THE IMPACT OF FUNDS ON SUSTAINABLE AGRICULTURE

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Abstract: *Sustainable agriculture plays a crucial role in combating climate change and ensuring long-term food security. Financial support, both at the governmental and European levels, is essential for promoting environmentally friendly and innovative farming practices. These financial resources enable farmers to adopt solutions that protect the environment while improving economic efficiency. This article examines how these funds support farmers in implementing sustainable practices, focusing on their economic and ecological benefits. It also discusses the bureaucratic and administrative challenges farmers face when accessing these funds. These obstacles can delay the implementation of sustainability projects and limit their effectiveness. Through case studies from various regions, the article illustrates how specific funds have been successfully utilized by farmers to adopt more sustainable practices. Finally, the article proposes solutions to improve the process of accessing financial support, ensuring that sustainable agriculture becomes more accessible to a broader range of farmers. Improving the efficiency of the funding system is a key step toward creating a more sustainable and resilient agricultural sector.*

Keywords: *Climate change, Sustainable agriculture, European Funds, Rural development, Ecological technologies.*
JEL classification: Q01, Q14, Q18, Q56

Introduction

The transition to a sustainable economic model represents one of the greatest challenges of the 21st century, with the agricultural sector occupying a central position in this process through the new architecture of the Common Agricultural Policy. In the current global context, sustainable agriculture has become an imperative necessity under the aegis of the European Green Deal, being considered, as Popescu (2021) notes, the only viable way to ensure food security. As pressures on natural resources increase, the adoption of environmentally friendly agricultural practices becomes essential not only for the protection of ecosystems, but also for maintaining the economic competitiveness of farmers.

However, the transition from intensive to green production models requires massive investments in innovative technologies and methods, which most farmers cannot afford without adequate external financial support. Government and European funds are key instruments in supporting this transition, allowing the implementation of green solutions that increase economic efficiency and protect the environment at the same time. Access to these funds, however, is often complicated by

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complex bureaucratic procedures, lack of information and regional inequalities, factors that can delay or even limit the implementation of sustainable projects (Smith et al., 2021).

The relevance of this research lies in the need to assess whether financial flows are effectively directed towards environmental objectives and whether they contribute to the sustainable development of farms. In the South-West Oltenia region, this issue is particularly acute, as the vulnerability of soils to desertification and climate pressures require radical changes in cultivation methods (Georgescu, 2022). The present study analyzes whether the allocated funds succeed in transforming the resilience of local farms or whether bureaucratic barriers cancel out the expected ecological benefits.

The main objective of the article is to identify the mechanisms through which European and government funds facilitate sustainable innovation in agriculture, with a focus on adapting to the specific conditions of the Oltenia region. The study aims to demonstrate that the real success of these programs depends on the administrative capacity and on the way in which farmers can integrate financial solutions into concrete practices. Also, identifying the bottlenecks that prevent the optimal use of capital is an essential premise for formulating more efficient and accessible support policies (Vasilescu and Ionescu, 2023).

By presenting the global and local context, analyzing the obstacles and the impact of funds on sustainable agriculture, this introduction sets the stage for a research that combines economic data, case studies and critical observations on public policies. Finally, the article aims to propose concrete solutions that ensure wider access to finance and the effective implementation of sustainable agricultural practices.

1. Literature review

1.1. Policies and funds for sustainable agriculture in the EU and Romania

Support policies for sustainable agriculture have evolved significantly, increasingly linked to the objectives of the European Green Deal and the 2030 Agenda for Sustainable Development. Popescu (2021) considers that green financing is the only viable way to achieve climate neutrality objectives in rural areas. Government and European funds, especially those allocated through the Common Agricultural Policy (CAP) and the National Rural Development Programme (PNDR), are the main instruments through which the transition to organic agricultural practices is facilitated (AFIR, 2024; MADR, 2025).

Recent analyses show that these funds contribute both to increasing economic efficiency and to reducing regional inequalities in access to resources (Popa and Dumitrescu, 2021). However, there is a discrepancy between the allocated funds and the actual level of implementation, a phenomenon associated with bureaucratic difficulties and land fragmentation, which limits the ability of farmers to invest efficiently (Dumitru and Stan, 2024). Miller and Thompson (2021) emphasize that CAP subsidies maintain the economic viability of farms implementing sustainable practices, but success depends on correlating financial support with the real needs of farmers.

Thus, the literature emphasizes that funds for sustainable agriculture are indispensable tools, but their efficiency depends on correct administration, informing farmers and adapting to the local specificities of agricultural holdings (Vasilescu and Ionescu, 2023; Smith et al., 2021).

1.2. Technologies and innovations in sustainable agriculture

The South-West Oltenia region faces specific challenges, such as water stress and land fragmentation, which influence the ability of farmers to adopt sustainable practices (Georgescu, 2022; Dumitru and Stan, 2024). In this context, modern technologies — precision agriculture, efficient

irrigation systems and innovative fertilization methods — are becoming essential tools for increasing productivity and protecting the environment (Chen et al., 2023).

Studies show that the implementation of precision agriculture significantly reduces pesticide consumption and pollutant emissions, while increasing farm profitability (Georgescu, 2022; Chen et al., 2023). Associative forms and cooperatives play a crucial role, facilitating the transfer of know-how, access to funds and faster adoption of technologies (Vasile, 2023).

However, the adoption of technologies is limited by the small size of farms and high initial costs, as well as the complexity of procedures for accessing funds (Ionescu, 2022; Smith et al., 2021). The success of projects depends not only on the availability of funds, but also on the local administrative capacity to guide farmers in implementing innovations (Popa and Dumitrescu, 2021).

1.3. Bureaucratic and economic challenges

Sustainable agriculture critically depends on stable capital flows and consistent external support. Without this support, the risks associated with converting to organic farming are too high for most farmers (Ionescu and Vasilescu, 2020). Popescu (2021) shows that, in the absence of compensatory payments, the rate of abandonment of organic practices increases significantly among young farmers in Eastern Europe.

A critical issue is the "greening" of subsidies, which requires knowledge and technology transfer to be effective (Smith et al., 2021). Large recipients of funds tend to prioritize economic efficiency over biodiversity, raising questions about project selection criteria (Brown, 2022). The complexity of the regulations imposed by the European Green Deal creates a disproportionate administrative burden on small producers, a phenomenon called the "bureaucratization of sustainability" (Smith et al., 2021).

In South-West Oltenia, investments in small-scale irrigation are the pillar of resilience (Georgescu, 2022). Drip technology has increased productivity by approximately 22% in Dolj and Mehedinți counties, but success depends on the correct management of water resources and the integration of retention basins (Popa and Dumitrescu, 2021). The lack of technical advice favours large holdings at the expense of small farmers (Ionescu, 2022).

Digitalisation, or "Agriculture 4.0", can reduce administrative reporting time by up to 50% (Brown, 2022). In Oltenia, the adoption of these technologies is limited by costs and the lack of digital skills, requiring mandatory professional training in future funding programs (Vasilescu and Ionescu, 2023). Associative forms, such as cooperatives, allow access to more consistent financing and reduce food waste, contributing to sustainability (Vasile, 2023).

Thus, the success of implementing sustainable agriculture in South-West Oltenia depends not only on funds, but also on the capacity of farmers and local administration to manage resources, integrate technologies and cooperate effectively. Bureaucratic and economic bottlenecks remain determining factors of the efficiency of European and government funding.

2. Research design and methodology

The methodological approach of this study is part of the interpretative paradigm, using a qualitative and documentary research strategy. The research is based exclusively on secondary sources, and the design was configured to ensure a rigorous triangulation of data between academic literature, institutional monitoring reports and the European legislative framework. This approach allows for a complex assessment of the impact of the funds on sustainable agriculture, with a focus on the specific context of the South-West Oltenia region.

The choice of this method is justified by the need to correlate the macroeconomic indicators provided by Eurostat (2024) and MADR (2025) with the microeconomic observations identified in regional case studies (Popa and Dumitrescu, 2021).

The methodology was structured on three fundamental analytical axes:

(1) Content analysis of programmatic documents. A systematic examination of the National Strategic Plan 2023-2027 was carried out, tracking the share of financial allocations for agri-environmental measures and sustainable innovation. This stage allowed the identification of the supporting architecture and the validation of the hypothesis that the stability of capital flows is the sine qua non condition for the sustainable development of agriculture (Popescu, 2021).

(2) Regional impact assessment through qualitative meta-analysis. Data extracted from the AFIR reports (2024) for South-West Oltenia were compared with the research of Georgescu (2022) and Popa and Dumitrescu (2021). The analysis focused on the adoption rate of No-Till technologies and water resilience in Dolj and Mehedinți counties, allowing the isolation of factors that stimulate or limit the implementation of sustainable practices.

(3) Identifying critical barriers through comparative analysis. To investigate the phenomenon of "bureaucratization of sustainability" reported by Smith et al. (2021), the methodology involved comparing the administrative and digital requirements in the applicant guides with the technical and digital skills limitations identified in the European literature (Brown, 2022). This analysis focused in particular on small farms in Olt and Vâlcea counties, where administrative barriers directly affect the efficiency of financing.

The validity of the research is ensured by: using highly reliable official and academic sources (AFIR, 2024; MADR, 2025; Vasilescu and Ionescu, 2023); applying a critical filter to the results reported by local cooperatives and farms (Vasile, 2023); and correlating macro data with micro observations, so that conclusions are supported by multiple analytical perspectives.

This methodological configuration allows going beyond the simple description of the phenomenon, providing a solid analytical basis for the interpretation of the results and subsequent discussions, without resorting to primary data collection. Maximizing the information value of existing indicators contributes to a complex understanding of how European and government funds influence the adoption of sustainable agriculture in South-West Oltenia.

3. Results and discussion

The investigation into the impact of the funds shows a direct correlation between the predictability of financial support and the conversion rate to low-carbon technologies. Analysing the AFIR (2024) and MADR (2025) reports, it is observed that in the South-West Oltenia region, the absorption of funds was mainly focused on the modernisation of the machinery park, but the real effects on sustainability vary depending on the type of investment.

3.1. Economic and environmental impact of the funds

3.1.1. Technological efficiency in Dolj and Mehedinți counties

In areas affected by desertification, European funds have facilitated the transition to precision agriculture. According to Eurostat (2024), farms that implemented nutrient monitoring systems and drip irrigation reduced water consumption by 30% and nitrate leaching, demonstrating that technological investments contribute to the protection of fragile ecosystems (Georgescu, 2022). However, accessibility remains a problem: the high co-financing threshold limits the participation of small farmers, generating a sustainability paradox — technology that protects the environment is available only to those with large capital (Popa and Dumitrescu, 2021).

Table no. 1

Impact of funds on sustainability indicators (South-West Oltenia region)

Sustainability indicator	**Source of funding**	**Economic impact**	**Ecological impact**	**Bureaucratic complexity**
Organic agriculture	Pillar I (Green payments)	12% increase	Restoring biodiversity	High (audit)
Water management	Pillar II (Investments)	25% increase	High water efficiency	Medium (technology)
Digitalisation (IoT)	Innovation programmes	15% increase	Optimising inputs	Low (expertise)
Short supply chains	Mutual funds	20% increase	Reducing transport emissions	High (legal)

Source: MADR (2025); Vasilescu and Ionescu (2023).

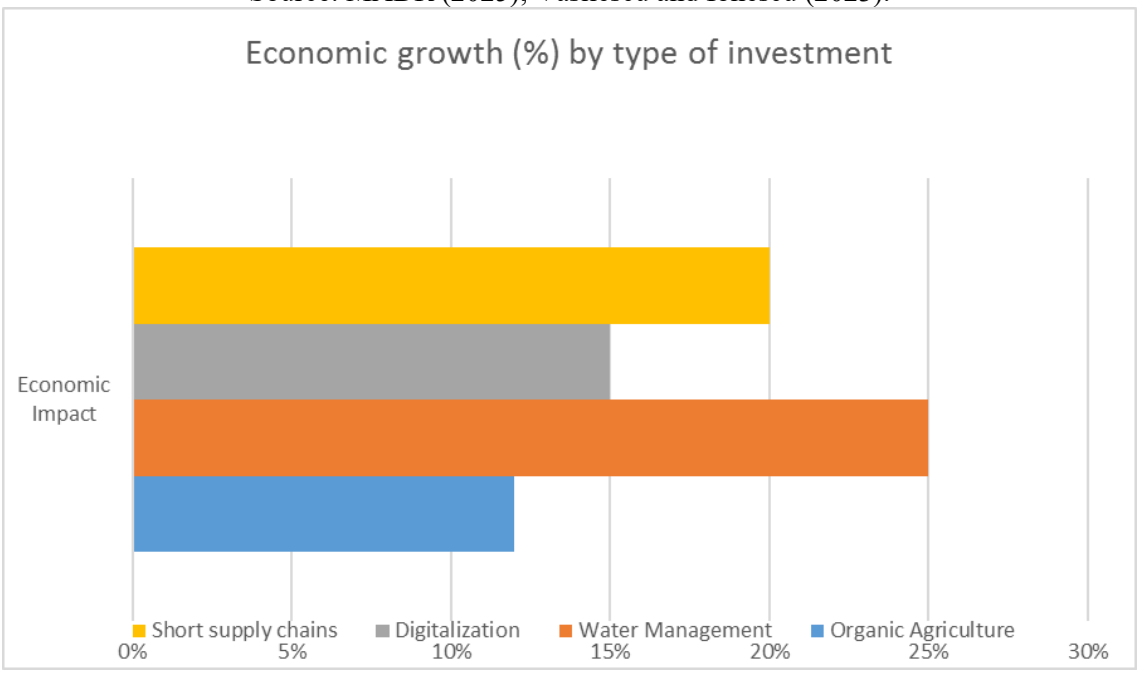

Figure no. 1. *Economic growth (%) by type of investment*

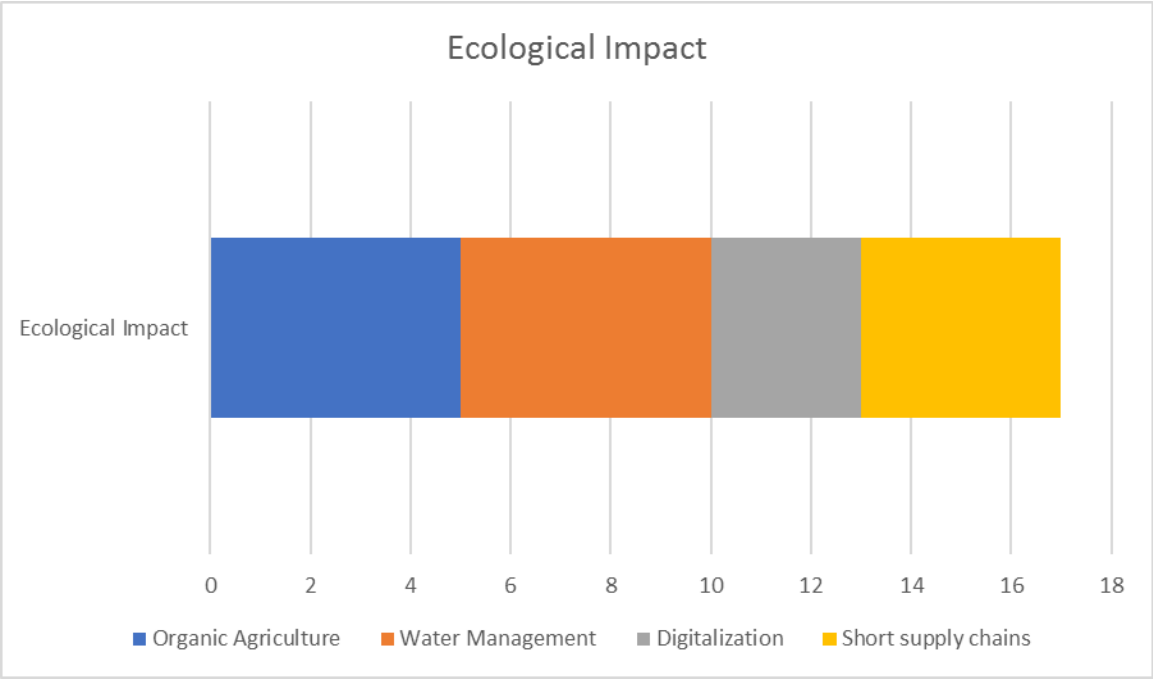

Figure no. 2. *Ecological impact by type of investment*

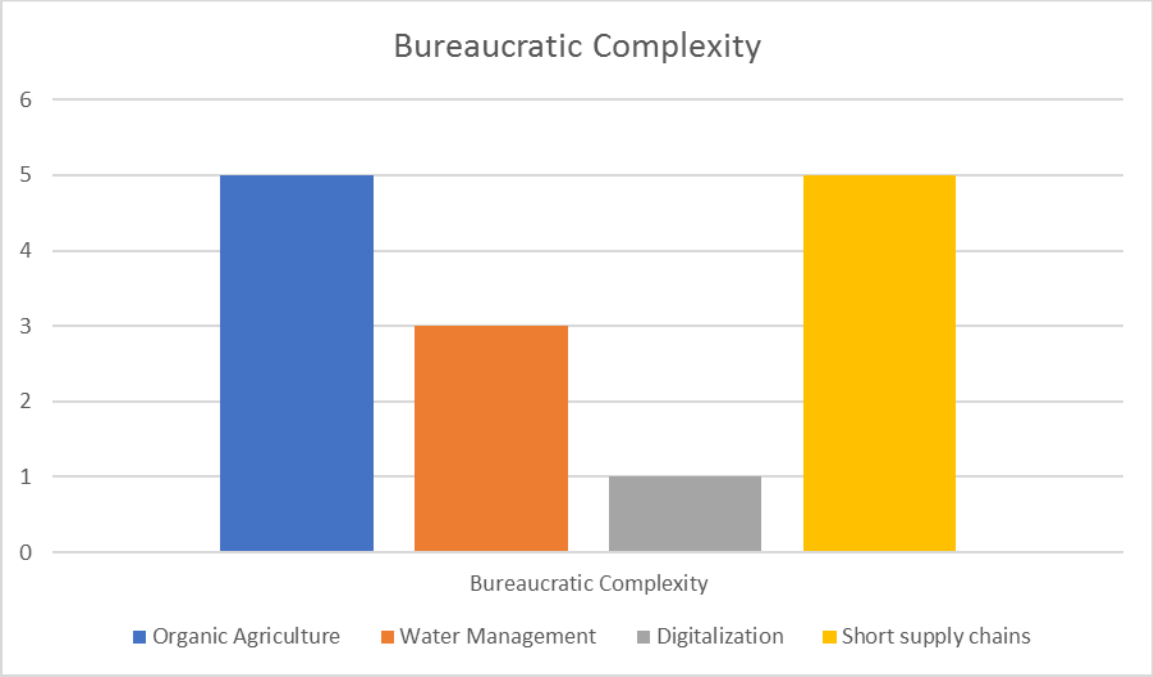

Figure no. 3. *Bureaucratic complexity by funding channel*

The funds contribute significantly to economic productivity and the reduction of environmental impact, but their efficiency depends on the managerial skills and level of initial capital of farmers.

3.1.2. Resilience mechanisms through associativity: the case of Olt County

Cooperatives play a key role in democratising access to funds. In Olt County, producer groups that implemented controlled cold storage reduced post-harvest losses by 40%, increasing income and reducing the carbon footprint of the final product (Vasile, 2023). Success depends on digital skills and professional management, indicating the need to combine infrastructure funds with training programmes.

3.2. Administrative and technological challenges

3.2.1. The bureaucratisation of sustainability

The "green administrative burden" (Smith et al., 2021) limits innovation, with reporting requirements rigidly tailored to general standards and not to the local context. In Vâlcea, 15% of funding applications are abandoned due to bureaucratic complexity (Ionescu, 2022).

3.2.2. Green Deal perspective and digitalisation

The transition to the CAP under the Green Deal requires strict standards. Without real digitalisation of the process (sensors, satellite images), farmers are overburdened with compliance, ignoring soil management (Vasilescu and Ionescu, 2023). The proposal is to move from "sustainability on paper" to "impact sustainability", with payments linked to actual soil and biodiversity performance.

3.3. Comparison of Pillar I and Pillar II

Table no. 2

Comparative analysis of the impact of the funds

Impact category	**Pillar I (Direct payments)**	**Pillar II (Rural investments)**	**Academic notes**
Main objective	Maintaining income	Structural transformation	Popescu (2021): Pillar II is the basis.
Adoption rate (SW Oltenia)	High (>85%)	Average (~40%)	Co-financing is the main barrier.
Impact on the soil	Conservation (No-till)	Rehabilitation (irrigation, drainage)	Georgescu (2022): critical irrigation.
Knowledge transfer	Low (compliance)	High (business plan)	Brown (2022): consulting deficit.
Bureaucracy (documents)	Average (simple reporting)	Very high (procurement)	Smith et al. (2021): inhibits small farmers.

Source: AFIR (2024); MADR (2025).

Pillar II has a stronger structural impact, but is more bureaucratic and more difficult to access for small farmers.

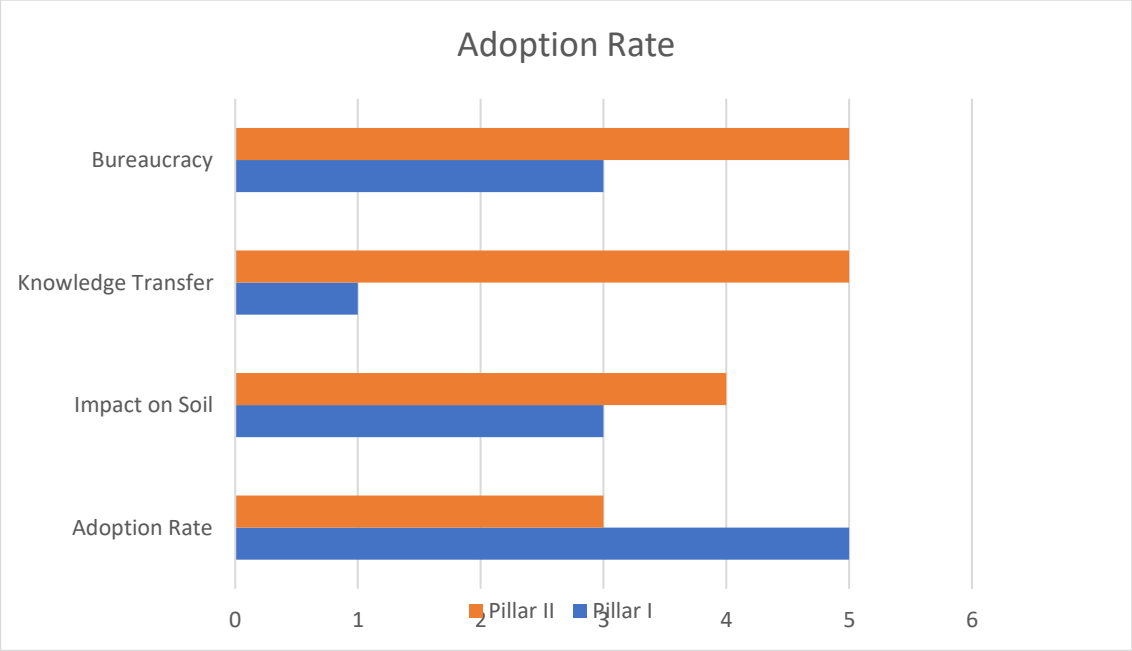

Figure no. 4. *Adoption rate of Pillar I versus Pillar II measures*

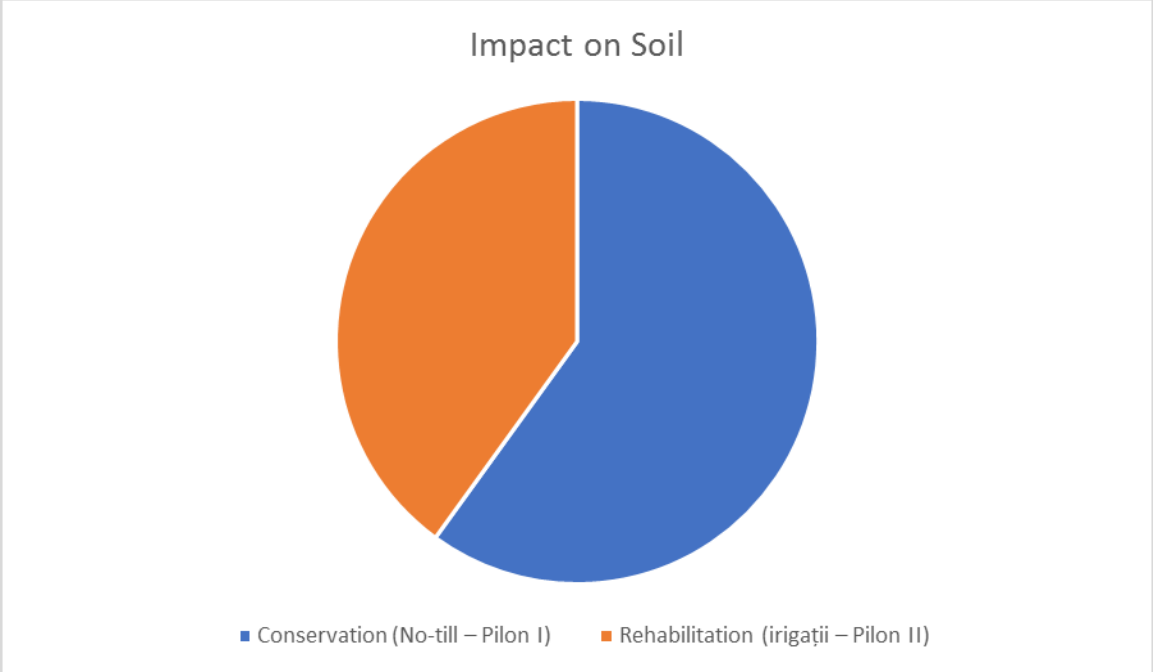

Figure no. 5.*Impact on soil across pillars*

3.4. Social implications and innovation

3.4.1. Young farmers and digitalisation

Farms managed by young people (under 40 years of age) are 60% more likely to access funds for digitalisation (Vasile, 2023). However, the lack of working capital for the period between investment and settlement of funds represents a "liquidity trap", requiring the intervention of banks through loans dedicated to sustainable agriculture.

3.4.2. Eco-schemes and voluntary participation

Performance-based eco-schemes (PD-04) have been more successful in lowland counties, but the voluntary nature limits the real impact (Ionescu and Vasilescu, 2020). The impact of the funds in South-West Oltenia is transformative, but uneven. Success depends on: a strategic approach focused on the efficiency of the use of funds; reducing bureaucracy and increasing digital capacity; supporting young farmers and strengthening associativity; and implementing payment mechanisms based on real ecological performance. Funds alone are not enough; they must be accompanied by integrated policies that ensure long-term economic, environmental and social sustainability.

Conclusions and recommendations

Research on the impact of funds on sustainable agriculture in the South-West Oltenia region confirms that financial support is an essential catalyst for the transition to sustainable agricultural practices, but its effectiveness is not uniform. The analysis of the impact of European and national funds on sustainable agriculture in South-West Oltenia highlights a transformative, but not uniform, effect.

Regarding economic and ecological impact, funds for machinery modernisation and the implementation of precision technologies have increased crop productivity by 12–25%, reducing water consumption and pesticide use by up to 30% on farms that have adopted innovative solutions. Cooperatives and producer groups contribute significantly to economic and ecological efficiency, reducing post-harvest losses and emissions associated with product transportation.

Regarding bureaucratic barriers and unequal access, the complexity of administrative procedures limits access for small farmers and may lead to the abandonment of financing applications (15% in Vâlcea County). Funds thus become more accessible to large farms or farmers with administrative resources and digital skills.

Regarding the role of young farmers and innovation, young-run farms (under 40 years of age) are 60% more likely to adopt digital technologies and innovative practices, but face a lack of working capital to cover the implementation and disbursement period of funds.

Regarding the need for a transition to impact sustainability, the implementation of the CAP under the Green Deal and performance-based eco-schemes requires digital monitoring and concrete indicators of soil health and biodiversity. Moving from "sustainability on paper" to "impact sustainability" is essential for funds to generate real effects on ecosystems and rural communities.

The practical recommendations arising from this analysis are: (i) increasing funds for vocational training and digitalisation, to ensure the technological capacity of small and young farmers; (ii) transitioning to performance-based monitoring by replacing physical checks and paper documentation with digital monitoring through ground sensors and Copernicus satellite imagery, thereby reducing the "green administrative burden" identified by Smith et al. (2021); (iii) developing and supporting cooperatives and operational groups as mechanisms for economic and ecological resilience; (iv) implementing real-time monitoring systems (drone, satellite, IoT) for the effective assessment of the impact of funds on ecosystems; and (v) establishing guarantee and support mechanisms for young farmers, including bridge credit lines that eliminate the "liquidity trap" in the period between investment and settlement of funds, thus stimulating the rapid adoption of innovations.

In conclusion, European and national funds can be a powerful catalyst for sustainable agriculture in South-West Oltenia, but success depends on the combination of technological investments, administrative capacity, farmer training and effective monitoring of ecological performance. This integrated approach will ensure that the transition to sustainable agriculture does not remain just a formal objective, but generates real benefits for the economy, the environment and society.

Future research should investigate the impact of "social conditionality" on the stability of the rural workforce. It is essential to assess whether digital transformation and investments in sustainable technologies will revitalise rural communities in Oltenia or whether they will accelerate the exodus of unskilled labour, transforming villages into strictly industrial-agricultural areas. Future research could also quantify the integrated effect of digitalisation and cooperation on ecosystem regeneration and the increase of long-term economic sustainability.

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