should be placed into coordinating between those who already participate in subsidies and perform landscape changes [37]. “There is a potential for coordination and improvement within and between public policies through the training of new advisors or incorporating skills aimed at addressing the specific needs and interests of hobby farmers and pensioners and those who already participate in subsidies and perform landscape changes” [37] (p. 697).

Older farmer age, higher general education, and previous participation in other agri-environmental measures [38], as well as previous experience and favorable environmental attitude, positively influence the willingness to participate in agri-environmental measures [39]. Part-time farmers will be likely to adopt measures for agricultural land use changes [40]. On the other hand, the findings indicate that the agricultural producers’ farms less likely to join agri-ecological production is found in farms with a high proportion of family labor [22]. A high degree of mechanization significantly decreases the odds of participation in both AES and investment support contracts [35].

In the sample of the agricultural advisory service employees, the majority were male (64.29%) in the age range of 41–60 (71.42%), had obtained a master’s or PhD degree (57.14%), and had been working in the organization for over 20 years (71.43%). Regarding the attitudes on the existing incentives for the preservation and improvement of the environment and natural resources, the agricultural advisory employees’ perceptions (mean value 3.35) were slightly more positive than those of the farmers (mean value 2.82). It can be concluded that both agricultural producers and agricultural advisory service employees agree the most that agri-ecological measures are a good way to improve the state of the environment, are a good way to promote the diversity of nature and organisms, and are a good way to promote the diversity of nature and organisms, which is in line with the findings of Vainio et al. (2021) [41]. We can conclude that the lowest-rated variables, by the agricultural producers and agricultural advisory services employees, are the perceptions that the agri-ecological measures are adequately distributed, are easy to apply, and take into account all interested parties equally, which is in line with the findings of Niskanen et al. (2021) [26]. The perceived complexity of the measures has been emphasized by the research of Zinngrebe et al. (2017) [42]. The low scores on perceptions on the adequate distribution may account for the fact that per hectare payment methods used in most AES may disproportionately benefit larger farms over small farmers [25].

The agricultural advisory employees’ perceptions (mean value 3.63) of obstacles and motivations for using agri-ecological measures were more highly rated than those of agricultural producers (mean value 3.27). The agricultural producers and the agricultural advisory service employees perceived one of the highest motivations for using agri-ecological measures to be agriculture-oriented training and education (3.90), which is in line with the work of Yilmaz (2015) [43]. They stressed the importance of the previous experience in the application of similar measures (3.79), which is in line with the work of Lastra-Bravo et al. (2015) [22]. The attitude towards the environment (3.68) and the existence of administrative assistance for implementation (3.65) were also considered to be important factors, which is in line with the work of Emery and Franks (2012) [44]. As for the obstacles for using agri-ecological measures, the agricultural producers stated the complexity of measures (2.45) and the implementation of measures (2.57), which in line with work by Brown et al. (2021) [10].

The agricultural advisory service employees perceive as the highest motivations the responsibility of farmers towards future generations (4.29), previous experience in the application of similar measures (4.21), farmers having agriculture-oriented training/education (4.14), and young farmers and attitude towards the environment (4.07). The findings indicate that advisory service employees perceive young farmers to be more ready to use the

agri-ecological measures (thus having a greater environmental awareness) [45] as younger farmers demonstrate consistently higher levels of engagement with the agri-environment schemes [46].

Farm size plays a significant role in shaping the demand for particular advisory services, for example, for the preparation of the business plan, and the shares of farms interested in advisory services on different agri-environmental issues ranged between 1% and 9%, thus indicating that the environmental awareness of the young farmers is not high if compared to economic considerations [47]. On the other hand, we found that parents who are farmer managers usually encourage their children and provide them higher education so that they get the opportunity to work outside of agriculture and away from rural areas, thus eventually enabling them higher standards of living, which represents a migration from rural areas and lost interest in agriculture [48]. The agricultural advisory employees perceive as the largest obstacle the size of agricultural holdings and the property rights (both rated 3.00), followed by the implementation of measures and productivity (both rated with 3.07).

The size of the holding has proven to be an important determinant of participation as increased farm size in the past five years affects participation in AEMs negatively, as well as labor-intensive farming types and high dependency of household income on farming activity, whereas previous experience, easy-to-implement environmentally friendly farm practices, and adequate compensation of extra costs encourage AE participation [45].

## 6. Conclusions

This research explored the perceptions of two interested parties, agricultural producers and advisory bodies, on the factors affecting the willingness of the agricultural producers to adopt agri-environmental (AE) practices that will reduce the negative impact of agricultural activities on the environment. In the sample of agricultural producers, the majority were male producers in the age range 51–60, living in a small household of 1–4 members with a higher education/BA degree and monthly household income of EUR 500–2000. The majority of the family members were involved in working in their agricultural holding mostly on a part time basis while hiring external workers to work in their agricultural holding that is situated on flat terrain with an agricultural specialization of plant production on soil of medium quality while owning their own agricultural mechanization, but without a business development plan for the agricultural holding. The agricultural producers were found to be willing to adopt additional agri-ecological measures in their agricultural holdings.

In the sample of the agricultural advisory service employees, the majority were male employees in the age range of 41–60, with master's/PhD degrees, that have been working in the organization for over 20 years. This research also included a policy official's view the on further introduction of AE measures into the Republic of Serbia under the IPARD 3 program, from the sector for agricultural policy, sector for rural development, and department for the IPARD of the Ministry of Agriculture, Forestry and Water Management.

We can conclude the following:

- The findings show that the policy framework for the introduction of new agri-ecological measures is ready, with adequate support measures providing the trainings/education and the development of the business plan for the AE operations.
- The agricultural producers are aware of the environmental impacts and are willing to adopt new agri-environmental practices.
- The agricultural advisory employees believe that the highest motivations for using agri-ecological measures is the responsibility of farmers towards future generations.



- The agricultural producers believe that they need additional agriculture-oriented training/education and that previous experience in the application of similar measures can be of significant aid.
- National advisory services shall have an important role in promoting agri-environmental management practices and their implementation in the agricultural policies of the Republic of Serbia.
- The European Union IPARD III program can improve the competitiveness of the agricultural policies of the Republic of Serbia and promote the European standards in the field of hygiene, food safety, animal welfare, and environmental protection, enabling agricultural producers to place their products on the EU market.
- The Republic of Serbia needs to continue with the implementation activities from the action plan for harmonization with the acquis of the EU in the field of agriculture and rural development.
- The Republic of Serbia in the future must ensure the separation of payments from production and the linking of area-based payments with cross-compliance standards.
- The policymakers and developers should carefully also consider the distinctive characters of the regions and, in the future, can strive to develop targeted agri-environmental policies.

The findings have direct implications for policymakers and other stakeholders in the agricultural chain, showing that the willingness to adopt an agri-ecological measure of agricultural producers is clearly identified. The findings can contribute to other EU accession countries regarding the analysis of the significant factors of the agri-ecological policy transition and spur further discussion regarding the level of the harmonization with CAP.

The limitation of the research regards the sample size, which can present a limitation to the generalizability of the results. Also, findings based on the self-reported intentions stemming from a hypothetical nature of the study could differ in real situations.

Future studies can further explore the various relationships among the themes brought up in this research framework and reveal new conclusions. For example, future studies could also integrate regulatory and administrative burdens, the amounts of financial incentives, and the quality of education provided, in order to identify the best policies for the agri-environmental management practices and their subsequent implementation in the agricultural policies of the Republic of Serbia.

**Author Contributions:** Conceptualization, J.V.T. and R.P.; methodology, J.V.T.; software, V.M.; validation, J.V.T., R.P. and V.M.; formal analysis, R.P.; investigation, J.V.T.; resources, V.M.; data curation, J.V.T.; writing—original draft preparation, J.V.T.; writing—review and editing, R.P.; visualization, V.M.; supervision, R.P.; project administration, J.V.T.; funding acquisition, J.V.T. and R.P. All authors have read and agreed to the published version of the manuscript.

**Funding:** This research received no external funding.

**Institutional Review Board Statement:** Not applicable.

**Informed Consent Statement:** Not applicable.

**Data Availability Statement:** Not applicable.

**Acknowledgments:** This research was a part of the research within the project Jean Monnet Module European sustainable values in common agricultural policy (EUVALUESCAP), co-funded by the Erasmus + Programme of the European Union, Project: 101047444—EUVALUESCAP—ERASMUS-JMO-2021-HEI-TCH-RSCH.

**Conflicts of Interest:** The authors declare no conflict of interest.

## Appendix A

### Box A1. Interview questions for the policymakers.

#### Interview Questions

1. How do you evaluate the incentives for the preservation and improvement of the environment and natural resources applied in the Republic of Serbia, and which incentives for supporting agri-ecological measures, good agricultural practice, and other environmental protection and preservation policies would you single out as those of primary importance for future good agri-ecological practice in agriculture of the Republic of Serbia?
2. Do you think that additional education and/or training of farmers for the use of agri-ecological measures will contribute to their effective use?
3. Do you think that the involvement of farmers in the development of an agri-ecological plan for the use of the mentioned measures would be beneficial for both parties?
4. Will it be necessary to increase the number of personnel in the competent institutions and, if so, will they need additional training before starting the implementation of the program of agri-ecological measures?
5. Do you think that the new agri-ecological measures will be more complex in terms of drafting and implementing specific agri-ecological contracts?
6. If the staff do not have previous work experience in agri-ecological programs, will the advisory and administrative staff in the relevant institutions receive adequate training that will enable them to control the implementation of agri-ecological contracts, as well as control the monitoring and reporting of costs?
7. Do you think that the staff in charge of approving agri-ecological measures will be able to provide adequate advisory assistance to farmers on agri-ecological aspects of management agricultural holdings?
8. Do you think that the provided feedback on the progress and acceptance of the measures and on possible administrative problems will be significant for representatives of the local government, as well as agricultural and environmental associations, and if the answer is yes, why?
9. Do you think that a set of specific agri-ecological measures and different payment standards should be determined for a certain region if soil quality, labor costs, or length vegetation period in one part of the country different from another?
10. The European Commission has introduced a comprehensive package of indicators—the Common Monitoring and Evaluation Framework (CMEF). There are five main types of indicators: input indicators are usually used to monitor progress in terms of disbursement of financial resources to farmers; product indicators monitor the undertaking of specific measures; result indicators are related to the direct and immediate effects of measures on farm management; impact indicators go beyond the scope of direct results and monitor long-term effects on the environment; and basic indicators represent an important reference point for assessing the impact of individual measures and program as a whole. Which of the above indicators do you consider the most important for monitoring the situation and evaluating the agri-ecological practices of the Republic of Serbia? (grades 1–5).
  1. Input indicators.
  2. Product indicators.
  3. Result indicators.
  4. Impact indicators.
  5. Basic indicators.

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