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SUSTAINABLE DEVELOPMENT OF THE AGRICULTURAL SECTOR IN THE CARPATHIAN REGION: EUROPEAN EXPERIENCE AND UKRAINIAN REALITIES

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Abstract. The article under scrutiny investigates the conceptual and applied foundations of managing the sustainable development of agricultural enterprises in the Carpathian region of Ukraine with consideration of European integration processes and regional specifics. The research emphasises the importance of harmonising environmental and economic interests through the introduction of green public procurement, technological innovations, and institutional transformations in the agricultural sector. The methodological framework is based on a systemic approach that combines statistical analysis, SWOT analysis, structural-functional methods and the comparative generalisation of EU experience. The study identifies the key strengths, weaknesses, opportunities and threats to sustainable agricultural development in the Carpathian region, which is characterised by challenging natural conditions, significant soil erosion and limited investment capacity. The implementation of integrated technological solutions, including precision agriculture, contour-melioration systems and organic production practices, has been shown to be crucial for reducing environmental degradation and enhancing soil fertility. Furthermore, adapting EU Common Agricultural Policy instruments, such as ecological subsidies, digital monitoring platforms and circular economy principles, creates opportunities to align Ukrainian agricultural practices with European standards. The novelty of the study lies in its proposed organisational and economic mechanism, which integrates green procurement, financial incentives, technological modernisation and institutional support in order to ensure the ecological competitiveness and resilience of the agrarian sector. The practical significance of the research lies in developing regional models of sustainable agricultural management, particularly green procurement pilot projects, which could be replicated in other Ukrainian regions. The findings show that making Ukrainian agricultural products more environmentally responsible, increasing their digitalisation and fostering public-private partnerships can significantly boost their competitiveness in domestic and international markets.

Keywords: sustainable development, agricultural enterprises, environmental policy, green public procurement, integrated technologies, Carpathian region, European experience.

JEL Classification: L23, L38, P01

1. Introduction

In the context of globalisation and European integration, the sustainable development of agricultural enterprises is essential for the competitiveness of the national economy. The interrelated components of the socio-economic system that determine its competitive development trajectories are natural, social, and production management conditions. In Ukraine, national and regional institutions are responsible for regulating environmental policy at various levels of government, interacting with government bodies, public organisations and international partners. Their functions are aimed at achieving general goals relating to environmental protection and sustainable development. It is worth noting that, in EU countries, the implementation of environmental policy is largely

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determined by whether political power is centralised or decentralised, based on how responsibilities for its formulation and implementation are distributed.

The issue of managing the development of agricultural enterprises based on the principles of environmentally friendly production is widely discussed in the works of domestic and foreign scientists. Ukrainian researchers M. Bagorka, T. Galushkina, D. Dobryak, O. Drebot and P. Melnyk, among others, focus on the theoretical and methodological principles of the sustainable development of agriculture, the formation of environmental policy in the agricultural sector, and the mechanisms of its implementation. The foreign authors L. Bartos, S. Anderson, U. Elg, T. Marsden and M. Elshtein support the idea of aligning economic and environmental interests, and develop the concepts of the "green economy", corporate environmental responsibility and eco-innovations. A comparative analysis of these approaches reveals that sustainable development hinges on the implementation of intricate organisational and economic mechanisms integrating state support, institutional innovations, and stakeholder initiatives. In the context of decentralisation, adapting European experience of greening agricultural production to regional development specifics becomes particularly relevant.

The study's general methodology is based on a systematic approach to analysing the processes involved in managing the development of agricultural enterprises within the context of greening production. In order to achieve the objective of the study, a series of methods were employed. Firstly, general scientific methods (analysis, synthesis, induction and deduction) were utilised to identify the theoretical foundations of managing the sustainable development of agricultural enterprises. Secondly, a comparative analysis was carried out to generalise the European experience of implementing environmental innovations. Thirdly, a SWOT analysis was conducted to determine the strengths and weaknesses and threats at the regional level. Fourthly, the structural-functional method was employed to study the relationships of natural, social and production conditions. Finally, the graphical method was used to clearly display the structure of capital investments and the share of integrated technologies.

The study drew upon a range of data sources, including official statistical data, the results of domestic and foreign scientific research, and regulatory legal acts of Ukraine and the European Union.

At varying levels of management, the sustainable development of agricultural production is constrained by interrelated institutional and organisational-economic factors. It is evident that current legislation frequently fails to consider regional particularities, particularly in contexts where environmental sustainability is of paramount importance due to prevailing natural conditions. A further issue is the inadequacy of mechanisms for monitoring compliance with environmental standards, which reduces the motivation of agricultural enterprises to comply with them. Research indicates that prior to the war, Ukrainian agriculture exhibited comparatively elevated levels of economic growth; nevertheless, the level of state support remained considerably lower in comparison to that observed in EU countries. Consequently, during the 2019–2021 period, the Producer Support Estimate (PSE) indicator in Ukraine averaged a mere 1.7% of the gross income of agricultural enterprises, whereas in EU countries it attained 18.8%. Support per 1 ha of agricultural land amounted to 16.9 USD in Ukraine versus 561.9 USD in the EU. Total support as a percentage of GDP (TSE) was also lower, at 0.35% in Ukraine compared to 0.56% in the EU. At the same time, market support in Ukraine had a negative value for most years, since domestic producer prices were lower than world prices (Dibrova, 2023).

2. Organisational and Economic Mechanism for Managing Sustainable Development of Agricultural Enterprises

Given the non-systemic nature of programme documents for agricultural development and the declarative nature of environmental legislation, the need for a comprehensive, competitive environmental strategy for the development of the agro-industrial complex that considers regional characteristics, appropriate financing and control mechanisms is becoming increasingly urgent. Involving the public and specialists in the planning and implementation of programme documents will help to increase their efficiency and realism.

Studies have shown that establishing a sustainable development management system for the agricultural sector is a complex and multifaceted process. Table 1 outlines the theoretical and practical aspects of managing the agricultural sector sustainably, ensuring the industry's competitiveness and environmental sustainability.

he overarching objective of the sustainable development management system in the agricultural sector is to attain a balance between the economic efficiency of agricultural production and the conservation of natural resources. The establishment of such a system is intended to ensure a reduction in the negative impact on ecosystems, promote the rational use of land, water and biological resources, and also maintain long-term environmental, economic and social sustainability.

In economically developed countries worldwide, the formulation and implementation of national policy is predicated on the principles of sustainable development, with a view to harmonising economic, environmental and social processes. The notion of proactive enterprise

Table 1
Formation of a sustainable agricultural sector management system

Theoretical aspects	Practical aspects
Education and information support: training and informing agricultural producers about modern environmental standards, technologies and management methods that contribute to the preservation and restoration of natural resources	
Environmental sustainability: taking into account the impact of economic activity on the environment and developing strategies aimed at reducing it and preserving natural resources	**Introduction of environmentally friendly technologies:** for example, the introduction of such technologies in agriculture as conservation and precision agriculture, biological plant protection, the use of organic fertilizers, agroforestry, etc.
Innovative development: improving technologies, production methods and management aimed at ensuring environmental sustainability	**Monitoring and evaluation:** determining the impact of economic activity on the environment, which allows for timely prevention of negative consequences
Stakeholder approach: meeting the needs of all stakeholders (farmers, consumers, public organizations and authorities); taking into account various interests and points of view when developing management strategies	**Stimulation of greening measures:** stimulating mechanisms, in particular, financial benefits, subsidies for the implementation of environmentally friendly practices

Source: developed by the authors

development and the establishment of suitable business models has garnered international recognition. The implementation of this concept is facilitated by the decisions of international organisations, as well as processes taking place in investment markets. The UN has played a special role in preparing the Fundamentals of Responsible Investment, paying particular attention to environmental issues. There is interest in investment opportunities in "green" sectors from funds (e.g., investments and insurance). The concept of a sustainable fund (also known as a sustainable development fund) is being developed, taking into account environmental, socio-cultural, ethnic and economic factors (Chodyński, 2011).

The complexity of the economic system in the agricultural sector is due to the slow implementation and development of environmental policy. Most enterprises operate in the domestic sector of the economy, where partners are not required to implement environmental management systems. In countries where "the relative value of foreign trade turnover accounts for 60-80% or more of gross domestic product", the implementation of environmental policy is more active (Biliavska, 2015). Research indicates that the overwhelming majority (85%) of domestic agricultural producers hold a favourable view of the potential for market access in the EU, contingent on technological advancements in the domain of agricultural crop cultivation (Environmental and Social Audit of Ukraine's Agricultural Production, 2023).

The organisational and economic mechanisms that manage the sustainable development of agricultural enterprises play an extremely important role at all levels of administration. They ensure the implementation of processes that increase environmental and economic efficiency and stimulate the implementation of environmental protection measures. The fundamental principles that underpin its implementation are systematicity, innovation, economic efficiency, sustainable development, flexibility and adaptability, interaction and partnership, and transparency and accountability.

The establishment of an ecological security system in the agricultural sector is closely related to the industry's economic potential. The pursuit of absolute balance between society and the environment is inherently challenging, as the inherent volatility of socio-ecological and economic systems renders such a feat unattainable. The fundamental principle of ecological security in the agricultural sector is to minimise the anthropogenic impact on the agro-ecosystem, thereby ensuring the sustainability of human life (Shkuratov, 2017). It is therefore evident that achieving ecological security necessitates the implementation of a flexible organisational and economic mechanism that provides for a systemic managerial impact on the entities of the agricultural sector. The purpose of this mechanism is twofold: firstly, to prevent environmental risks, and secondly, to create conditions for sustainable economic growth.

The organisational and economic mechanism for managing the sustainable development of agricultural enterprises is characterised as a multi-level system in which state authorities play a decisive role. When nationwide strategic planning is in place, the system offers significant advantages (see Table 2).

In the context of the convergence of domestic a nd international legislation at various levels of management, the implementation of environmental policy, which is informed by the particularities of the sectoral economy, is becoming increasingly imperative. Within the domain of agriculture, this predicament assumes particular significance, given the potential for agricultural practices to exert a substantial deleterious effect on ecosystem integrity. Institutions within the administrative regions can play a decisive

Table 2

Levels of the organisational and economic mechanism for managingsustainable development of agricultural enterprises

Levels	Main advantages
Mega -	The introduction of environmental standards increases the country's reputation in the world market. Environmentally friendly products often have higher added value.
Macro -	Compliance with environmental standards and the introduction of innovative technologies aimed at reducing environmental impact contribute to the sustainable development of the industry.
Meso -	The optimal location of raw material sources and processing plants reduces the burden on the environment. Control and regulation of production processes contribute to the conservation of natural resources and improvement of the ecological situation.
Micro -	Producing goods with improved environmental characteristics increases demand for products and boosts enterprise profitability. Adhering to environmental legislation helps enterprises avoid fines and reduce financial risks. Using ISO (International Organization for Standardization) and EMAS (Environmental Management and Audit Scheme) to optimise production processes reduces product costs.

Source: developed by the authors

role in ensuring the sustainable development of the agricultural sector by monitoring and controlling the environmental situation.

The pivotal function in guaranteeing the eco-friendly practices of agricultural enterprises is incumbent upon state and executive authorities. In the context of European integration processes, these authorities, through regulatory and economic mechanisms, foster the entrepreneurial initiative of commodity producers in the domain of environmental protection. Concurrently, the prevailing structure of the environmental monitoring system and its management mechanisms continue to demonstrate inefficacy. The distribution of the metrological base across various departments, along with the delegation of environmental inspection responsibilities to regional authorities, impedes the efficacy of coordination efforts undertaken by the Ministry of Environmental Protection and Natural Resources of Ukraine. It is important to note that the Ministry does not possess ownership of the observation network or the information contained within it. Furthermore, the current system of parameters is not harmonised with European standards (Domanetska, 2017).

Studies show that economic incentives are a key motivator for producers to implement environmental standards. In 2020, one of the most accessible and popular sources of support for farmers was the "5-7-9" affordable lending programme, which provided short-, medium- and long-term loans for the purchase of fuel, seeds and fertilisers, as well as investments in new equipment and elevators. A sociological study conducted by experts from the Kyiv School of Economics found that farms which received loans exhibited a higher level of compliance with current regulations regarding the use and storage of harmful materials (mineral fertilisers, chemicals and pesticides). The study also found that these farms had a higher level of use of technological maps.

The effective management of the development of agricultural enterprises, with consideration for the greening of production, necessitates an integrated approach and co-operation between all stakeholders. In this context, it is advisable for managers at different levels of management to focus special attention on the regulatory and legal support of green public procurement, as a determining prerequisite for the greening of production and ensuring its competitiveness (see Table 3).

The green public procurement policy is predicated on the establishment of environmental criteria at each stage of production, thus ensuring compliance with environmental standards and the acquisition of advantages in tender procedures. However, in Ukraine, the utilisation of non-price criteria in public procurement is a relatively recent development in the context of tendering processes. In the absence of practical experience in implementing green public procurement in agricultural enterprises, it is advisable to organise pilot projects that showcase successful examples and lay the groundwork for wider implementation.

Implementing green policies in public procurement in Ukraine's agricultural sector, particularly in the Carpathian region, could be a decisive step towards achieving sustainable agricultural development. The relevance of green public procurement in this region is due to important organisational and economic factors. For example:

– The use of environmental standards at the regional level will allow preserving unique agro-ecosystems, reducing pollution of soils and water resources, and also contributing to their restoration.

– Compliance with environmental requirements for products with geographical indications can become a competitive advantage in domestic and international markets.

– The implementation of green policy requires new skills and knowledge, which will lead to the creation

Table 3
Legal regulation and policy of green public procurement in the agricultural sector of Ukraine

Legislative framework	Implementation mechanism	Policy and strategic programmes
The Law of Ukraine "On Public Procurement"	Regulates the procedure for procurement of goods, works and services for public funds and contains provisions that allow the inclusion of environmental criteria in tender documentation (The Law of Ukraine "On Public Procurement", 2015).	The National Strategy for Sustainable Development includes goals for reducing environmental impact and stimulating ecological production; defines the main areas of support for green public procurement. State support programs for the agricultural sector: financial support for the implementation of ecological technologies; subsidies and grants for enterprises engaged in organic farming and using renewable energy sources. Regional programmes and initiatives: local authorities can develop and implement their own green procurement support programs; support for local producers of environmentally friendly products through tender procedures.
The Law of Ukraine "On Environmental Protection"	The main principles of environmental protection and the obligations of enterprises to comply with environmental standards are disclosed; it promotes the introduction of environmentally friendly technologies in production (The Law of Ukraine "On Environmental Protection", 1991).	
The Law of Ukraine "On Alternative Fuels"	The production and use of biofuels and other environmentally friendly types of energy are justified (The Law of Ukraine "On Alternative Types of Fuel", 2000).	
The Resolution of the Cabinet of Ministers of Ukraine "On Approval of the National Waste Management Strategy in Ukraine until 2030"	The goals and measures to reduce waste volumes and increase the level of their utilisation are determined; it promotes the purchase of products with less packaging materials and from recycled materials (The Resolution of the Cabinet of Ministers of Ukraine "On Approval of the National Waste Management Strategy in Ukraine until 2030", 2017).	

Source: developed by the authors

of new jobs in the field of environmental technologies, agronomy and sustainable development.

The significance of green public procurement in the agricultural sector of Ukraine, particularly in the Carpathian region, is paramount in the process of greening production, enhancing competitiveness and promoting sustainable development. The implementation of this policy necessitates support from the state, local authorities, producers, as well as active involvement of the public.

The integration of technological innovations has been identified as a pivotal factor in optimising the utilisation of natural and production resources, thereby facilitating substantial enhancement in production productivity while concomitantly reducing the adverse environmental impact. "The development of a resource-efficient economy has become a natural trend in the development of many developed countries, even those rich in natural resources. They are transforming their economic systems, relying on systemic innovations in response to the growing challenges of resource constraints and climate change" (Musina, 2017).

In economically developed countries, the following technological innovations are widely implemented in the agricultural sector: big data for production decision-making; integrated supply chain planning systems; GPS technologies and sensors for real-time production monitoring; automation of process accounting and creation of analytical systems; robotic equipment. The experience of countries such as Germany, France and Canada shows that combining high-tech tools (e.g., drones, sensors and precision agriculture) with biological approaches enables productivity to be maintained while reducing the carbon footprint of agricultural production (Mazur, 2018). Digital technologies such as precision agriculture, the Internet of Things (IoT), artificial intelligence (AI) and blockchain increase the productivity and competitiveness of agricultural enterprises. They ensure resource optimisation, reduce costs by 10–20%, increase yields by 15–25% and reduce post-harvest losses by 5–10% (Tomashuk, 2025).

However, the implementation of technological innovations in agriculture in Ukraine faces a number of challenges. These include the high cost of modern technologies, limited access to high-quality infrastructure, an insufficient level of knowledge regarding the effective use of technologies, legislative and administrative obstacles, a low level of investment in scientific research and development in the field of agrotechnology, and constant changes in the economic and political situation, which create uncertainty and risks for many farmers, especially those running small and medium-sized farms. In this regard, research into the effectiveness of implementing green technologies based on productivity, digitalisation, energy efficiency

and utilisation of natural resources is relevant (Desiatniuk, 2025).

The Carpathian region of Ukraine is characterised by complex topography, an increased risk of erosion, diverse soils and, consequently, higher degradation rates on sloping land. In this context, it is particularly important to choose integrated technologies that can increase agricultural production efficiency while preserving the natural potential of the soil. Integrated soil conservation agriculture technologies (including contour and reclamation systems, as well as minimal and zero tillage techniques such as no-till and strip-till, and agroforestry) significantly reduce the risk of water and wind erosion while maintaining soil fertility and increasing its resistance to degradation processes. The integration of these solutions with practices such as integrated nutrient management (i.e., the balanced application of organic and mineral fertilisers, the use of green manure, and the precise application of fertilisers using sensor systems), organic farming, and the implementation of precision farming technologies (e.g., GPS monitoring, drones, and digital analytical platforms) forms the basis for the development of highly efficient and resource-saving agroecosystems. The integration of digitalisation and biological plant protection methods with the principles of organic production has been demonstrated to engender a dual benefit: firstly, it serves to reduce the environmental impact on agricultural landscapes, and secondly, it enhances the competitiveness of regional agricultural products in both domestic and international markets.

Statistical data indicates that the Carpathian region of Ukraine possesses considerable potential for enhancing its environmental competitiveness through the implementation of digital integrated information systems. The implementation of such systems would ensure optimised management of natural resources and production processes. However, the utilisation of such technologies remains inadequate. The proportion of integrated solutions within the capital investment structure for the protection and restoration of soils, groundwater and surface waters in the region is 29.7 percentage points lower than the national average. The observed disparity underscores the necessity to establish a stimulating state policy, to attract investments and to implement pilot projects for the digitalisation of the agricultural sector, with a particular focus on precision agriculture, soil monitoring systems, water resources and agricultural landscapes. In Ukraine, the total share of investments directed towards the implementation of integrated technologies is 38.2%, indicating a relatively high level of technological renewal. By contrast, this indicator is much lower in the Carpathian region, at only 8.5%. This suggests limited opportunities for modernising the production base in mountainous and foothill areas. This difference is due to institutional and economic barriers, as well as the insufficient development of the region's innovation infrastructure (Figure 1).

3. Strategic Guidelines and European Experience

The SWOT analysis conducted as part of the research process systematically outlined the key institutional, organisational-economic and environmental-economic factors that impact the sustainable development of the agricultural sector at the regional level. The results obtained led to the formulation of strategic guidelines for the functioning and development of the management system of agricultural enterprises in the Carpathian region of Ukraine. The SWOT analysis made it possible to identify the most significant strengths and weaknesses in the development of the management system of agricultural enterprises in the region. The key strengths include favourable natural and climatic conditions for the production of major crop and livestock outputs; a strategically advantageous geopolitical position in the context of the Russian Federation's military aggression; and a high-capacity

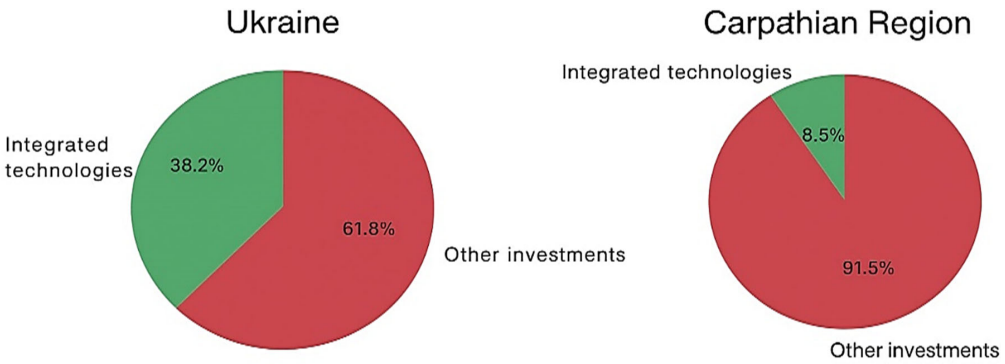

Figure 1. Share of integrated technologies in the structure of capital investments in the protection and restoration of soils, groundwater, surface waters in Ukraine and the Carpathian region on average for 2022-2024

Source: the State Statistics Service of Ukraine

regional food market supported by the tourism and recreation sector, as well as by population growth driven by internally displaced persons. Among the negative factors, the deterioration of agricultural land quality due to degradation processes, unfavourable budget, tax and monetary policies, the lack of a developed market infrastructure for organic agricultural products, the formation of small volumes of marketable products in small enterprises and the limited market for regional producers' organic products are worth highlighting. Opportunities and threats that should be minimised were also identified (Table 5).

A SWOT analysis of the Carpathian region of Ukraine shows that proper expert assessment and implementation of organisational and economic measures, initiated and actively participated in by legislative and executive bodies, is an important condition for increasing the efficiency of international projects, regional programmes and strategies.

The sustainable development of agricultural enterprises necessitates a comprehensive approach to its management system, as a determining condition for the rational use, preservation and restoration of natural resource potential in the process of carrying out production activities. The domestic legislative framework places a particular emphasis on ensuring environmental safety in the context of agricultural production. The Common Agricultural Policy (CAP) of the European Union (EU) serves as a case in point, illustrating the systematic implementation of regulatory, institutional and financial measures to achieve the goals of sustainable development of the agricultural sector.

In the context of EU countries, the integration of environmental policy with economic incentives, digital technologies and comprehensive phased state support constitutes an effective organisational and economic mechanism for sustainable agricultural development. The EU CAP places a particular emphasis on environmental subsidy programmes, which are designed to encourage the adoption of environmentally sustainable management practices, accounting for challenging management conditions (e.g., the cultivation of agricultural products on sloping terrain). Concurrently, digital land management platforms and automated monitoring systems, reliant upon satellite technologies, ensure the expeditious decision-making at all stages of management activities. In order to promote the transition towards a green economy, the principles of the circular economy are increasingly being implemented in the agricultural sector. This contributes to the efficient use of resources, the minimisation of waste, and increased environmental responsibility on the part of producers. Within the framework of EU

Table 5
SWOT analysis of the sustainable development management system of agricultural enterprises in the Carpathian region of Ukraine

STRENGTHS (S)	WEAKNESSES (W)
1. Favorable natural and climatic conditions for growing the main types of crop and livestock products	1. Deterioration of the quality indicators of agricultural lands due to the spread of degradation processes
2. Favorable geopolitical position in conditions of martial law	2. Unfavorable budget and monetary policy
3. High capacity of the regional food market (increase in the population due to internally displaced persons and the functioning of the tourism and recreation sector)	3. Lack of developed market infrastructure for organic agricultural products
4. Developed transport infrastructure	4. Formation of small volumes of marketable products in small and medium-sized enterprises
5. High prices for organic products and products with geographical indications	5. Limited market for organic products of regional producers
OPPORTUNITIES (O)	THREATS (T)
1. Growth in incomes and living standards of the population of different age and socio-economic groups	1. Relatively low natural fertility of soils, in particular, in foothill and mountainous areas
2. Expansion of foreign economic relations as a result of cross-border co-operation	2. Differentiation of wage levels in different sectors of the economy, outflow of labour force to the countries near and far abroad
3. Increasing the efficiency of using the production capacity of food processing enterprises	3. Establishing quotas for the export of organic products
4. Production of high-quality and safe food products with a high share of added value	4. Low level of solvent demand of the population
5. Increasing the level of use of tourism and recreation potential	5. Long-term conversion transition from traditional to organic production
6. Widespread use of environmental marketing tools	6. Activation and emergence of unscrupulous competitors
7. State regulation of agricultural production and support for regional producers	7. Insufficient level of state support for small agricultural enterprises

Source: developed by the authors

programmes, in particular the "EIP-AGRI" (European Innovation Partnership in Agriculture) and the LEADER initiative, support is provided for local agro-ecological innovations, digital technologies, organic production and sustainable management of natural resources.

Consequently, the contemporary world is confronted with pressing environmental challenges that necessitate a fundamental re-evaluation of management principles and the adoption of sustainable practices across all levels. In this regard, a systemic approach to the process of managing the sustainable development of the agricultural sector is required, as well as the implementation of an appropriate institutional and economic mechanism that combines tools, methods and resources to achieve environmental responsibility and competitiveness at the national and regional levels.

4. Conclusions

The sustainable development of agricultural enterprises in Ukraine, in particular in the Carpathian region, faces a number of institutional, economic and technological challenges. The prevailing mechanisms of state regulation and environmental policy have proven to be inadequate in their effectiveness, particularly with regard to their adaptation to regional particularities. The inadequate level of financial support is a pivotal impediment to the adoption of environmentally sustainable production practices. The PSE indicator in Ukraine exhibits a substantial discrepancy when compared to the EU average.

It is imperative that the organisational and economic management mechanism integrates green public procurement, financial incentives and monitoring tools for ensuring compliance of production with environmental requirements. Technological innovations have been identified as a key factor in enhancing environmental competitiveness. However, the level of implementation in the Carpathian region remains below the national indicators.

The SWOT analysis indicated the necessity to leverage regional advantages, including favourable natural conditions, advantageous cross-border location and significant tourist and recreational potential. The initiation of pilot projects of green public procurement at the regional level, with the objective of establishing models of environmentally friendly production, will contribute to the development of effective regional programmes of agro-industrial development.

Further research into the sustainable development of the agricultural sector in the Carpathian region of Ukraine could involve: assessing the effectiveness of green public procurement pilot projects; developing digitalisation models for the agricultural sector (e.g., precision farming and soil and water resource monitoring); substantiating the economic return from implementing integrated technologies in mountainous and hilly areas; and forming a regional-level system of environmental competitiveness indicators.

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