Social assessment of turning food industry by-products into secondary feedstuffs via circular-economy schemes (NEWFEED project)

E. Xaxiri[1*], D. San Martin[2], A. Kapetanakou[1], A. Gavliil[1], V. Papadimitriou[1], E. Maravelia[1]

[1] SEVT, Federation of Hellenic Food Industries, 340 Kiffisias Avenue - 15451 Athens - Greece
[2] AZTI, Food Research, Basque Research and Technology Alliance (BRTA), Astondo Bidea, Edificio 609, 48160 Derio, Bizkaia, Spain

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*Presenting author email: eirxax@sevt.gr

Introduction

The NEWFEED project is dedicated to developing sustainable animal feed solutions by transforming food industry by-products into high-value ingredients, thereby promoting a circular economy in the Mediterranean region. The project focuses on optimizing feed ingredients derived from winery, orange juice, and olive oil by-products through advanced processing techniques. These efforts aim to enhance sustainability, reduce costs, and assess the social and economic impacts of these innovations using Socio-Economic Key Performance Indicators (SE-KPIs). The ultimate goal is to foster industry-wide adoption and create replicable business models across the region.

Methodology

The project employs a comprehensive multi-actor approach to validate three distinct value chains in the Mediterranean area:

1. **Spain**: Led by AZTI, this case study explores the use of grape stems from wineries to develop a second-generation feed ingredient for ruminants, specifically dairy sheep and cattle.
2. **Greece**: Coordinated by NTUA, this study investigates the use of orange peels from the orange juice industry to produce an enhanced feed ingredient for dairy sheep.
3. **Egypt**: Managed by HUSD, this study examines the potential of olive cake from the olive oil industry as an improved feed ingredient for poultry, particularly broiler chickens.

The methodology includes several key components:

- **Optimization and Scaling-Up**: Developing and refining three innovative feed ingredients derived from by-products of the winery, orange juice, and olive oil industries. Processing techniques include solid fermentation and enzymatic hydrolysis to enhance nutritional value and digestibility, alongside advanced drying processes to improve feed safety, security, and shelf life.
- **Value Chain Validation**: Applying a multi-actor approach to test and validate the entire value chain for each case study. This encompasses all stages from by-product generation and processing to feed formulation, livestock management, consumer acceptance, sustainability evaluation, and regulatory compliance.
- **Animal Feeding Trials**: Conducting trials (TRL 6-7) to validate intermediate feed ingredients and final diets.
- **Sustainability Assessment**: Evaluating the environmental, economic, and social sustainability of the new value chains.
- **Market Replicability**: Assessing the potential for market replication of each value chain in the Mediterranean through the development of business models and roadmaps.
- **Communication and Dissemination**: Sharing project findings and advancements with relevant stakeholders to promote adoption and foster industry-wide impact.

Results

The analysis of data collected from the feed, livestock, food industry, and valorisation sectors revealed several key findings:

- **Overall Performance**: Most companies are in the "Continuous Improvement" range, indicating ongoing efforts to enhance sustainability practices.
- **Strengths**: Notable strengths were observed in areas such as worker health and safety.
- **Areas for Improvement**: The results highlighted areas needing improvement, particularly in environmental sustainability, the inclusion of food by-products in diets, and the preservation of local communities and landscapes.

- **Sector-Specific Insights**:
  - **Feed Sector**: The feed sector showed a mix of "Continuous Improvement" and "Basic" levels, with particular strengths in worker health and safety but weaknesses in local community engagement and value chain sustainability.
  - **Livestock Sector**: Similar to the feed sector, the livestock sector exhibited a combination of "Continuous Improvement" and "Basic" levels, with notable strengths in worker health and safety but areas needing improvement in local community impact and value chain integration.
  - **Food Industry Sector**: The food industry sector demonstrated a range of performance levels, with strengths in transparency and environmental sustainability but weaknesses in biodiversity and the inclusion of food by-products in diets.
  - **Valorisation Sector**: The valorisation sector stood out with exceptional performance, achieving a "Proactive" level in transparency and sustainability. However, areas like green jobs and collective bargaining still require attention.

Conclusions

The NEWFEED project demonstrates significant potential for improving sustainability in Mediterranean livestock systems through the use of food industry by-products. Key conclusions and recommendations include:

- **Feed Sector**: The sector is classified under the "Continuous Improvement" level, indicating potential for further actions. Focused efforts are needed to enhance local community engagement, protect landscapes and cultural heritage, and promote local tourism. The adoption of sustainable value chains proposed by NEWFEED can significantly support feed sector companies in improving their performance.
- **Livestock Sector**: Positioned at the "Continuous Improvement" level, the livestock sector requires targeted actions to improve local community impact and value chain sustainability. Implementing NEWFEED's valorized solutions can drive improvements in these areas.
- **Food Industry Sector**: Classified under the "Continuous Improvement" level, the food industry sector needs to address biodiversity and environmental impact assessments. Key actions include increasing green jobs, protecting landscapes and cultural heritage, and promoting local tourism.
- **Valorisation Sector**: Operating at a "Proactive" level, the valorisation sector shows strong commitment to sustainability but needs to expand green employment opportunities. This sector's positive socio-economic impact on local communities can be further enhanced through targeted actions.

Overall recommendations

- **Local Community Engagement**: Across all sectors, there is a critical need for focused actions to protect landscapes, cultural heritage, and promote local tourism. Improving socio-economic impact on local communities should be a priority.
- **Value Chain and Sustainability Integration**: Enhancing the integration of sustainability in the supply chain and developing new biobased value chains are crucial for improving sectoral performance.
- **Green Job Creation**: Expanding green employment opportunities is essential for enhancing sectoral sustainability and providing socio-economic benefits to local communities.
- **Biodiversity and Environmental Impact**: Immediate actions are needed to address environmental impacts, biodiversity conservation, and ecosystem restoration plans, particularly in the food industry and feed sectors.

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