STUDY ON THE INTEGRATION OF GREEN ACCOUNTING IN AGRICULTURE

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Abstract: *The analysis focuses on the integration of green accounting into the agricultural sector as a modern approach to harmonizing economic efficiency with environmental responsibility. It highlights the need to adapt accounting systems so that they reflect not only financial results but also the ecological impact of agricultural activities. The study includes the use of a questionnaire addressed to farmers and representatives of agricultural enterprises, aiming to assess the level of knowledge regarding green accounting, existing practices for reporting environmental indicators, perceived costs and benefits, as well as the challenges faced in implementation. The collected results support the analysis of how green accounting principles can contribute to a more transparent decision-making process and to the sustainable development of agriculture, in line with European environmental policies.*

Key words*: green accounting; agriculture; sustainability; environmental impact; European policies*

INTRODUCTION

Also known as environmental accounting, green accounting includes the costs associated with environmental impacts in the analysis of a company's financial results. It helps companies understand the effects of their activities on the environment, giving them the opportunity to identify and adopt more sustainable processes without compromising financial performance.

Green accountancy extends traditional accounting by including the environmental and social costs of economic activities.

In agriculture, this approach provides a framework for assessing the real sustainability of farms by accounting for soil degradation, water use, biodiversity loss, and carbon emissions. The present study investigates how the application of green accountancy in agricultural enterprises can improve sustainability, enhance resource efficiency, and support policy alignment with the European Green Deal.

Agriculture is both a driver and a victim of environmental change. Intensive farming practices have increased productivity but often at the expense of soil fertility, water resources, and biodiversity.

Traditional accounting systems in agriculture mainly record financial outputs - revenues, subsidies, and production costs - while neglecting environmental externalities such as nutrient runoff, deforestation, or greenhouse gas emissions [1].

Green accountancy offers a corrective mechanism by integrating ecological indicators into financial reporting. It allows farmers and agribusiness managers to quantify environmental costs and benefits, ensuring a triple balance between economic performance, environmental protection, and social well-being [2].

In Romania and other EU countries, the adoption of green accounting practices in agriculture is still limited but growing due to policy incentives, the Common Agricultural Policy (CAP), and increasing consumer demand for sustainable food [5]. The objective of

this study is to examine how green accountancy can be implemented in agricultural enterprises to enhance sustainability and competitiveness.

MATERIALS AND METHOD

The study applies a mixed-method approach combining literature review, survey data, and comparative analysis of agricultural enterprises implementing environmental accounting systems.

Scientific literature and institutional documents such as the System of Environmental-Economic Accounting (SEEA) and FAO sustainability frameworks were reviewed [11,12]. Romanian studies on agricultural sustainability and farm management accounting provided contextual insight [13,14].

The analysis focused on identifying accounting tools applicable to agriculture, such as environmental cost accounting, life cycle assessment (LCA), and full-cost farm accounting.

Methodologies used in Green Accounting for agriculture pursue the following aspects:

- Environmental cost accounting - identifies and allocates costs associated with soil degradation, water pollution, and loss of biodiversity to specific farming practices.
- Life cycle assessment (LCA) - evaluates the environmental impacts of agricultural products from cultivation through processing and consumption.
- Natural capital accounting - measures the value of ecosystem services provided by agriculture, such as pollination and soil fertility.
- Triple bottom line (TBL) Accounting - assesses agricultural performance based on social equity, environmental stewardship, and economic viability.

A structured questionnaire was distributed to Romanian agricultural enterprises, including small family farms and large agribusinesses. The survey aimed to evaluate awareness and use of green accounting principles; types of environmental indicators integrated (energy use, fertilizer efficiency, soil quality); perceived benefits of environmental reporting; and main obstacles to implementation.

The results were compared with European studies on green accountancy in agriculture, including the Corporate Sustainability Reporting Directive (CSRD) [13] and the FAO's Agri-Environmental Indicators [14].

This comparison allowed the identification of convergence points and best practices relevant to Romanian agriculture.

RESEARCH RESULTS

The rising global food demand, coupled with environmental concerns, necessitates sustainable agricultural practices.

Green accounting helps farmers and policymakers make informed decisions that balance productivity with environmental integrity.

The principles of Green Accounting in agriculture are:

- Sustainability - focuses on maintaining soil health, biodiversity, and water resources for future generations.
- Transparency - requires clear reporting of environmental impacts, such as greenhouse gas emissions and water usage, to stakeholders.
- Accountability - farmers and agricultural businesses must take responsibility for their environmental footprint and disclose relevant impacts.
- Integration - combines financial performance with environmental data to provide a holistic assessment of agricultural practices.

In the following, we will present the data that were obtained by applying the questionnaire.

Green Accounting Questionnaire

1.Age

- Under 25 years old
- 25-34 years old
- 35-44 years old
- 45-54 years old
- 55-64 years old
- 65 and over
- Prefer not to answer

2. Gender

- Female
- Male
- Other

3. Education level:

- Middle school education
- High school education
- Post-secondary/professional school education
- University studies(Bachelor`s degree)
- Postgraduate studies(Master`s degree)
- Doctorate(PhD)

4. How familiar are you with the concept of green accounting?

- I am familiar with the concept, I know what it refers to
- I have heard of the concept, but I don`t know what it refers to
- I have not heard of this concept

5. In your opinion, how important is green accounting for sustainable business practices?

- Very important
- Somewhat important
- Not important

6. Does your organization currently use green accounting practices?

- Yes
- No
- Not sure

7. Which environmental aspects do you think should be included in green accounting?

- Impact on biodiversity
- Energy consumption
- Waste management
- Water consumption
- Carbon emissions

8. Would you like to see regulations or incentives to promote green accounting?

- Yes
- No
- Maybe

9. What are the main benefits of implementing green accounting in organizations?

- Better decision-making
- Regulatory compliance

- Improving corporate image
- Cost savings
- Environmental sustainability

10. What challenges does your organization face in adopting green accounting?

- Limited organizational awareness
- Lack of data or transparency
- High implementation costs
- Lack of expertise

11. How do you think green accounting could influence business decision-making process?

- Positive
- Negative
- Neutral/No change
- I don`t know

Following the analysis of the responses received, we were able to formulate several observations, which we present below.

1. Age

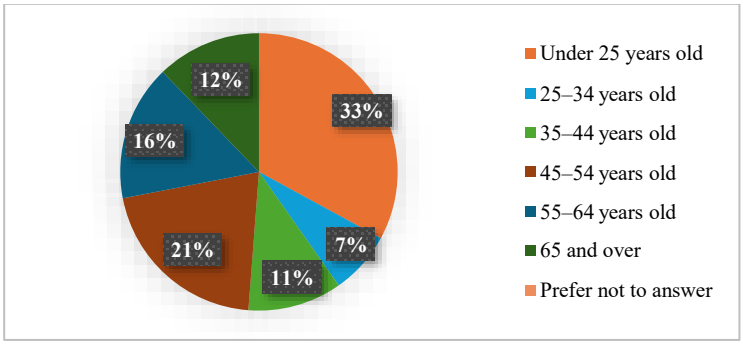

Figure 1. Age categories of respondents

The age distribution of respondents helps identify generational attitudes toward sustainability and innovation. Younger farmers or managers show higher openness to green accounting and environmental technologies, while older respondents might rely more on traditional practices, valuing economic stability over environmental indicators. This variable can reveal if awareness and adoption correlate with generational shifts in agricultural management culture.

2. Gender

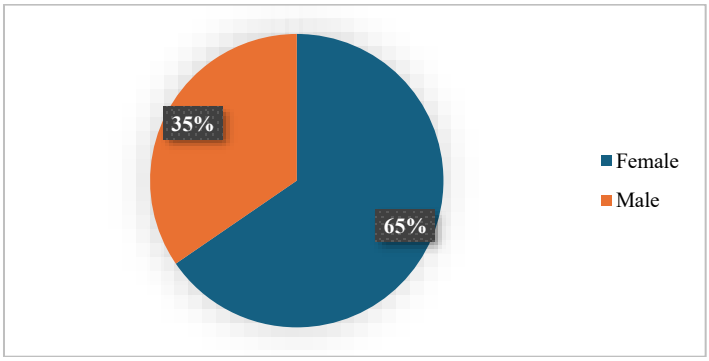

Figure 2. Gender categories of respondents

Gender can influence environmental perception and management style. Studies often find that women tend to express stronger concern for ecological issues, while men may focus more on economic efficiency. In this context, analyzing gender distribution provides insight into whether sustainability awareness is evenly spread or influenced by demographic composition in agricultural enterprises.

3. Education level

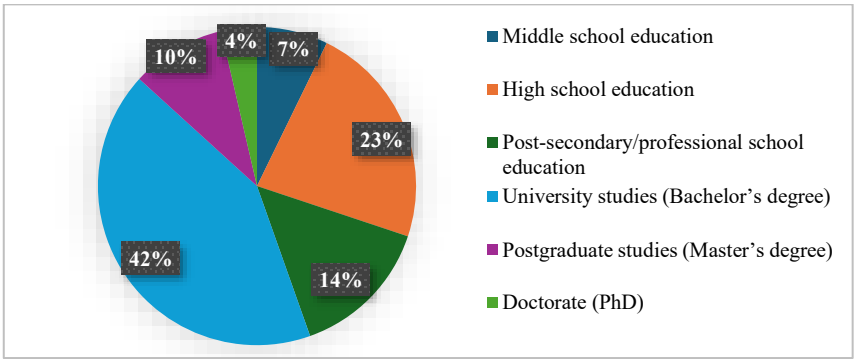

Figure 3. Education level of respondents

Higher education levels usually correlate with better understanding of complex systems like green accounting. Respondents with university or postgraduate education are more likely to recognize its benefits, such as integrating ecological performance into financial decision-making. Conversely, respondents with only basic education may need more training or simplified frameworks to engage effectively in green accounting practices.

4. How familiar are you with the concept of green accounting?

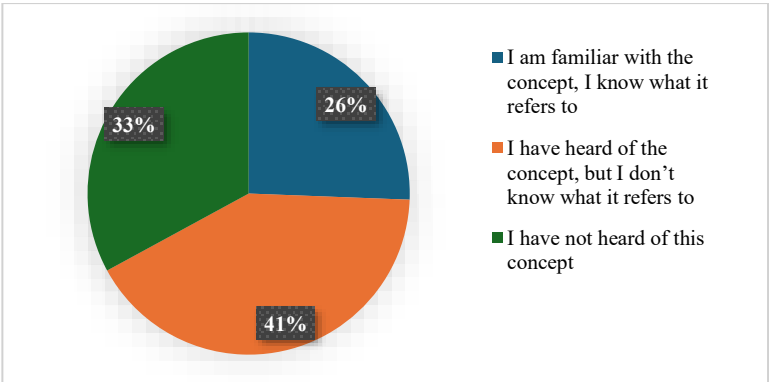

Figure 4. The level of knowledge about the concept of green accounting

This question measures awareness and knowledge. A high level of unfamiliarity indicates a gap in education or communication between policymakers and agricultural practitioners. If respondents report moderate to low familiarity, it suggests that green accounting is still perceived as a theoretical or institutional concept rather than a practical tool for farms.

5. In your opinion, how important is green accounting for sustainable business practices?

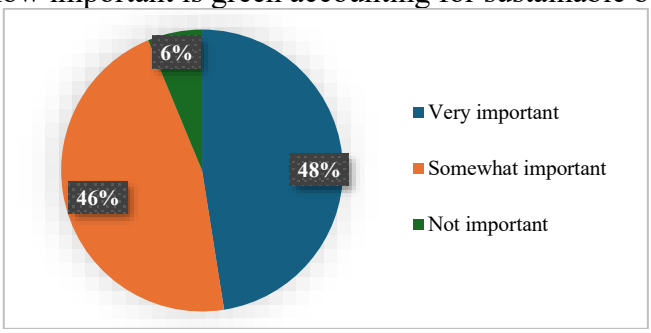

Figure 5. The importance of green accounting for sustainable business practices

Responses showing strong agreement underline a shared understanding that sustainability is not just ecological, but economic. Farmers recognizing the importance of green accounting demonstrate alignment with EU directives promoting environmental reporting. Lower scores would suggest resistance or skepticism toward its immediate utility in everyday farm management.

6. Does your organization currently use green accounting practices?

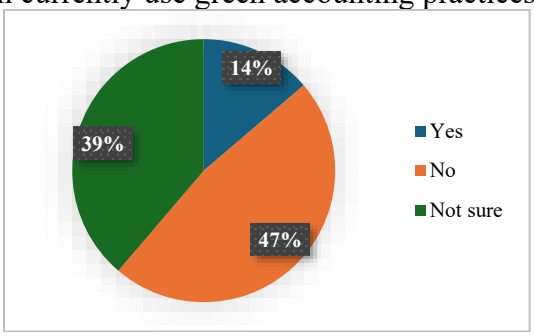

Figure 6. The use of green accounting practices

This question identifies the implementation gap. If most respondents indicate “no” or “not sure,” it confirms that although the concept is recognized, practical application remains limited. Barriers may include lack of standardized frameworks, insufficient incentives, or low institutional support.

7. Which environmental aspects do you think should be included in green accounting? (Select all that apply)

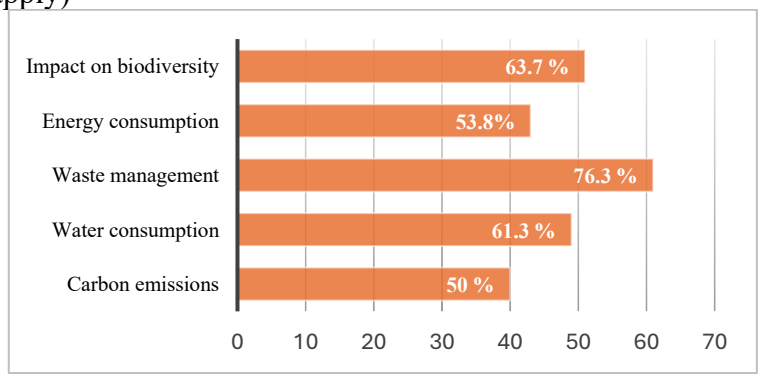

Figure 7. Environmental aspects included in green accounting

Typical answers may include soil health, water usage, waste management, biodiversity protection, and carbon emissions. The diversity of selected aspects reflects how broadly respondents perceive environmental responsibility. For instance, focus on soil and water suggests a production-centered view, while inclusion of biodiversity and emissions indicates systemic ecological awareness.

8. Would you like to see more regulations or incentives to promote green accounting?

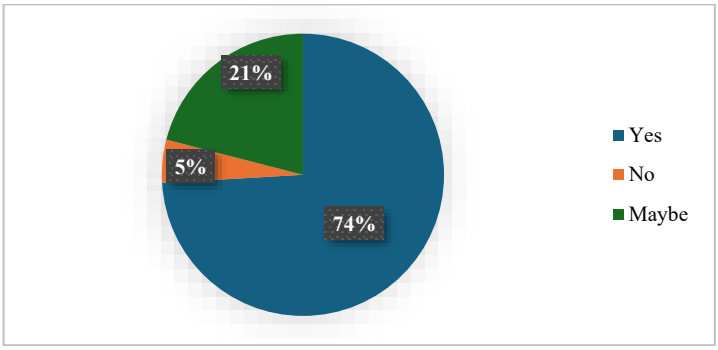

Figure 8. The importance of promotion green accounting

This question distinguishes between reactive and proactive attitudes. Preference for regulations shows recognition that mandatory frameworks are needed to ensure compliance.

Preference for incentives implies that respondents view sustainability as an opportunity if supported economically. A balance between both suggests a realistic perspective - regulation ensures accountability, while incentives encourage voluntary improvement.

9. What are the main benefits of implementing green accounting in organizations? (Select all that apply)

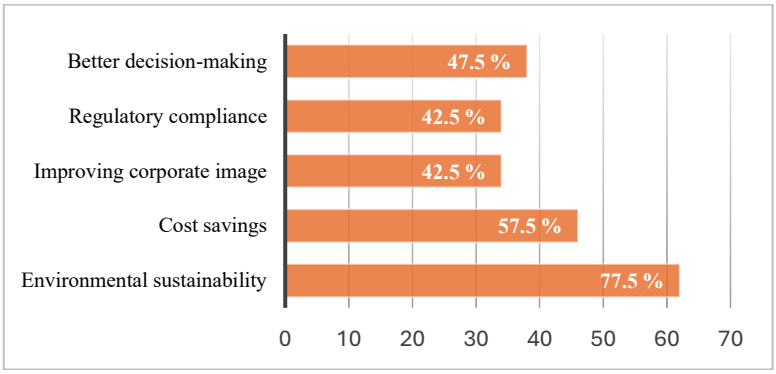

Figure 9. Main benefits of implementing green accounting

Commonly cited benefits may include:

- Improved resource efficiency
- Enhanced transparency for investors and consumers
- Compliance with EU sustainability policies
- Strengthened reputation and market competitiveness

The selection pattern reveals whether respondents view green accounting as an economic advantage or merely as an administrative burden. A focus on transparency and competitiveness indicates maturity in sustainability thinking.

10. What challenges does your organization face in adopting green accounting? (Select all that apply)

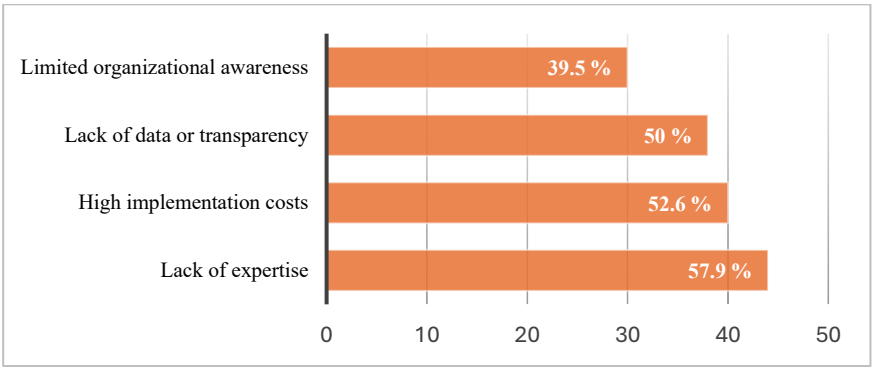

Figure 10. Challenges faced in adopting green accounting

Expected responses include lack of expertise, high costs, limited data, and unclear legal frameworks. These highlight the main barriers to integration. If cost is predominant, economic constraints dominate decision-making. If lack of knowledge is common, it signals the need for training and institutional support. Recognizing multiple barriers implies that solutions must be systemic, not only financial.

11. How do you think green accounting could influence the business decision-making process?

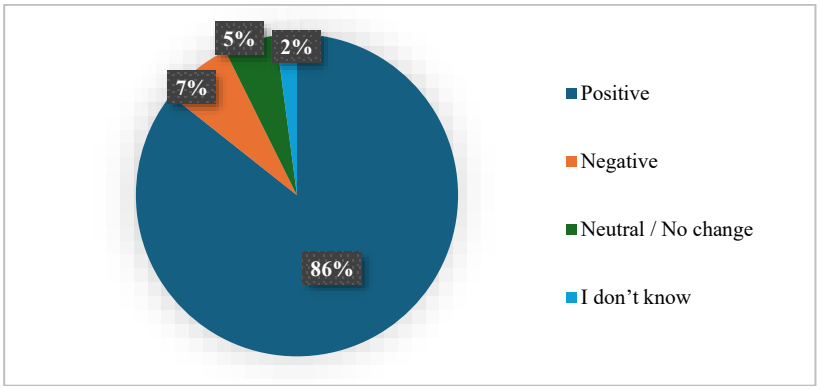

Figure 11. How green accounting could influence the business decision-making process

This question assesses the strategic potential of green accounting. Positive responses indicate that respondents believe environmental performance data can guide resource allocation, long-term planning, and sustainable investment. If skepticism prevails, it suggests that many still perceive environmental accounting as detached from financial reality, underscoring the need for better communication of its practical value.

The survey results highlight a transitional stage of the agricultural sector toward sustainability. The discrepancy between theoretical awareness and practical adoption indicates a gradual transformation of managerial paradigms, shaped by the European regulatory framework, educational capital, and differentiated access to resources.

Integrating these findings into the analysis enables the formulation of robust conclusions regarding: the educational gap in green accounting literacy, the economic constraints that limit implementation, and its strategic potential for long-term sustainable development in agriculture.

CONCLUSIONS

The research demonstrates that green accountancy is not merely a reporting instrument but a transformative management framework that integrates financial performance with environmental and social responsibility.

In agricultural enterprises, where natural resources are both inputs and outcomes of production, green accounting provides the methodological basis for quantifying ecological externalities, such as soil degradation, water pollution, and greenhouse gas emissions, and incorporating them into economic decision-making

By internalizing environmental costs, farms can more accurately assess their true profitability, ensuring that economic growth does not occur at the expense of environmental degradation.

The results of the survey revealed that, although awareness of green accounting principles is increasing, practical implementation remains limited, particularly among smaller farms and enterprises with lower levels of education or limited financial capacity. This underscores the need for capacity-building programs, training initiatives, and knowledge transfer mechanisms to bridge the gap between theoretical understanding and operational practice.

Moreover, the findings highlight the generational and educational dimensions of sustainability adoption. Younger, better-educated respondents showed a stronger inclination toward innovation and environmental responsibility, suggesting that the transition to green accounting is being driven by a new generation of farm managers more aligned with European sustainability objectives. This generational renewal may serve as a catalyst for embedding environmental accounting into the broader culture of agricultural management.

The study also confirms that policy alignment and institutional support are crucial for scaling up the adoption of green accounting. The European Green Deal, the Corporate Sustainability Reporting Directive, and the CAP collectively create a favorable framework that encourages sustainable business models and transparent environmental reporting.

However, for these policies to achieve full impact at the farm level, national institutions in Romania and other EU member states must ensure coherent implementation, provide financial incentives, and simplify reporting standards tailored to agricultural realities.

From a strategic perspective, green accountancy can serve as a decision-support tool, enabling agricultural enterprises to:

- Identify opportunities for resource efficiency and cost reduction;
- Monitor environmental performance indicators alongside financial metrics;
- Demonstrate compliance with sustainability standards and attract environmentally conscious consumers and investors;
- Strengthen corporate reputation and competitiveness in both domestic and European markets.

The study therefore suggests that green accounting contributes to a triple sustainability balance - economic viability, environmental stewardship, and social well-being - by promoting transparency, accountability, and long-term resilience in agricultural systems.

Future efforts should concentrate on:

1. Developing standardized sustainability indicators adapted to agricultural contexts, ensuring comparability and consistency across farms and regions;
2. Digitalizing environmental data collection and reporting, enabling real-time monitoring and decision-making;

3. Integrating green accounting into educational curricula for agricultural economics and management to cultivate future professionals skilled in sustainability reporting;
4. Encouraging cross-sector collaboration between farmers, policymakers, and researchers to design feasible and effective implementation models.

In conclusion, the implementation of green accountancy in agriculture represents a paradigm shift-from viewing environmental protection as an external constraint to recognizing it as an intrinsic component of economic success.

When properly applied, it becomes a driver of sustainable competitiveness, enabling agriculture to fulfill its dual role: feeding the population while preserving the ecological foundations on which its productivity depends.

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