

Fostering inclusive waste valorization in Spanish olive oil cooperatives through collaborative pathways

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Waste is a critical issue with serious environmental effects. In the case of organic waste, a significant portion is generated at the initial steps of the value chain: the primary production. While the bioeconomy proposes strategies for transforming that biomass into valuable biobased products, these strategies often fail to include primary producers from participating, which is fundamental for developing sustainable and resilient value chains. Cooperatives are agricultural organizations that integrate several farmers to aggregate production volumes, share resources, and link smallholders with larger value chains. While these organizations could help to include farmers in bioeconomy strategies such as waste valorization, the development of these strategies require the coordination of different stakeholders: biomass producers, technology providers, and offtakers. VCG.AI (VCG) is an AI and consulting services company that identifies the potential interlinkages between these actors to create value through relational cooperation. For this research, VCG was interested in learning about the factors that affect the development of waste valorization strategies from the perspective of biomass producers to know how to engage them in these initiatives. As biomass producers, cooperative organizations were selected for the study because of their added benefit of smallholder inclusion. The targeted cooperatives focused on olive oil production in Andalusia, Spain. The selection was made due to the region's relevance for the sector, the abundance of cooperatives in the area, and both the potential and danger of olive oil production waste. The central research question was: How can private organizations collaborate with olive oil cooperatives to develop inclusive waste valorization strategies? The study defined three objectives to address the research question: 1) Identify key factors influencing the development of waste valorization strategies in olive oil cooperatives, 2) Assess the inclusiveness of the agricultural cooperatives toward smallholders, and 3) Develop a practical framework for collaboration between the cooperatives and private organizations to develop waste valorization strategies. The investigation used a qualitative research approach, specifically a case study. For the data collection, semi-structured interviews were conducted with seven first-grade olive oil cooperative representatives. For the analysis of the data, a hybrid approach of framework and thematic analysis was used, identifying three main themes encompassing their respective key factors: socio-economic environment, organizational culture and dynamics, and resource management. The interpretation of the identified factors used a systems thinking perspective to establish the interconnections between the variables and possible initiatives as part of the systematic change required to address them. Additionally, three characteristics enhancing the inclusiveness in the organization were distinguished: equality, provision of cooperative services, and

diversification of income sources. These were compared to the literature to determine that the olive oil cooperatives exhibit characteristics of inclusive organizations. Finally, the influencing factors identified provided a foundation for building a practical framework for collaboration between private organizations, like VCG, and olive oil cooperatives to develop waste valorization strategies.

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