DOI: 10.55643/fcaptp.6.59.2024.4543

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Received: 27/08/2024
Accepted: 18/11/2024
Published: 31/12/2024

INNOVATIVE MANAGEMENT TOOLS FOR IMPLEMENTING STATE ENVIRONMENTAL-ECONOMIC POLICIES IN RURAL AREAS: EU APPROACHES

ABSTRACT

The purpose of the article is to research the tools and approaches of the EU in the management of environmental and economic policy (EEP) in rural areas (RA) and to identify priority innovative tools for Ukraine (IT). The conditions for the use of IT and EU approaches in EEP and the level of their implementation in Ukraine are indicated. Taking into account the peculiarities of the development of RA and the existing threats, the goals of EEP that are significant for Ukraine have been singled out. Prerequisites for acquiring a synergistic nature of the ecological development of RA are established. It is indicated that the approaches of the EU regarding the implementation of the state EEP in RA under the significant uncertainty caused by the war should be considered as a strategic perspective for Ukraine, and the task of state management becomes the formation of framework conditions for the further ecological development of RA and the approbation of IT for such development.

Keywords: innovative tools, environmental and economic policy, agriculture, rural areas, agricultural producers, subsidies, EU experience, adaptation

JEL Classification: H23, O13, Q15, Q50, Q58

INTRODUCTION

The European Union has developed and is implementing a model of ecologically balanced development, which aims to implement an optimal, coordinated policy for solving economic, social and environmental problems in rural areas. For this purpose, the EU institutional structures have developed and introduced into the legal field the principles of Common Agricultural Policy (CAP). Approaches to the formation of management decisions aimed at stimulating ecological agricultural production and achieving environmental safety indicators in the agricultural sector defined by EU documents are also legally regulated. A significant advantage of the CAP compared to the past ecological and economic approaches of the EU is that it is based on quantitative criteria that are clearly defined in the legal documents of the European Union. Wetland permit for carbon-rich soils, water management, and crop rotation management make CAP approaches more flexible and effective. The total direct and secondary costs of implementing the CAP are ~EUR 23 billion per year, making the EU's Common Environmental and Economic Policy (CEP) realistic. Also, a peculiarity of CEP is flexibility in accordance with the national priorities of the EU member states, and adaptability to the geographical distribution of natural resources.

The experience of the EU EEP in rural areas has proven that effective state management in this area involves the use of new approaches in planning environmental activities, solving employment problems in rural areas, changing the logistics of agricultural products, promoting ecological products to the market, a reasonable choice of financial instruments and, in general, establishing the interaction of institutional, business structures and the population. In the new conditions, Ukraine needs to change the paradigm of state policy in the agrarian sphere - from budgetary and investment support to stimulating the development of innovative ecological and economic activities in rural areas and, in general, the development of rural areas.

In the normative and legal field of Ukraine, state environmental policy is defined as a system of tools ("measures") aimed at managing the ecological situation, rational use of natural capital and forming a dynamic balance of "development of the economy, society, nature" (Bukanov, 2020) and "the introduction of the ecosystem approach in all directions of social and economic development (Law of Ukraine, 2019). Therefore, it is expedient to harmonize the Ukrainian system of the specified instruments and approaches of the European Union in these matters (Fatkhutdinov et al., 2021; Denysiuk et al., 2022). At the same time, the full-fledged implementation of indicated approaches in Ukraine is significantly hindered, first of all, due to the lack of financial support for the EEP in rural areas due to the deficit of the state budget.

LITERATURE REVIEW

The European Union conducts a well-founded EEP regarding the development of rural areas. This policy is based on a significant amount of research work.

Thus, Konat et al. (2019) consider it expedient to harmoniously expand the use of fiscal/financial instruments among the tools for the implementation of the state EEP. At the same time, Konat et al. (2019) indicate that it is expedient to coordinate the application of tax and subsidy instruments, taking into account the size of the farms to which they are used and the type of production. The concept of "related" tools, which significantly expands the EEP toolkit, is also introduced.

Doukas et al. (2023) indicate that the challenges and benefits of the Common Agricultural Policy are variable across time periods and countries where the CAP is implemented. It is indicated that the introduction of the new EU EEP led to an increase in the cost of production of agricultural products and caused significant problems with the adaptation of farmers to new conditions. This determined the need for financial subsidies to farmers. The above is a certain caution in the introduction of the mentioned approaches in Ukraine in conditions of crisis and lack of budgetary resources to compensate agricultural producers for their expenses for environmental purposes.

Gargano et al. (2021) investigated the prospects of multifunctional agrarian farms in Italy as a tool for the development of rural areas in view of the CAP. It is noted that multifunctionality is also a tool for ensuring sustainability for agricultural holdings in the territories of risky agriculture. Acquisition of new functions by agricultural enterprises of Ukraine in view of the experience of Italian entrepreneurs is a promising direction of development.

In the article by Amblard (2021), it is indicated that until now in the EC, regulatory policy instruments are predominantly aimed at individual farms to solve the problems of diffuse pollution in rural areas. According to Amblard (2021) and Dankevych et al. (2021), the effectiveness of regulatory policy will increase with the use of hybrid tools. The effectiveness and result of the use of such tools is proposed to be determined using the social-ecological system (SES). In contrast to the EU, in Ukraine, regulatory instruments are mainly not individual in nature but have a mass impact - on regions, clusters of producers, and areas of activity, therefore the use of instruments of EU regulatory hybrid policy is a useful approach.

Analysis of the sustainability of agricultural territories of the EU countries using the cluster approach was carried out by Herman (2024). The cumulative impact of social, economic and environmental indicators on ensuring the level of sustainability is indicated. It is noted that the level of sustainability of economic activity in agricultural production of the EU countries correlates with the development of rural areas. These qualitative findings are supported by a thorough statistical study by Jezierska-Thöle et al. (2022) and Horák et al. (2023), which indicates a correlation between the success of the green economy and the volume of environmental grants and subsidies provided under the CAP. It is noted that the green economy, based on the experience of the EU, has become an important tool for solving economic and social problems during the crisis, in particular, a tool in the fight against unemployment. It is indicated that "costs per hectare" are most significantly correlated with the economic component of "quality of life" in rural areas. The article by Hutorov et al. (2021), Tomashuk and Khaietska (2022) and Sumets et al. (2022) confirmed the relationship between the success of ecological agricultural production and the development of rural areas in Ukraine. This was used in the presented research.

Ukrainian scientists also studied the ecological and economic aspects of EU policy in rural areas and the peculiarities of their implementation in Ukraine.

In the fundamental study of Hranovska (2019) it is indicated that the sustainable development of economic activity in the agrarian sector and, accordingly, the development of rural areas requires a systematic innovative improvement of all state policy instruments in this area. This requires the use of EU experience, in particular the creation of an appropriate institutional environment for this. As tools of the institutional environment, Hranovska (2019) considered: streamlining of state management of land and water use; legal monitoring of agricultural enterprises; creation of the eco-products market; effective regulation of prices and logistics of agricultural goods. Ukrainian scientists worked out the areas indicated by Hranovska (2019). For example, Andriushchenko et al. (2019), Dvigun et al. (2022a) and Matvieieva et al. (2023) studied

the impact of innovative tools on improving land use indicators by Ukrainian agricultural enterprises. The systematic approach to the formation of the specified institutional environment is detailed in the article by Svystun et al., (2020). In view of the needs for the development of cross-border cooperation of Ukrainian and European agricultural producers, Vysochanska (2021) points out the importance of a systemic approach to the EEP. Yarova (2019) points out the need to eliminate disproportions in the environmental activities of small, medium and large agricultural enterprises, following the example of the EU. The legal aspects and tools of the EEP for studying EU approaches are researched in detail in the articles of Sydorov (2020), Glushko and Hbur (2022). The insufficient level of coherence of national and European legislation in this area is indicated.

An article by Shestakovska and Batrakova (2019) analyzes the experience of the EU regarding the state policy of innovative development of rural areas. On the basis of the above analysis, the need for increasing the targeted funding of R&D in this area, subsidizing innovations; provision preferential loans for the implementation of ecological technologies; compensation of interest paid on loans of agricultural enterprises for the specified purposes, tax, customs benefits, etc., is indicated.

The article by Pitel and Novak (2021) researched the conceptual foundations of EEP management regarding the development of rural areas in Ukraine. It is indicated that a system of balanced agricultural production management tools oriented to long-term environmental goals has not yet been implemented in Ukraine. It is noted that the share of funds from the state and local budgets in the total amount of expenses for environmental goals of rural development is only 2.3%. At the same time, the own funds of the subjects of economic activity for these purposes make up 79.1%, which indicates insufficient use by the state of the EEP tools available to it and contradicts the approaches of the EU.

The use of EU experience in balancing the development of individual regions and countries of the European Union to achieve environmental, social and economic goals is considered in the article by Mazur and Tomashuk (2019). Perevozova et al. (2019), Nyzheholenko (2020) and Baik et al. (2021) formalized such an approach using integrated indicators of economic, social and environmental development. Priamuhina (2019) pointed out an important peculiarity of regional ecological and economic systems that will ensure the sustainability of production activities in the face of dynamic challenges. This is their adaptability, which is considered in the presented research.

The article by Revenko (2020) investigated the use of EU experience in the implementation of EEP tools in the agricultural production of countries such as China, Brazil, India and South Africa. It was established that the introduction of these tools did not slow down the development of their agricultural industry. It is noted that using the experience of the EU countries in this area does not exempt the national management from implementing its own tools for the development of rural areas. At the same time, Rogach et al. (2019) indicated that for the declaration of needs for the implementation of EU EEP approaches in Ukraine, support for the greening of agricultural production is formal and insignificant.

The experience of the EU implementation of digital management tools for the implementation of state EEP is considered in the article by Patseva et al. (2023) using the example of the online platform "EkoSystem" implemented by the Ministry of Environmental Protection and Natural Resources of Ukraine. Using EU approaches, ways of forming and implementing state environmental and economic policy are proposed.

Bendasiuk et al. (2022) using the experience of EU countries indicated the priority of innovative approaches to the development of agribusinesses and rural areas. It is indicated that ecological innovations are the tool that can solve the main problems not only of an ecological but also of a socio-economic nature, to ensure effective use of nature. Management models are studied, and it is indicated how certain areas of ecological innovation will contribute to the development of rural areas.

Chechotkin and Prystemskyi (2020) considered in detail the financial instruments of the state policy of promoting eco-production in rural areas. It is indicated that the use of these tools, in particular, programs for the development of the agricultural sector, should be targeted, aimed at the formation of infrastructure, provision of state scientific support and training of human resources. In Kachuriner (2022) these issues are investigated more objectively. Thus, it is indicated that the use of the Ecolabel tool, which allows to eliminate the shortcomings of the regulation of agricultural enterprises, will improve the legal field regarding requirements for eco-production. The importance of such legal instruments as environmental standards; environmental impact assessment; agricultural taxes is noted.

Bila (2020) points to the success of the modernization of agriculture in developing countries with the involvement of TNCs. This, in particular, solves the problems of investments and access to world markets. Voitenko and Chubei (2021) indicated the importance of the experience of Brazil, Turkey, and China for Ukrainian farmers. The Chinese experience is studied in detail in the work of Shen et al. (2022). This article examines the impact of digitalization on quality development and green growth in rural areas.

DOI: 10.55643/fcaptp.6.59.2024.4543

Important political results of the implementation of the state environmental and economic policy in rural areas are also indicated in scientific works. In particular, Dziamulych and Maksymiak (2023) note the importance of solving employment problems in rural areas. These problems give rise to social tension, so their solution will ensure political stability in the country. Tymoshenko (2024) points out that social depression and, accordingly, political instability are caused by the low level of income of agrarians. The mentioned problems can be solved by the implementation of the state EEP using the best modern practices.

According to the study by scientists of a wide range of aspects of the EU EEP, some approaches of the EU should be thoroughly investigated in order to avoid potential challenges, in particular, the reduction of the export of Ukrainian agricultural products to the countries of the European Union. Priorities, prospects and obstacles to the implementation of the planned approaches in Ukraine should be determined.

AIMS AND OBJECTIVES

The purpose of the article is to research the tools and approaches of the EU in the management of ecological and economic policy in rural areas and to determine the priority innovative tools for Ukraine. The objectives of the article are to assess the conditions for using EU tools and approaches in the management of environmental and economic policy and the level of their implementation in Ukraine, and, based on the specifics of the development of the agricultural sector and the existing threats, to highlight the goals of EEP in rural areas that are significant for Ukraine.

METHODS

The method of analysis and synthesis was used during the research to substantiate the need for the synergistic effect of EEP tools, and the consistency of their application. The method of critical analysis made it possible to determine the principles of the EU EEP, which became the basis of such an EU EEP tool as the formation of priorities in the distribution of expenditures for the development of rural areas. The comparison method pointed to the importance of such tools of the EU EEP as cross-compliance and consolidation of management actions. The method of abstract logical analysis made it possible to establish that, in the conditions of war, the approaches of the EU EES for Ukraine should be considered from a strategic perspective. In this case, the formation of framework conditions for the further ecological development of rural areas and the testing of new innovative management tools for such development become the task of the state. The method of generalization made it possible to establish that economic incentives for Ukrainian farmers in the introduction of eco-technologies are the prospects of long-term development of the EU market and the probability of the EU stopping the import of agricultural goods that do not meet EU requirements. Using the method of logical abstraction, it is indicated that a significant component of the EU experience for Ukraine regarding the goals of greening rural areas is not only the innovative direction of the eco-development of agricultural production but also the formation of rural economic activity that is resistant to external shocks.

RESULTS

In the Communication from the European Commission to the institutional structures of the European Union (Communication from the Commission, 2017), challenges, goals and guidelines for the development of the agricultural sector are indicated and the necessary changes in the common agricultural policy for the formation of a "smarter, modern and sustainable CAP" are identified. The directions of EEP in rural areas are named: "Using research and innovation to better link what we know to what we grow", "Fostering a smart and resilient agricultural sector", and "A fair income support to help farmers to make a living." In general, according to EU documents, the definition of "agricultural activity" is not narrowed down to the production of agricultural products, but also includes the maintenance of agricultural territory.

According to Regulation EU (2021), the CAP is tasked not only with reducing the negative impact on the environment, but also with reducing climate hazards, increasing the amount of environmental public goods from all types of agricultural and forest land and, in general, from rural areas.

At the same time, in order to stabilize and diversify economic activity in rural areas, CAP is aimed at increasing the number of non-agricultural enterprises in rural areas. These are, for example, directions for the formation of new value chains - small renewable energy, bioeconomy, ecotourism, etc. The so-called EEP of the EU also became a significant tool. "Eco-schemes" aimed at stimulating the latest practices of environmentalization of agricultural activities, in particular, rationalization of management of permanent pastures, use of landscape features, cyclical wetting of peat lands, swamp, organic

land use, technologies for preventing resistance of agricultural animals to antimicrobial drugs, etc. In Regulation EU (2021) it is indicated that eco-schemes should mainly involve at least two areas of eco-activity - environmental protection, climate action, animal welfare, and elimination of consumer health problems due to resistance to antimicrobial drugs due to improper use of antibiotics in animal husbandry, etc.

An important direction of the EU EEP is the support of small agricultural holdings, which, as indicated in Regulation EU (2021), have a significant impact on the level of employment in rural areas and, in general, on the development of rural areas. In view of this, the task of balanced support of small agricultural holdings, reduction of the level of administration, and replacement of financial intervention tools of direct payments for them has arisen. In order to ensure a better orientation of such support, the differentiation of subsidies was determined and the instruments of additional financial support for small-land farmers were introduced.

The EEP tools under the CAP include not only financial support for farmers but also a wide range of advisory services, the provision of which is entrusted to specially formed advisory services. It is worth noting that the provision of advisory services is envisaged throughout the entire life cycle of agriculture from the stage of its creation; definition of production models and their changes depending on the forecast of market demand dynamics; familiarization with innovative practices, ecological agricultural technology; coordination of production activities with EU eco-standards, etc. Advisory services are integrated as much as possible with research structures, farmers' associations and other structures that form the Agricultural Knowledge and Innovation System (AKIS). The implementation of AKIS in Ukraine is carried out under the EU project "Institutional and Political Reform of Small-Scale Agriculture" (IPRSA).

Important for achieving the goals of the CAP according to EU Regulation (2021) is the use of EEP tools in agriculture, which would ensure a synergistic effect on the effectiveness of the specified tools. Therefore, it is worth adding to the EEP tools the consistency of their application and the binding nature of the management commitments made by the institutional structures regarding the reformation of agricultural activity.

The task of CAP is also to raise the awareness of managers and employees of the agricultural industry and forestry that they are not only users of natural capital, but also managers of ecosystems, landscapes, habitats of plants, animals and people. Therefore, the strategic feasibility and measurability of using CAP tools is important. The above determines the constant development and improvement of CAP. An example of this is the transition from the established green architecture of the CAP, aimed at the coordinated implementation of three EEP tools: cross-compliance, direct eco-payments and voluntary implementation of environmental measures by producers, to a targeted, integrated and flexible policy in the agricultural sector, aimed at "achieving high environmental added value of the European Union" (Regulation EU, 2021). Under this approach, the following factors were unified: requirements for receiving direct payments; rules of management and control of agricultural activities; increasing variability in the provision of subsidies, which will allow moving away from the unitary approach to different agricultural producers and strengthen the ecological connection with the introduction of assistance to farmers. This will strengthen the strategic importance of CAP for the formation of the cyclical agricultural economy of the EU.

It should also be taken into account that the CAP is not aimed purely at environmental issues, but primarily at ensuring the effectiveness of ecological and economic activities in rural areas according to the so-called "the delivery model". This is facilitated by the toolkit of extended variant subsidiarity, which makes it possible to best adapt the specified approach to regional conditions, national needs of the EU countries, peculiarities of agricultural activities that have developed in the regions under the traditional structure of agricultural production, differences in access to natural resources, etc. Evidence of the priority of "the delivery model" is, in particular, the fact that in order to prevent the destruction of ecosystems in rural areas, the loss of biodiversity, the EU institutional structures plan to direct 7.5% of the annual expenditure under the MFF financial program to these goals in 2024 and increase of these costs in 2026-2027 to 10%.

The principles announced in Communication from the commission (2017) regarding the implementation of EEP in rural areas were:

1. Agricultural production should be based on renewable resources that are used by individual farms; the use of non-renewable resources should be minimized by introducing secondary processing of production waste.
2. Crop production technologies should contribute to the restoration of soils, preservation of their fertility, and prevention of erosion. The use of fertilizers should be minimized, and the cultivated plants should be a component of the soil ecosystem.
3. Certification and labeling of ecological products must be carried out in accordance with EU norms, the use of ecotypes in the case of non-ecological impurities is unacceptable.

DOI: 10.55643/fcaptp.6.59.2024.4543

4. Management of eco-production of plant products should include the management of: soil fertility, selection of plant varieties, multi-year crop rotations, selection of technologies for soil treatment, sowing and harvesting, use of circular technological processes. Compensatory use of fertilizers and plant protection products is allowed only if they comply with EU standards.
5. The income of agricultural producers should not only financially support agro-enterprises, households and communities in rural areas, but also determine general societal benefits, therefore the increase in production costs for environmental purposes should be compensated in an institutional manner.
6. Integration of efforts of all institutional structures to achieve reasonably defined goals of the EEP.

This, according to Doukas et al. (2023), conditions the use of such an EU EEP tool as the formation of priorities in the distribution of expenditures for the development of rural areas:

- Viability and competitiveness of subjects of economic activity in rural areas.
- Rationalization of food supply chains and risk management.
- Restoration, protection and development of ecosystems.
- Effective use of natural capital, resistance to climate change.
- Social and economic development.

The condition of cross-compliance for direct payments has also become an effective tool of the EU EES. This tool was used to confirm compliance of agricultural producers with environmental standards. This substantiates their right to tax benefits and financial assistance. "A 'one farm payment' system" has also become a useful tool, according to which financial assistance does not depend on the volume of production, but only on full compliance with the obligations of farmers to protect the environment. Direct payments under EU directives have been reduced for large livestock farms and directed to programs to promote the quality of livestock products and ensure proper handling of animals.

An important tool of EEP management according to Regulation EU (2021) is the consolidation of management actions of institutional structures to acquire a synergistic nature of ecological development of rural areas. The prerequisites for this should be:

1. Implementation of a coordinated system of organizational, regulatory, financial, tax management measures to stimulate environmental innovations in agriculture. The specified system should be accompanied by a digital automated complex of information resources.
2. Development of rules and procedures for the interaction of various institutional structures for the implementation of strategic and operational measures to achieve the specified values of the target indicators of ecological agricultural production.
3. Development of economic and administrative measures to stimulate the creation of venture funds aimed at innovations in agricultural production.
4. Implementation of norms and transparent rules of stratified access to state financial support of agricultural enterprises of ecological orientation.

The structure of EU EEP tools for environmental protection includes: a significant number of regulatory interpretations of EU Directives and legal provisions of national legislation of EU member states, environmental fees, fines, means of maintaining the functioning of the eco-products and services market, subsidies, benefits and loans. At the same time, fiscal policy instruments occupy a special place in this structure. This is due to their certain autonomous role in the formation of the financial basis of the EU EES and due to a significant number of national differences of this policy in European countries. These differences were formed due to differences in approaches to balancing the means of punishment and incentives. In the EU, tax instruments have become an important factor that determines the ecological direction of the economic activity of agrarians. By using the tools of fiscal policy, national governments have the opportunity to stimulate the ecological and economic behaviour of entrepreneurs in rural areas and adjust the direction of economic development in a flexible manner, taking into account the specifics of the development of the agrarian sector. At the same time, the difference between fiscal instruments and direct administrative influence is that they create an opportunity for farmers to conduct their production activities at their own discretion, only with the obligation to pay for its negative environmental consequences. That is, economic and, in particular, fiscal instruments are an indirect means of influencing farmers in determining priorities - either their own economic needs or the ecological needs of rural areas and society.

Also, in the EU countries there is a difference in the perception of environmental taxes - as tools of EEP or means of economic growth of the national economy. At the same time, scientific studies subsidized by the EU indicate that the expansion of the use of fiscal instruments for the protection of the environment together with the activities of agricultural enterprises does not lead to an increase in the real GDP of the member states of the European Union. This is due to the fact that this expansion has the effect of reducing investments and worsening the competitiveness of agricultural production. This indicates the need for a detailed assessment of the effectiveness of fiscal instruments in the specified area, which is especially important for Ukraine, whose institutional structures are looking for new ways to replenish the state budget in conditions of significant economic troubles. The application of fiscal instruments of the EEP requires an assessment of their impact on the sustainable development of rural areas, the formation of rational and challenge-resistant ecological agricultural production.

The experience of the EU indicates the need to harmonize the fiscal policy on environmental protection with the legal instruments of the EEP in this area, taking into account the need to comprehensively ensure the interests of the state, regions and local communities. This requires an assessment of the action or counteraction to the goal of using fiscal tools and related state management tools, taking into account the specifics of a specific agricultural economy - its size, geographic location, available natural resources, type of economic activity, etc. The specified problem in the EU is solved by using a flexible set of criteria and indicators and, as a result of applying the specified set, regulating the direct automatic channeling of preferential loans or subsidies and other types of instruments.

The full-scale war slowed down agricultural reforms in Ukraine and complicated the problems in this area (Blikhar et al., 2024; Shovkun-Zablotska et al., 2024; Khaietska et al., 2023). In particular, the war reduced the ability of Ukrainian farmers to adapt to the requirements of the application of new ecological technologies in the face of significant challenges. Therefore, the approaches of the EU regarding the implementation of the state EES in rural areas under the significant uncertainty caused by the war should be considered, first of all, as a strategic perspective for Ukraine. The task of institutional structures is the formation of framework conditions for further ecological development of rural areas and the testing of new innovative tools of state management of such development. The experience of the EU indicated the need for such an EEP tool as the coordination of management actions at the national, regional and local levels, first of all, the involvement of rural communities in the development of agreed decisions. The problems here are that today: communities in rural areas of Ukraine remain aloof from the development of ecological strategies for territorial development (Mazur and Tomashuk, 2019); in the conditions of a permanent crisis, there is a lack of incentives for agro-economic activity of nature protection direction (Dvigun, et al., 2022b); inadequate investment and resource provision of EEP tools; in the conditions of war, there is no systematic approach to the implementation of the state environmental and economic policy.

The experience of the EU policy indicates that the tasks facing the state ecological and economic management of Ukraine are primarily: eliminating the causes of the decrease in natural potential; coordination of ecological, economic and social goals in the process of agricultural activity; monitoring of the implementation of legal norms of environmental safety, maintaining biological diversity (Pokataiev et al., 2023a, 2023b). For this, the Ukrainian state management can use regulatory, organizational and economic instruments of environmental regulation. What is urgent in the conditions of Ukraine is the stabilization of the ecological situation on agricultural lands, the introduction of stable regulation of nature use, the reproduction of damaged ecosystems; increasing the level of environmental safety not only in all links of technological chains of agricultural production, but also in related activities.

Carbon pollution of the environment is an urgent direction of the EEP of Ukraine, as pointed out by the partner countries. The share of agricultural production in the total volume of emissions today is ~20%. The reason for this is the use of outdated non-ecological agricultural technologies (Table 1) and that is why the agricultural industry needs innovations.

Table 1. Shares of carbon dioxide emissions due to the use of certain technologies in the total volume of agricultural production emissions in Ukraine. *(Source: using data from Presentation for International Forum AgroGreenDeal (2021))*

№	Type of agricultural technology	Share size, %
1	The use of traditional technologies for handling livestock waste	2
2	Emissions from intestinal fermentation	8.3
3	Irrational use of agricultural soils	33.5
4	Emissions from loss of organic carbon in soils	48.2
5	Emissions due to the use of fuel in agricultural machinery	5.3
6	Emissions from the burning of organic waste, soil cleaning with fire	0.5
7	Other sources of pollution	2.2

DOI: 10.55643/fcaptp.6.59.2024.4543

Alignment of the State EEP of Ukraine with the European Green Course, declared by the European Commission and approved by the European Parliament in 2019 and the "Farm to Fork strategy" 2020 aimed at greening the agricultural sector opens an access for Ukraine to modern technologies, expert assistance in the introduction of innovative tools management during the implementation of the state EEP. This also provides access to sustainable long-term financing of environmental measures, primarily from the Green Climate Fund. An economic stimulus for Ukrainian farmers in the introduction of ecological technologies is the prospect of long-term development of the EU agricultural products market, because the export of organic farming products alone is planned to reach a volume of USD 1.000 million by 2030. (Ivaniuta and Yakushenko, 2022). Another incentive is the possibility of the European Union stopping the import of agricultural goods that do not meet EU requirements. Sustainable export of Ukrainian agricultural products to the markets of EU countries is possible only with proper organizational efforts, financial costs and a significant level of support at the state level. Since agricultural production, which already today provides ~10% of the country's GDP and ~40% of the national volume of exports, is sensitive to internal and external demand, therefore, in case of strengthening of EU environmental requirements, the enterprises of the sector may be directed to voluntary implementation of environmental standards. This can be hindered by the consequences of irrational use of natural resources: soil depletion, contamination of water bodies with chemicals and discharges of organic substances, consequences of using outdated equipment and technologies, etc. According to FAO data, in the year preceding the large-scale invasion, ~6,500,000 hectares of agricultural land in Ukraine were already degraded, that is, unsuitable for agricultural activity. The state of forestry is also a cause for concern - the forest cover rate nowadays is 15.9%, which is significantly less than the optimal value of 20%, which also worsens the fulfillment of Ukraine's international obligations to ensure biodiversity. Harmonization of Ukrainian legislation with EU legal standards regarding greening of agricultural activities and rural areas of Ukraine is also an urgent issue. This concerns the normalization of issues related to nitrate pollution of water resources as a result of agricultural activities; formation of the code of effective innovative agricultural technologies, control and labeling of genetically modified products, regulation of the use of fertilizers and pesticides, regulatory requirements for the quality of agricultural products, primarily honey, eggs, juices and other items included in the nomenclature of exports to the EU. This will provide the appropriate legal tools for the management of the implementation of the state EEP in rural areas.

In Ukraine, based on the experience and financial assistance of the EU, the use of digital management tools for the implementation of state EEP in rural areas is expanding. An example of this is the cooperation of specialized institutional structures of Ukraine with the Office of Effective Regulation of BRDO. The result of cooperation is the implementation of a multi-year program with a funding volume of USD 150 million to create sustainable ecosystems in rural areas. This program is implemented under the large-scale EU project "Support for digital transformation" (DTA) - which forms the prerequisites for the formation of Ukraine's strategy for the implementation of EU approaches to the ecological development of villages. At the same time, the non-systematic nature of the introduction of innovative technologies in agricultural production, inadequate financing of the protective focus of economic activity in rural areas leads to a slowdown in the pace of implementation of the state EES in Ukraine. The reason for the improper implementation of digital technologies in agricultural production is not only the non-systemic nature of institutional policy, but also the traditional way of thinking of Ukrainian farmers, which leads to an unwillingness to use these technologies. The above, as it is shown by the analysis of the results of the survey of agricultural producers (Aggeek, 2024), applies both to the management of large agricultural holdings and to individual entrepreneurs, which indicates the systemic nature of the specified factor. This is evidenced both by the level of use of digital financing services by Ukrainian farmers (Figure 1) and the number of FMS (Farm Management System) used by surveyed farmers (Figure 2).

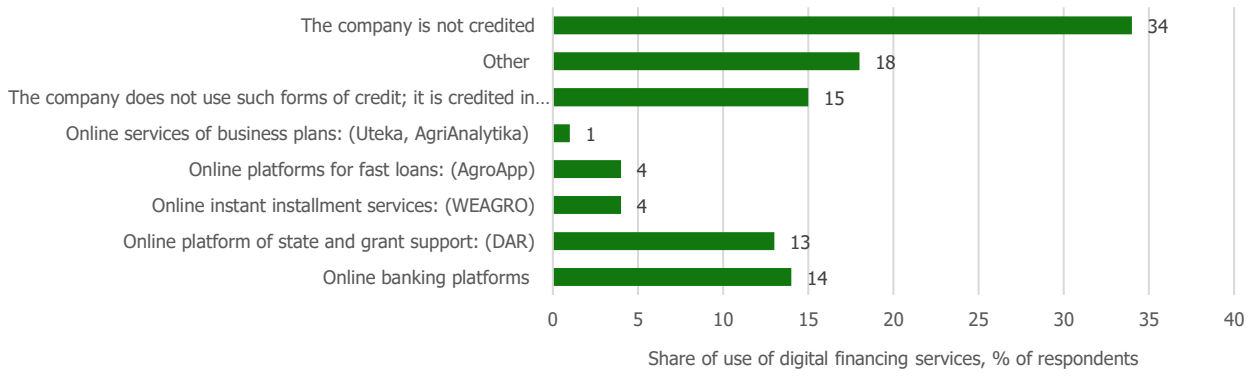

Figure 1. Level of use of digital financing services by agricultural producers, % of respondents. *(Source: using data from Aggeek (2024))*

For comparison, the EU's financial support for the greening of agricultural activities has a wide range of instruments and includes: loans, in particular, specialized loans for eco-investments, institutional guarantees and credit guarantees, as well as financial support of specialized venture funds. The most common national subsidy scheme for agricultural producers in EU countries today, after the termination of the Basic Payment Scheme (BPS) in 2024, is the Single Area Payment Scheme (SAPS). SAPS is provided if the farmer complies with environmental requirements and depending on the area of the farm. At the same time, it should be noted that most of these tools are not available in Ukraine. The use of bank loans (Figure 1) is minimized due to the high level of credit rates, despite the simplification of the registration procedure (Figure 2), only 13% of the total number of surveyed farms received access to state financial support (Aggeek, 2024). The data given in Figure 1 also testify to the low level of trust of the management of agricultural enterprises in credit providers - a third of the respondents directly indicated that they avoid credit borrowing, and another 33% - that they avoid borrowing from banks. This makes the greening of rural areas of Ukraine extremely difficult, since this process, as the experience of EU regulatory activity shows, requires significant financial resources.

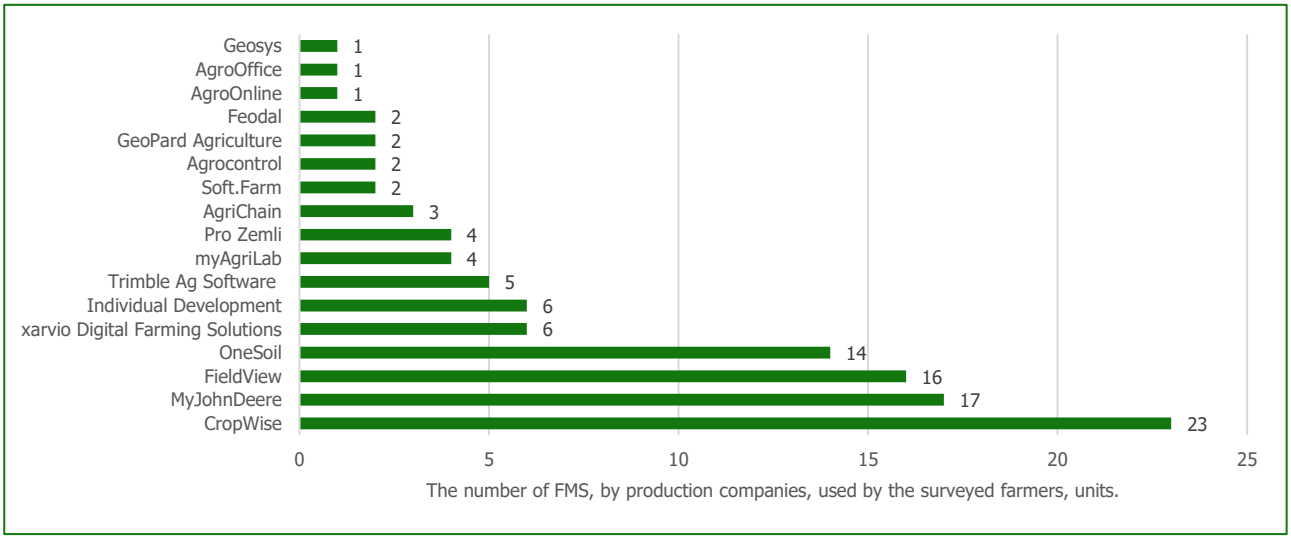

Figure 2. Number of FMS, by manufacturing firms, used by the surveyed farmers, units. *(Source: using data from Aggeek (2024))*

A characteristic sign of the willingness of producers to implement digital tools in ecological and economic activities is the survey data of Aggeek, (2024), regarding the use of agricultural enterprise management systems (Farm Management System, FMS). Although some of the interviewees have experience of using several such systems, a significant part of Ukrainian farmers (more than 96%) neglects them (Figure 1).

Determining the priority innovative management tools for the implementation of the state EEP in rural areas for Ukraine can be outlined as follows:

1. Introduction of changes in the structure of agricultural lands for effective balancing of the components of agro-ecosystems.
2. Stimulation of organic agricultural production: partial state financing of the costs of organic agriculture under the control of state institutions of the implementation of environmental standards by enterprises working in this field. Stimulation of biotechnologies, "climate-smart" agricultural and forestry industries.
3. State regulation of environmental norms of the production process, certification, monitoring of production technologies, processing, labeling and provision of organic products to consumers.
4. Stimulation of the formation of a modern infrastructure of agricultural markets, the creation of regional markets for organic farming products and the use of information and communication technologies for the formation of the population's need for organic products. Stimulation of domestic demand for ecological agricultural products, limiting access to the market for products that use non-ecological technologies.
5. Ensuring an increase in the production of agricultural products through the introduction of innovative ecological technologies, the transition from extensive to intensive development of rural areas.
6. Increasing the adaptability of agrarian farms to climate change, market needs, introduction of risk-oriented management with the aim of acquiring sustainable economic activity in rural areas.

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7. Regional differentiation of agricultural production by volumes and directions of activity in accordance with the characteristics of regional resources, landscapes, taking into account the possible change of indicative directions due to changes in climatic zones.
8. Promotion of regenerative activities aimed at restoring the state of the natural environment, providing ecological and economic services, ensuring the ecological sustainability of agricultural production.
9. Implementation of digital integrated ecosystems, provision of digital services to agricultural enterprises, both in the digitalization of their activities (monitoring of crops, satellite monitoring, precision sowing, harvest logistics for optimization of the logistics arm, application of fertilizers according to a variable rate, etc.), and in providing access to weather databases data, market conditions, changes in demand for agricultural products, etc. It is expedient to provide recommendations on the most rational structure of sowing for long-term forecasting and risk analysis, taking into account crop rotations.
10. Increasing social and economic support for those rural areas where communities meet environmental standards and elected local authorities also focus their activities on environmental goals. In particular, the indicated goals are to support farmers who work on ecological principles, grow crops that have a greater market demand, primarily in the domestic market, and, at the same time, the damage to the environment from their cultivation is minimal; monitor market trends and plan crop rotations accordingly; promote soilless production with reverse hydroponic systems; biotechnological production of protein products, etc.
11. In accordance with changes in climatic zones, implementation of recommendations to regions on effective adaptation of agricultural territories to climate change, prevention of desertification and use of technology for rapid detection of signs of localized drought in rural areas.
12. State support for climate-adapted forestry, promotion of the introduction of technologies of "ecosystem adaptation" and "proactive adaptation" of forests, departure from the cultivation of forest monocultures, transition to new principles of forest management aimed at sustainable production in the face of climate change.

Implementation of №10 is not an easy task for the institutional structures of Ukraine. This is largely due to the fact that until now, despite the fact that the consumption of protein agricultural products, milk, fruit and berry products does not reach the rational standards of the Ministry of Health of Ukraine, the percentage of expenditure on food products in the total expenditure of the population is much higher than in the EU countries. At the same time, the growth of production volumes is not accompanied by an increase in the level of access of an average Ukrainian to food products (Pohorielova, 2024).

It is important for Ukraine that the problem of environmental pollution is not only environmental problems or the issue of providing the population with healthy food, but also, given the strategic goals of development, an inefficient use of natural capital. At the same time, an ecological threat can be created by the fact that in case of significant economic and social problems, agricultural enterprises may resort to irrational methods of economic activity that can cause irreparable damage to the environment.

According to the EU approach, permanent improvement and standardization of the institutional system of environmental management should be carried out, which means, first of all, its methodological deepening. It is worth noting that this does not mean the expansion of the stimulating and punitive functions of this system, but the acquisition by it of the functions of harmonizing ecological, economic and social relations in rural areas.

A significant component of the EU experience regarding the goals of greening rural areas for Ukraine, given the Ukrainian realities, is not only the innovative direction of the eco-development of agricultural production, the rationalization of the use of natural capital, the sustainable development of rural areas, but also the formation of rural economic activity that is resistant to external shocks. The definition of "sustainable development" means a stable, long-term opportunity to benefit from rural natural resources and the acquisition of economic stability due to the continuous nature of the production of agricultural products or services. At the same time, resistance to external shocks means such a level of economic and financial security of agricultural enterprises that allows them to function even under external dynamic challenges of significant force. Resistance to external shocks should be provided by appropriate risk management tools, state support in case of excessive risk increase, and a balanced resource policy of the agricultural enterprises themselves, with a reasonable assessment of their weaknesses and opportunities.

The so-called approach approved by the EU is appropriate for Ukraine: "sustainable crop production intensification" (SCPI). There are different ways of implementing SCPI, for example, coordination of state support for this area and the entire chain of business structures working in this area, taking into account the value of natural resources in agricultural products

using regulatory price instruments for eco-production; formation of a wide range of advisory systems for agricultural producers in this direction. There is a tougher way - fines, in particular, for the use of nitrogen fertilizers, for carbon pollution of the soil, non-ecological agricultural services, etc. (Konat et al., 2019). At the same time, it is worth considering that in the case of an inadequate economic condition of Ukrainian agro-enterprises, eco-taxes can worsen the social condition of rural areas.

In general, the systematic implementation of CAP approaches in Ukraine will strengthen the competitiveness of Ukrainian farmers on the world market of agricultural products. The EEP that is aimed at strengthening the triangle of knowledge in agricultural production will increase the level of innovativeness of agriculture (Bohashko, 2022), strengthening interaction with EU innovation initiatives, in particular, the Food Partnership of the European Institute of Innovation and Technology will contribute to the effective modernization of Ukrainian agriculture. CAP approaches will also contribute to the improvement of the ecological condition of rural areas of Ukraine. First of all, it will take place near the cities, as a result of the reduction of the territories of landfills, conditioned upon the reduction of the amount of food waste and the loss of food resources due to the improvement of logistics and processing technologies. In this regard, it is also important to bring processing enterprises closer to agricultural producers, to plan the production of agricultural products depending on the forecasted demand, and to use other technological techniques of the circular bioeconomy.

DISCUSSION

During the study of the EU EEP and the development of recommendations for the implementation of its approaches in Ukraine, scientists often do not take into account the other level of threats to Ukrainian farmers and the propensity of Ukrainian agricultural producers to traditional technologies (Bukanov, 2020; Chechotkin and Prystemskyi, 2020). The influence of these factors is investigated in the presented article.

Often, researchers single out only one category from the set of EU EEP tools, which significantly narrows the possibilities of analysis. Thus, Chechotkin and Prystemskyi (2020) focused only on financial instruments. At the same time, the insufficient capacity of the state budget of Ukraine, especially during the crisis, to financially support the EEP is not taken into account. This is studied in detail in this article.

Also, one cannot agree with the thesis about the exclusively stimulating role of EEP tools (Bukanov, 2020). The presented article substantiates the need for a well-thought-out balancing of incentives, taxes and fines.

The development of EEP recommendations cannot be carried out without ensuring their flexibility for national, regional conditions (Mazur and Tomashuk, 2019). Even in the EU documents on EEP, the variability of the implementation of EEP norms for national economies is foreseen. When the priority directions of the EEP for Ukraine are determined, this is considered in the presented article.

The approach indicated by Konat et al. (2019) regarding the wide implementation of fiscal instruments to achieve environmental goals in rural areas can lead to a decrease in the volume of working capital of Ukrainian agricultural enterprises, a decrease in their investment attractiveness, a decrease in competitiveness and, in general, to a decrease in the real GDP of the country. At the same time, when the EEP is implemented in Ukraine, it is necessary to precisely define the groups of related instruments as an approach to the formation of a regulatory policy of combining tax and incentive factors, taking into account the peculiarities - the size or type of production of agrarian enterprises.

CONCLUSIONS

documents in this area determine its significance for Ukraine. It is also significant that large volumes of Ukrainian agricultural products are imported to the EU, so the non-compliance of Ukraine's EEP in agricultural production may lead to the loss of the European market. The introduction of EU approaches in the EEP for Ukraine should also be aimed at increasing the adaptability of Ukrainian agribusiness to external influences. Therefore, a significant component of the EU experience regarding the goals of greening rural areas for Ukraine is not only the innovative direction of the eco-development of agricultural production, the rationalization of the use of natural capital, the sustainable development of rural areas, but also the formation of rural economic activity resistant to external shocks. Important approaches of the EEP of Ukraine, according to the experience of the EU, are also the support of small farms, which have a significant impact on the level of employment in rural areas; introduction of a system of consulting services for farmers; condition of cross-compliance; increasing the number of non-agricultural enterprises in rural areas to stabilize and diversify economic activity in rural areas.

DOI: 10.55643/fcaptp.6.59.2024.4543

The importance of such application of the EEP tools of agricultural production, which would ensure a synergistic effect on the effectiveness of the indicated toolkit, is indicated. Therefore, to the list of EEP tools, it is worth adding the consistency of their application and the obligation of the management commitments made regarding the reform of agricultural activities undertaken by the institutional structures. They are called prerequisites for acquiring a synergistic nature of the ecological development of rural areas.

The principles of the EU EEP are indicated, which became the main tool of such an environmental and economic policy of the EU as the formation of priorities in the distribution of expenditures for the development of rural areas.

According to the study of statistical data on the use of digital financing services and digital agricultural production management systems by Ukrainian farmers, it was pointed out that farmers do not trust non-traditional technologies and innovative EEP tools. In view of the above, priority innovative management tools for the implementation of EEP in rural areas have been determined for Ukraine.

It is indicated that the EU approaches regarding the implementation of the state EEP in rural areas under the significant uncertainty caused by the war should be considered, first of all, as a strategic perspective for Ukraine. The task of institutional structures is the formation of framework conditions for further eco-development of rural areas and the testing of new innovative management tools for such development. Obstacles to this are named: rural communities are left out of the development of eco-strategies for the development of territories; in the conditions of a permanent crisis, there is a lack of incentives for agro-economic activity of nature protection direction; inadequate investment and resource provision of EEP tools; in the conditions of war, there is no systematic approach to the implementation of EEP. The authors see the implementation of quantitative criteria for evaluating the effective balance of incentives, taxes and fines as a management tool for the implementation of state environmental and economic policy in rural areas and the development of an algorithm for automated analysis of the specified balance as promising directions for further work on this issue.

ADDITIONAL INFORMATION

AUTHOR CONTRIBUTIONS

All authors have contributed equally.

FUNDING

The Authors received no funding for this research.

CONFLICT OF INTEREST

The Authors declare that there is no conflict of interest.

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ІННОВАЦІЙНІ ІНСТРУМЕНТИ МЕНЕДЖМЕНТУ РЕАЛІЗАЦІЇ ДЕРЖАВНОЇ ЕКОЛОГО-ЕКОНОМІЧНОЇ ПОЛІТИКИ В СІЛЬСЬКІЙ МІСЦЕВОСТІ: ПІДХОДИ ЄС

Метою дослідження є вивчення інструментів і підходів ЄС до менеджменту еколого-економічної політики (ЕЕП) в сільській місцевості (СМ) та визначення пріоритетних для України інноваційних інструментів (ІІ). Указані умови використання ІІ й підходів ЄС до ЕЕП та рівня їх упровадження в Україні. З огляду на особливості розвитку українського аграрного сектора й за наявних загроз виокремлено значущі для України цілі ЕЕП. Установлені передумови набування синергетичного характеру екологічного розвитку СМ.

Указано, що підходи ЄС до реалізації державної ЕЕП в СМ за значної невизначеності, обумовленої війною, для України варто розглядати як стратегічну перспективу, а завданням державного менеджменту стає формування рамкових умов подальшого екологічного розвитку СМ й апробація нових ІІ такого розвитку.

Названі перешкоди: сільські громади залишаються осторонь розроблення екологічних стратегій розвитку територій; в умовах перманентної кризи наявна нестача стимулів до агроекономічної діяльності природоохоронного спрямування; неналежне інвестиційне та ресурсне забезпечення інструментарію ЕЕП; в умовах війни відсутній системний підхід до впровадження ЕЕП.

Ключові слова: інноваційні інструменти, екологічна та економічна політика, сільське господарство, сільські території, агровиробники, субсидії, досвід ЄС, адаптація

JEL Класифікація: H23, O13, Q15, Q50, Q58

DOI: 10.55643/fcaptp.6.59.2024.4543