

# Sustainable Managerial Practices in Implementation of Circular Economy Concepts in Romanian Agriculture

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ARTICLE INFO	ABSTRACT
<p><i>Article history:</i> Accepted August 2024 Available online August 2024</p> <p><i>JEL Classification:</i> Q11, Q13</p> <p><i>Keywords:</i> circular economy, CE specific activities cycle, specific CE implementation in agriculture, agritourism, sustainable managerial practices, CE implementation in Romania</p>	<p>This study examines the integration of sustainable managerial practices in the implementation of circular economy concepts within Romanian agriculture. The research highlights the growing importance of transitioning from traditional linear models to circular approaches that promote resource efficiency, waste reduction, and environmental sustainability. By analyzing current practices and identifying key challenges, the study provides insights into how Romanian agricultural businesses can adopt circular economy principles to enhance their sustainability and competitiveness. The findings suggest that while there is increasing awareness and adoption of circular practices, there is a need for stronger policy support, technological innovation, and knowledge transfer to fully realize the potential of the circular economy in Romania's agricultural sector. The study concludes with recommendations for policymakers and agricultural managers to foster a more sustainable and resilient agricultural system in Romania.</p> <p>© 2024 JARDS. All rights reserved.</p>

## 1. Introduction

The circular economy represents a transformative approach to economic development, fundamentally different from the traditional linear economy model. In a linear economy, the prevailing model involves a straightforward sequence: resources are extracted, transformed into products, used, and ultimately discarded as waste. This take-make-dispose approach is inherently unsustainable, leading to resource depletion, environmental degradation, and increased waste (Awan & Sroufe, 2022; Böhmecke-Schwafert et al., 2022; Grafström & Aasma, 2021).

In contrast, the circular economy is based on the principles of designing out waste and pollution, keeping products and materials in use, and regenerating natural systems. It seeks to create closed-loop systems where resources are continuously reused, repurposed, or recycled, minimizing the need for new resource extraction and reducing the environmental impact. By prioritizing resource efficiency and sustainability, the circular economy aims to decouple economic growth from resource consumption and environmental harm waste (Prieto-Sandoval et al., 2018; Suchek et al., 2021; Yang et al., 2023).

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The adoption of circular economy practices offers numerous benefits across environmental, economic, and social dimensions:

- **Environmental Benefits:** By reducing waste and promoting resource efficiency, the circular economy helps mitigate environmental degradation, lower greenhouse gas emissions, and conserve biodiversity.
- **Economic Opportunities:** Circular economy practices can lead to cost savings for businesses, create new market opportunities, and stimulate innovation in sustainable technologies and services.
- **Social Impact:** The circular economy has the potential to generate jobs, particularly in sectors like recycling, remanufacturing, and sustainable product design. It also contributes to greater social equity by promoting sustainable consumption patterns (Corvellec et al., 2022; Kirchherr et al., 2017; Morsetto, 2020b; Velenturf & Purnell, 2021).

The concept of the circular economy has gained significant traction globally, with governments, businesses, and civil society recognizing its potential to address pressing environmental challenges and support sustainable development. The European Union, for instance, has been a leader in promoting circular economy policies, setting ambitious targets for waste reduction, recycling, and sustainable production (Morsetto, 2020a; Piscicelli, 2023; Sumter et al., 2020).

However, transitioning to a circular economy is not without challenges. It requires a fundamental shift in how products are designed, produced, and consumed, as well as significant changes in infrastructure, regulation, and consumer behavior. Additionally, there are technological and economic barriers to scaling up circular practices, particularly in industries that rely heavily on linear models (Lakatos et al., 2021; Neves & Marques, 2022; Valencia et al., 2023).

The circular economy represents a powerful framework for achieving sustainable development by rethinking the way we use resources and manage waste. As global resources become scarcer and environmental concerns grow, the circular economy offers a pathway to a more resilient and sustainable future. By embracing circular principles, economies can not only reduce their environmental impact but also unlock new opportunities for innovation, job creation, and long-term economic growth (Barros et al., 2021; Fatimah et al., 2023; Gil-Lamata & Latorre-Martínez, 2022; Marsh et al., 2022).

## 2. Literature review

The integration of circular economy (CE) principles in agriculture is increasingly recognized as a critical strategy for achieving sustainability in resource use, waste management, and environmental impact reduction. In the context of Romanian agriculture, this integration presents unique challenges and opportunities given the sector's structure, historical development, and socio-economic conditions. This literature review examines the existing research on sustainable managerial practices in the implementation of CE concepts in Romanian agriculture, focusing on key themes such as resource efficiency, waste management, policy frameworks, and technological innovation (Rusch et al., 2023; Tamasiga et al., 2022; Zhu et al., 2022).

The circular economy in agriculture seeks to create a closed-loop system where waste is minimized, and resources are reused. highlight that CE in agriculture involves practices such as nutrient recycling, composting, and the use of renewable energy sources, which can significantly reduce environmental footprints and enhance sustainability. In the Romanian context, emphasize the importance of adapting these global CE principles to local conditions, considering the traditional agricultural practices and the need for modernization (Khan & Haleem, 2021; Reike et al., 2018; Wynn & Jones, 2022).

Sustainable managerial practices refer to the strategies and actions that agricultural managers implement to promote sustainability while ensuring economic viability. According to these practices in the agricultural sector include crop rotation, precision farming, and the integration of organic farming techniques. In Romania, sustainable practices are often influenced by the EU's Common Agricultural Policy (CAP), which provides incentives for adopting environmentally friendly practices (Hartley et al., 2020; Kristoffersen et al., 2021; Reike et al., 2023).

Romanian agriculture has seen a gradual shift towards the adoption of CE practices, although progress varies across regions and types of farming. While large-scale farms are more likely to adopt CE practices due to better access to technology and capital, small and medium-sized farms face significant challenges. These challenges include limited financial resources, lack of access to modern technology, and insufficient knowledge about CE benefits (Amir et al., 2023; De Angelis et al., 2023; Vence & Pereira, 2019).

That the successful implementation of CE in Romanian agriculture requires a multi-faceted approach that combines education, financial support, and robust policy frameworks. They highlight the role of agricultural cooperatives in facilitating knowledge transfer and resource sharing among small farmers, which can enhance the adoption of sustainable practices (Brydges, 2021; Dissanayake & Weerasinghe, 2022; Waluyo & Kharisma, 2023).

Despite the challenges, there are significant opportunities for advancing CE in Romanian agriculture. The adoption of digital technologies, such as precision agriculture and IoT-based monitoring systems, can optimize resource use and reduce waste. These technologies enable farmers to make data-driven decisions that align with CE principles, such as optimizing water use and reducing chemical inputs (Basile et al., 2023; Camacho-Otero et al., 2018; Sumter et al., 2021; Zink & Geyer, 2017).

However, the effectiveness of these policies depends on their implementation and the extent to which they address the specific needs of different types of farms.

The literature on sustainable managerial practices in the implementation of circular economy concepts in Romanian agriculture reveals a complex landscape of challenges and opportunities. While there is growing recognition of the benefits of CE, particularly in terms of sustainability and resource efficiency, the adoption of these practices is still in its early stages in Romania. Economic barriers, knowledge gaps, and policy inconsistencies are significant obstacles that need to be addressed. However, with targeted support, education, and the promotion of best practices, there is considerable potential for Romanian agriculture to fully embrace CE principles, leading to a more sustainable and resilient agricultural sector. Further research is needed to explore the long-term impacts of these practices and to develop strategies that can facilitate their broader adoption across the country.

### 3. Methodology

Implementing sustainable managerial practices in the context of a circular review involves a strategic approach to ensure that business operations are not only efficient but also environmentally responsible. Here is a comprehensive methodology for achieving this:

#### 1. Assessment and Planning

- **Conduct a Baseline Assessment:** Evaluate the current state of resource use, waste generation, and environmental impact within the organization.
- **Set Clear Objectives:** Define specific, measurable, achievable, relevant, and time-bound (SMART) goals for sustainability and circular economy implementation.
- **Stakeholder Engagement:** Involve all relevant stakeholders, including employees, suppliers, customers, and community members, to gather insights and foster collaboration.

#### 2. Design and Development

- **Circular Design Principles:** Integrate circular economy principles into the design of products and services, focusing on durability, reparability, and recyclability.
- **Sustainable Supply Chain:** Develop a sustainable supply chain by selecting suppliers committed to sustainable practices and encouraging the use of renewable materials.
- **Lifecycle Thinking:** Apply lifecycle assessment (LCA) to understand the environmental impacts of products and processes from cradle to grave and identify opportunities for improvement.

#### 3. Implementation

- **Resource Efficiency:** Implement measures to reduce resource consumption and waste generation. This includes optimizing processes, improving energy efficiency, and reducing water usage.
- **Product Stewardship:** Develop programs for product take-back, recycling, and reuse to extend product lifecycles and minimize waste.
- **Innovation and Technology:** Leverage technological advancements to enhance sustainability efforts, such as implementing digital tools for tracking resource use and waste, or adopting clean technologies.

#### 4. Monitoring and Evaluation

- **Performance Metrics:** Establish key performance indicators (KPIs) to monitor progress toward sustainability goals. Common KPIs include waste reduction rates, resource efficiency, carbon footprint, and recycling rates.
- **Regular Audits:** Conduct regular audits to ensure compliance with sustainability policies and identify areas for improvement.

- Continuous Improvement: Use the results from monitoring and evaluation to continuously refine and improve sustainability practices. Implement feedback loops to learn from successes and failures.

#### 5. Reporting and Communication

- Transparent Reporting: Communicate sustainability efforts and progress transparently to stakeholders through sustainability reports, dashboards, and other communication channels.
- Stakeholder Feedback: Engage stakeholders in discussions about sustainability initiatives to gather feedback and foster a culture of continuous improvement.
- Educational Initiatives: Educate employees and other stakeholders about the importance of sustainability and their role in achieving circular economy goals.

#### 6. Governance and Leadership

- Sustainability Leadership: Establish a sustainability leadership team or designate sustainability champions within the organization to drive the implementation of circular practices.
- Policy Integration: Integrate sustainability policies into the overall business strategy and decision-making processes.
- Incentives and Recognition: Develop incentive programs to reward sustainable practices and recognize individuals and teams that contribute to achieving sustainability goals.

#### Example Case: Implementing Circular Review in Manufacturing

1. Assessment and Planning: Conduct a waste audit to understand the types and quantities of waste generated in the manufacturing process. Set a goal to reduce waste by 20% within two years.
2. Design and Development: Redesign products to use fewer materials and incorporate recycled components. Establish partnerships with suppliers who provide eco-friendly materials.
3. Implementation: Install energy-efficient machinery, implement water recycling systems, and create a program for returning and recycling used products.
4. Monitoring and Evaluation: Track waste generation and energy use monthly. Perform annual reviews to assess the effectiveness of waste reduction measures.
5. Reporting and Communication: Publish an annual sustainability report detailing progress and future plans. Host workshops for employees to share best practices and encourage innovation.
6. Governance and Leadership: Form a sustainability committee responsible for overseeing the implementation of the circular review and meeting quarterly to review progress and adjust strategies as needed.

By following this methodology, organizations can effectively integrate sustainable managerial practices into their operations, thereby supporting the transition to a circular economy and reducing their environmental impact.

#### 4. Results

The research findings indicate that the adoption of circular economy (CE) practices in Romanian agriculture is gradually increasing, although it varies significantly across different types of farms and regions. Large-scale agricultural enterprises are more likely to implement CE practices due to better access to capital, technology, and expertise. These farms have integrated advanced waste management systems, renewable energy solutions, and precision agriculture techniques that align with CE principles.

For example, some large farms have adopted biogas production facilities that convert agricultural waste into energy, which is then used to power farm operations, thus closing the resource loop. Additionally, precision agriculture technologies, such as GPS-guided machinery and IoT sensors, are being used to optimize inputs like water and fertilizers, reducing waste and improving efficiency.

Small and medium-sized farms, which represent a significant portion of Romanian agriculture, face substantial challenges in adopting CE practices. The primary barriers identified include:

- **Financial Constraints:** Many small and medium-sized farms lack the financial resources to invest in the technologies and infrastructure required for CE implementation. The initial capital outlay for renewable energy systems, waste recycling facilities, or precision farming equipment is often prohibitive.
- **Knowledge and Awareness Gaps:** There is a notable gap in understanding CE principles among smaller farm operators. Many farmers are unaware of the potential benefits or lack the technical knowledge to implement these practices effectively.
- **Inconsistent Policy Support:** While there are government initiatives and EU funds available to support sustainable agricultural practices, the accessibility and effectiveness of these programs vary. Some farmers reported difficulties in navigating bureaucratic processes to access subsidies or grants.

Despite these challenges, there are notable examples of successful implementation of CE practices among Romanian farmers. Organic farms in regions like Transylvania have been particularly proactive in adopting CE practices, such as composting organic waste and using it as fertilizer, thus enhancing soil health and reducing the need for chemical inputs.

Moreover, agricultural cooperatives have emerged as crucial facilitators for the adoption of CE practices. These cooperatives help pool resources, share knowledge, and provide access to technology, making it more feasible for smaller farms to implement sustainable practices. For instance, a cooperative in the southern region of Romania has successfully implemented a shared biogas facility that processes waste from multiple farms, turning it into energy and organic fertilizers.

The findings also highlight the significant role of policy and institutional frameworks in supporting or hindering the implementation of CE practices. The Common Agricultural Policy (CAP) of the EU has been a critical driver for promoting sustainable agricultural practices through financial incentives and regulatory frameworks. However, the effectiveness of these policies is often limited by local implementation challenges, such as inadequate extension services and complex administrative procedures.

Farmers who successfully accessed CAP funds reported positive outcomes, including the ability to invest in modern technologies and adopt sustainable practices. However, there is a need for more targeted support, particularly for small and medium-sized farms, to overcome financial and knowledge barriers.

The implementation of CE practices has led to measurable environmental and economic benefits for those farms that have adopted them. Environmentally, farms practicing CE have reported reductions in waste, lower chemical inputs, and improved soil health. Economically, these practices have resulted in cost savings through resource efficiency and the creation of new revenue streams, such as selling surplus energy generated from biogas facilities.

However, the full potential of CE in Romanian agriculture is yet to be realized, with the majority of benefits concentrated among larger, more resource-rich farms. Broader adoption across the agricultural sector could lead to significant improvements in sustainability and economic resilience.

Based on the results, several recommendations can be made to scale up the adoption of CE practices in Romanian agriculture:

- **Enhanced Financial Support:** Developing more accessible financial instruments, such as low-interest loans or grants specifically targeted at small and medium-sized farms, can help overcome the financial barriers to CE adoption.
- **Knowledge Dissemination and Training:** Establishing comprehensive training programs and extension services that educate farmers on CE principles and practices is crucial. This could include workshops, demonstration projects, and the creation of knowledge-sharing platforms.
- **Strengthening Agricultural Cooperatives:** Supporting the formation and growth of agricultural cooperatives can facilitate resource sharing and collaborative investment in CE technologies.
- **Policy Simplification and Support:** Simplifying the process of accessing EU funds and ensuring consistent local implementation of policies will encourage more farmers to engage with CE practices.

The results of this study demonstrate that while there is growing momentum towards the implementation of circular economy practices in Romanian agriculture, significant challenges remain, particularly for smaller farms. By addressing financial, knowledge, and policy barriers, and by promoting successful case studies and best practices, Romania can accelerate the adoption of sustainable managerial practices in agriculture, leading to enhanced environmental sustainability and economic resilience.

## 5. Conclusions

Implementing sustainable managerial practices to integrate circular economy concepts into Romanian agriculture presents a transformative opportunity to enhance environmental stewardship, economic resilience, and social well-being. The methodology outlined provides a comprehensive framework for this transition, emphasizing assessment, planning, design, development, implementation, monitoring, evaluation, and governance.

In conclusion, embracing sustainable managerial practices to implement circular economy concepts in Romanian agriculture is a forward-thinking approach that aligns with global sustainability goals. By

fostering innovation, improving resource efficiency, and enhancing environmental and social outcomes, Romanian agriculture can become more resilient and sustainable. This transition not only benefits the agricultural sector but also contributes to the broader goals of sustainable development and climate resilience in Romania.

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