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IMPLEMENTAÇÃO DE PRÁTICAS DE ECONOMIA CIRCULAR NO SETOR AGROALIMENTAR: UMA ANÁLISE COMPARATIVA DO OESTE DO PARANÁ, BRASIL E DA REGIÃO MARCHE, ITÁLIA

IMPLEMENTING CIRCULAR ECONOMY PRACTICES IN THE AGRI-FOOD SECTOR: A COMPARATIVE ANALYSIS OF THE WESTERN PARANÁ STATE, BRAZIL AND THE MARCHE REGION, ITALY

IMPLEMENTACIÓN DE PRÁCTICAS DE ECONOMÍA CIRCULAR EN EL SECTOR AGROALIMENTARIO: UN ANÁLISIS COMPARATIVO DEL OESTE DE PARANÁ, BRASIL Y DE LA REGIÓN DE MARCHE, ITALIA

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Thematic area: Economia Agrícola e Meio Ambiente.

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Resumo: O conceito de desenvolvimento sustentável busca equilibrar o crescimento econômico com a proteção ambiental e os direitos humanos. Nesse sentido, a economia circular oferece soluções para reduzir o impacto ambiental e promover a responsabilidade social, reintegrando resíduos e subprodutos na cadeia produtiva. Este modelo vem sendo discutido como solução na transição para um futuro sustentável e está alinhado com políticas de inovação e sustentabilidade. A pesquisa visa analisar a implementação da economia circular no setor agroalimentar em duas regiões: Oeste do Paraná (Brasil) e Marche (Itália), examinando suas implicações para modelos de negócios e a sustentabilidade regional. A pesquisa utilizará uma combinação de revisão de literatura e análises quantitativas e qualitativas para entender melhor as práticas de economia circular e seu impacto no desenvolvimento territorial sustentável. A relevância do estudo é social, científica e econômica, com o objetivo de contribuir para políticas públicas, gerar novos conhecimentos e promover o desenvolvimento econômico sustentável.

Palavras-chave: Desenvolvimento sustentável; Bioeconomia; Desenvolvimento regional.

Abstract: The concept of sustainable development seeks to balance economic growth with environmental protection and human rights. In this context, the circular economy offers solutions to reduce environmental impact and promote social responsibility by reintegrating waste and by-products into the production chain. This model is being discussed as a solution in the transition to a

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sustainable future and is aligned with innovation and sustainability policies. The proposed research aims to assess the implementation of the circular economy in the agri-food sector in two regions: Western Paraná (Brazil) and Marche Region (Italy), examining its implications for business models and regional sustainability. The research will use a combination of literature review and quantitative and qualitative analyses to better understand circular economy practices and their impact on sustainable territorial development. The study's relevance is social, scientific, and economic, aiming to contribute to public policies, generate new knowledge, and promote sustainable economic development.

Key-words: Sustainable development; Bioeconomy; Regional Development.

Resumen: El concepto de desarrollo sostenible busca equilibrar el crecimiento económico con la protección ambiental y los derechos humanos. En este sentido, la economía circular ofrece soluciones para reducir el impacto ambiental y promover la responsabilidad social, reintegrando residuos y subproductos en la cadena de producción. Este modelo se está considerando como una solución en la transición hacia un futuro sostenible y está alineado con políticas de innovación y sostenibilidad. La investigación propuesta tiene como objetivo evaluar la implementación de la economía circular en el sector agroalimentario en dos regiones: Oeste de Paraná (Brasil) y Marche (Italia), examinando sus implicaciones para los modelos de negocio y la sostenibilidad regional. La investigación utilizará una combinación de revisión de literatura y análisis cuantitativos y cualitativos para comprender mejor las prácticas de economía circular y su impacto en el desarrollo territorial sostenible. La relevancia del estudio es social, científica y económica, con el propósito de contribuir a políticas públicas, generar nuevos conocimientos y promover el desarrollo económico sostenible.

Palabras-clave: Desarrollo sostenible; Bioeconomía; Desarrollo regional.

Background and introduction

The concept of sustainable development began to take shape at the end of the last century. Sustainability represents an alternative to economic growth that does not harm environmental development, human rights or future generations (UNITED NATIONS, 1987). This concept includes the search for processes that are less environmentally degrading and more socially responsible. In organizational contexts, the need to maintain business continuity makes the concept essential for companies.

However, the process of linear exploration production, production, usage, and waste generation has been taking humanity to the planetary boundaries. The implementation of the circular economy has been growing as sustainable themes gain more attention at the municipal, regional, and national levels (SCHROEDER; ANGGRAENI; WEBER, 2019; SILVA; FRANZ, 2022).

The Circular Economy (CE) can be an approach to intervene and moderate the impacts generated in the agri-food sector, proposing actions and solutions to readmit waste and by-products into the production chain (CHIARALUCE; BENTIVOGLIO; FINCO, 2021). Furthermore, to develop innovative circular business models, managers and technicians must be aware of the possible solutions that can be adopted to recover and value their waste (CHIARALUCE;



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BENTIVOGLIO; FINCO, 2023).

Initiatives to promote the CE are closely aligned with important EU priorities such as industrial innovation, jobs and growth, investment agenda, climate and energy, social agenda, and worldwide efforts on sustainable development. Consumers and businesses are important economic actors that propel this process, and industry must take the lead by pledging to source sustainably and collaborate across value chains (EUROPEAN COMMISSION, 2015).

Also, businesses increasingly recognize the circular economy as a crucial building block in transitioning to a net-zero and nature-positive world. The shift from linear economic models to circular economic models necessitates the adoption of new metrics to drive progress in circularity (WBCSD, 2023). By increasing circularity, organizations can reduce risks, maximize the value of resources, and develop resilience, all while mitigating climate change and alleviating pressures on nature.

From this standpoint, the circularity in the agri-food system will be evaluated by examining its premises and units of analysis through a comparative approach in two distinct territories: Western Paraná, Brazil, and Marche Region, Italy. This evaluation will provide insights into how circular economy practices are being implemented and their influence on regional sustainability in these areas.

Problem and justification

Growing global concern about environmental, social, and economic issues has driven organizations and governments to seek innovative and sustainable solutions to face complex challenges. In this regard, the circular economy has emerged as a promising approach to redefining the traditional economic model, standing out for its emphasis on the efficient use of resources, reducing waste, and promoting sustainable practices.

The problem that permeates this research is the review of sustainable issues – notably: environmental, social and economic – as a development mechanism and above all as a path to managing sustainable territorial development. According to the theme exposed in the introduction, to analyze sustainable territorial development, the following research problem is established: **What are the implications of circular economy practices in the agri-food sector for business models and regional sustainability in the Marche Region, Italy, and Western Paraná State, Brazil?**

The search for an answer to the research question is justified in three dimensions: social, scientific and economic relevance. Social relevance (1): the development of research has the potential to contribute to the improvement of public policies, propose solutions to social problems and favor the reduction of inequalities. Scientific relevance (2): the development of the research meets the needs of science and develops a new methodology for evaluating CE in the territory. Economic relevance (3): This research project has the potential to generate employment and income, as well as provide the development of entrepreneurial activities.

As for the theoretical justification, it lies in the fact of deepening the debate on the topic (territorial development, sustainability ‘economic, social and environmental’, and circular economy) empirically – that is, based on a comparative case study between two territories, being of a practical nature, this is research that will contribute to the strategic management of sustainability in this space of the studied object.



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Objectives

This project seeks to contribute to a better understanding of the theoretical model of circular economy and territory in an agri-food environment. In these terms, the general objective is **to analyze the implementation strategies of circular economy practices by entrepreneurs in the agri-food sector, from a comparative perspective in two different territories: Western Paraná (Brazil) and Marche Region (Italy).**

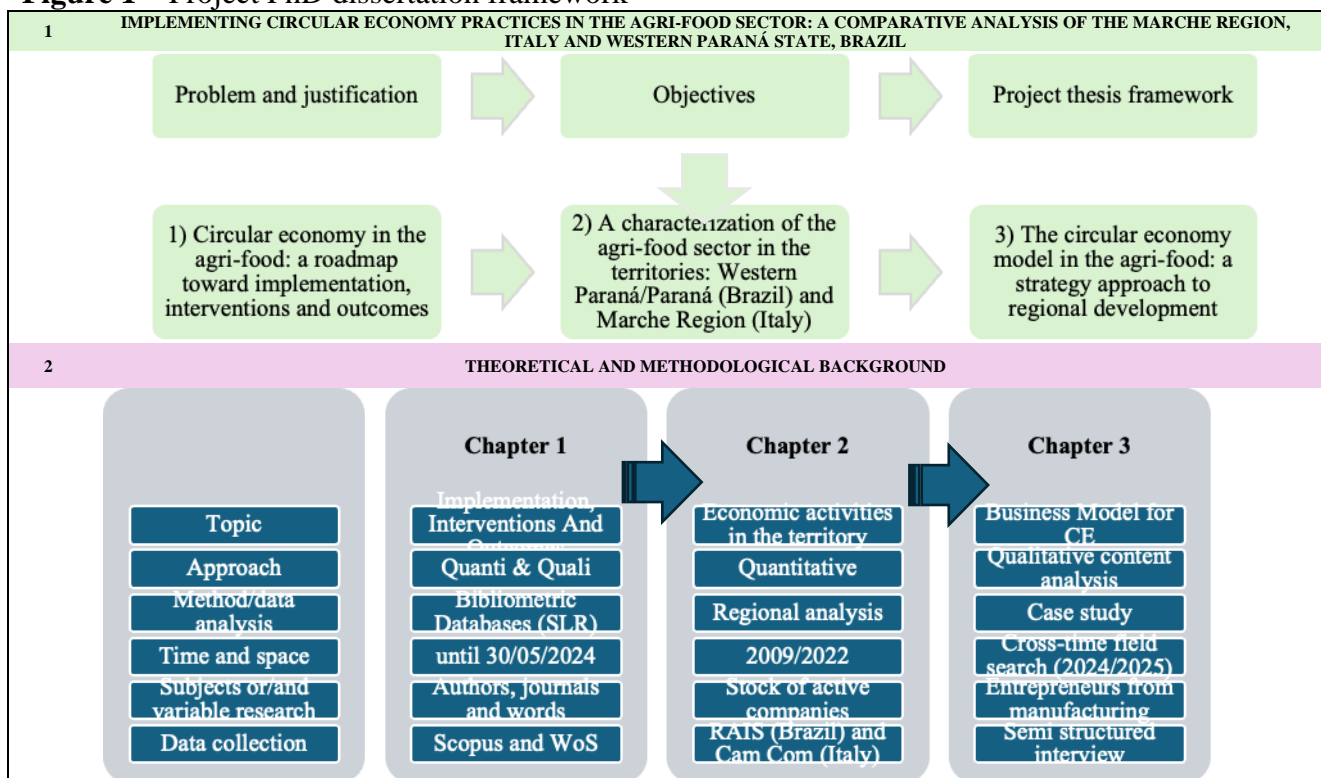
The specific objectives are:

- To analyze how entrepreneurs implement circular economy practices in the agri-food sector.
- To assess the level of circularity in the agri-food sector in the Marche Region (Italy) and Western Paraná State (Brazil)
- To examine how the circular economy influences managerial choices and changes in the business models of agri-food companies.

Materials and methods

To meet the goal of analyzing the implementation strategies of circular economy practices by entrepreneurs in the agri-food sector, from a comparative perspective in two different territories: Western Paraná (Brazil) and Marche Region (Italy), Figure 1 describes the methodological procedures of this project.

Figure 1 – Project PhD dissertation framework



Source: Author' elaboration (2024).

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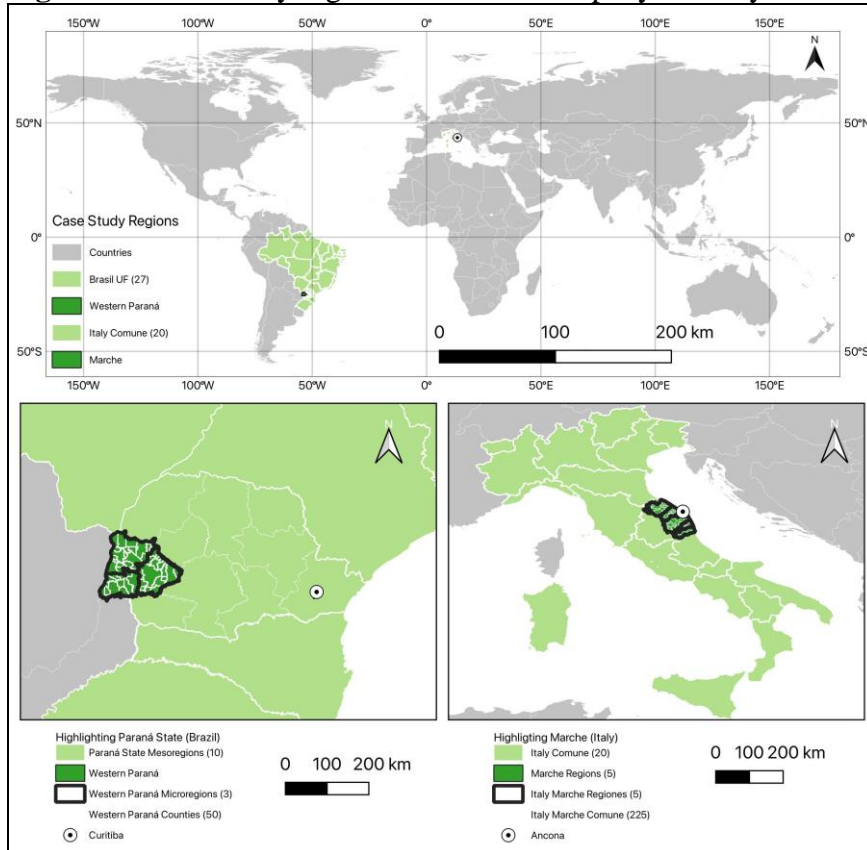
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That is, the period includes a systematic literature review until May 2024, a quantitative analysis to measure the circularity of the sector between 2009 and 2022, and a qualitative analysis to collect data between 2024 and 2025. The geographic space includes the West of Paraná in Brazil and the Marche Region in Italy (Figure 2).

Figure 2 – Case study regions where the company's survey will be applied



Source: Author' elaboration (2024).

Results and discussion

The circular economy is most often described as a combination of reduction, reuse and recycling activities, although it is often not highlighted that CE requires systemic change (KIRCHHERR; REIKE; HEKKERT, 2017). After analyzing 114 definitions from CE, the authors provided the following synthetic definition:

“(…) an economic system that replaces the ‘end-of-life’ concept with reducing, alternatively reusing, recycling and recovering materials in production/distribution and consumption processes. It operates at the micro level (products, companies, consumers), meso level (eco-industrial parks) and macro level (city, region, nation and beyond), with the aim to support achieving sustainable development, thus simultaneously creating environmental quality, economic prosperity and social equity, to the benefit of current and future generations. It is enabled by novel business models and responsible consumers” (KIRCHHERR; REIKE; HEKKERT, 2017, p. 229).

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Regarding the circular economy in agriculture, Velasco-Muñoz et al. (2021) state that it involves a collection of actions aimed at ensuring biodiversity and the regeneration of agroecosystems, as well as the economic, environmental, and social sustainability of agriculture. These practices pursue the efficient and effective use of resources at all stages of the value chain.

To support a thorough implementation of the circular economy model within the agro-industrial sector, it is important to ensure food independence, economic security, and the attainment of sustainable development objectives. Crucial to this effort is the establishment of effective public policies that foster the advancement of innovative, resource-efficient technologies and the adoption of circular business practices. These initiatives will boost the competitiveness of the domestic agricultural industry, enhance its investment appeal, and protect the environment (LITVAK; LITVAK, 2023).

Converting unsustainable business models into sustainable ones is the aim of CE. In this regard, performance evaluation seems to be essential for encouraging the adoption of better practices, benchmarking outcomes, and successfully communicating them to various stakeholders (CAGNO et al., 2023). Businesses may reduce resource consumption and environmental effects, boost customer value, and increase revenue by implementing CE practices (DZIEDZIC et al., 2022).

Final remarks

The results of this study are expected to deepen the understanding of sustainability (economic, social and environmental) associated with the circular economy, considering territorial development. This is to collectively not only deepen academic understanding on topics, but also influence concrete practices and policies to promote an effective transition towards more sustainable and circular models. Specific topics to be worked on in this project will be closely linked to the circular economy, such as: waste management, energy efficiency and circular supply chain with a focus on the production chain of the territories (Brazil and Italy). It will have both theoretical and managerial contributions. As a theoretical contribution, we intend to expand the debate on the topic, reviewing seminal and classic concepts and comparing them with the most recent publications in the literature. The research aims to provide an expansion of knowledge about territorial development and sustainability. As a practical contribution, it is expected that this research will draw the attention of interested parties in the territories to the urgency of thinking about the governance model, especially for the government and development institutions to increase investments to promote actions that reflect greater sustainability.

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Referencess

CAGNO, E. et al. One Framework to Rule Them All: An Integrated, Multi-level and Scalable Performance Measurement Framework of Sustainability, Circular Economy and Industrial Symbiosis. *Sustainable Production and Consumption*, v. 35, p. 55–71, jan. 2023.



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CHIARALUCE, G.; BENTIVOGLIO, D.; FINCO, A. Circular Economy for a Sustainable Agri-Food Supply Chain: A Review for Current Trends and Future Pathways. **Sustainability**, v. 13, n. 16, p. 9294, 19 ago. 2021.

CHIARALUCE, G.; BENTIVOGLIO, D.; FINCO, A. The circular economy model in the agri-food sector: A new strategy for the regional development. **AIMS Agriculture and Food**, v. 8, n. 3, p. 851–872, 2023.

DZIEDZIC, M. et al. International circular economy strategies and their impacts on agricultural water use. **Cleaner Engineering and Technology**, v. 8, p. 100504, jun. 2022.

EUROPEAN COMMISSION. **Closing the loop - An EU action plan for the Circular Economy**. Brussels: European Commission, 2 dez. 2015. Disponível em: <<https://eur-lex.europa.eu/legal-content/EN/TXT/PDF/?uri=CELEX:52015DC0614>>. Acesso em: 6 maio. 2024.

KIRCHHERR, J.; REIKE, D.; HEKKERT, M. Conceptualizing the circular economy: An analysis of 114 definitions. **Resources, Conservation and Recycling**, v. 127, p. 221–232, dez. 2017.

LITVAK, O.; LITVAK, S. IMPLEMENTATION OF THE CIRCULAR ECONOMY MODEL IN THE AGRICULTURAL SECTOR OF UKRAINE. **Baltic Journal of Economic Studies**, v. 9, n. 2, p. 146–156, 23 maio 2023.

SCHROEDER, P.; ANGGRAENI, K.; WEBER, U. The Relevance of Circular Economy Practices to the Sustainable Development Goals. **Journal of Industrial Ecology**, v. 23, n. 1, p. 77–95, 2019.

SILVA, C. L. D.; FRANZ, N. M. The Global Movement of the Transition from Linear Production to the Circular Economy Applied to the Sustainable Development of Cities. **Fronteiras: Journal of Social, Technological and Environmental Science**, v. 11, n. 2, p. 52–67, 2 ago. 2022.

UNITED NATIONS. **World Commission on Environment and Development (Brundtland Commission) “Our Common Future”**. New York: United Nations, 1987. Disponível em: <<https://ambiente.wordpress.com/wp-content/uploads/2011/03/brundtland-report-our-common-future.pdf>>. Acesso em: 30 abr. 2024.

VELASCO-MUÑOZ, J. F. et al. Circular economy implementation in the agricultural sector: Definition, strategies and indicators. **Resources, Conservation and Recycling**, v. 170, p. 105618, 1 jul. 2021.

WBCSD. **Circular Transition Indicators v4.0 – Metrics for business, by business**. Geneva: World Business Council for Sustainable Development, 30 abr. 2023. Disponível em: <<https://www.wbcsd.org/Programs/Circular-Economy/Metrics-Measurement/Resources/Circular-Transition-Indicators-v4.0-Metrics-for-business-by-business>>. Acesso em: 17 abr. 2024.

