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ADDRESSING THE ADOPTION OF NEW CIRCULAR TECHNOLOGIES IN AGRIFOOD SUPPLY CHAINS: EMPIRICAL INVESTIGATIONS

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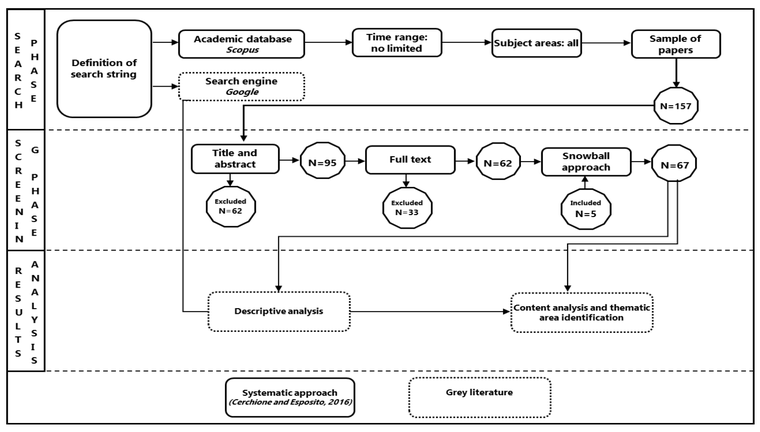
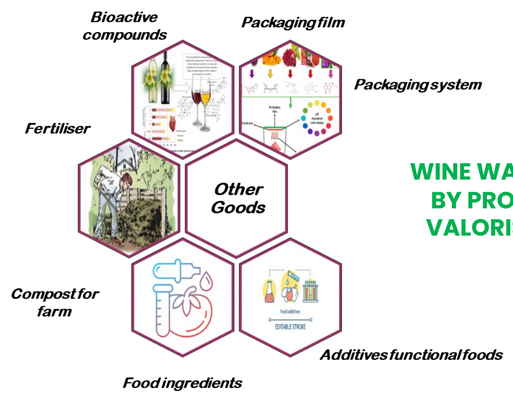
Wine waste valorisation: crushing the research domain

This research uncovers the state of the art of wine waste valorisation by conducting a systematic literature review on a sample of 67 scientific papers, further including grey literature, to obtain a more comprehensive overview of the phenomenon under investigation.

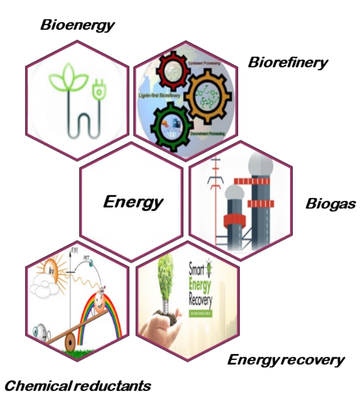


(Abbate et al., 2024)

The results of this study highlight the urgent need for the industry and the scientific community to investigate sustainable and profitable alternatives for wine waste valorisation. The tight ties between academia and business may support the wine industry in addressing this shift.



WINE WASTE AND BY PRODUCTS VALORISATION

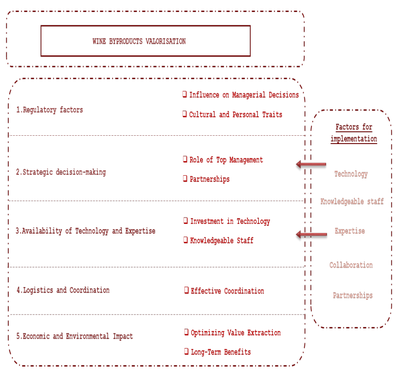


Harvesting Synergies: Exploring Industrial Symbiosis in Viticulture Industry

This study investigate by-products and waste valorisation practices within the Italian wine industry using a grounded theory approach through multiple case studies.

Company	Role of the interviewee	Number of employees	Dimension	Interview time
A	Marketing and sustainability manager	30	Small	62 min
B	CEO	7	Micro	58 min
C	CTO	8	Micro	55 min
D	Owner	10	Small	48 min
E	Owner	3	Micro	64 min
F	Owner	2	Micro	59 min
G	CTO	605	Large	49 min

(Eisenhardt, 2021; Yin, 2014)

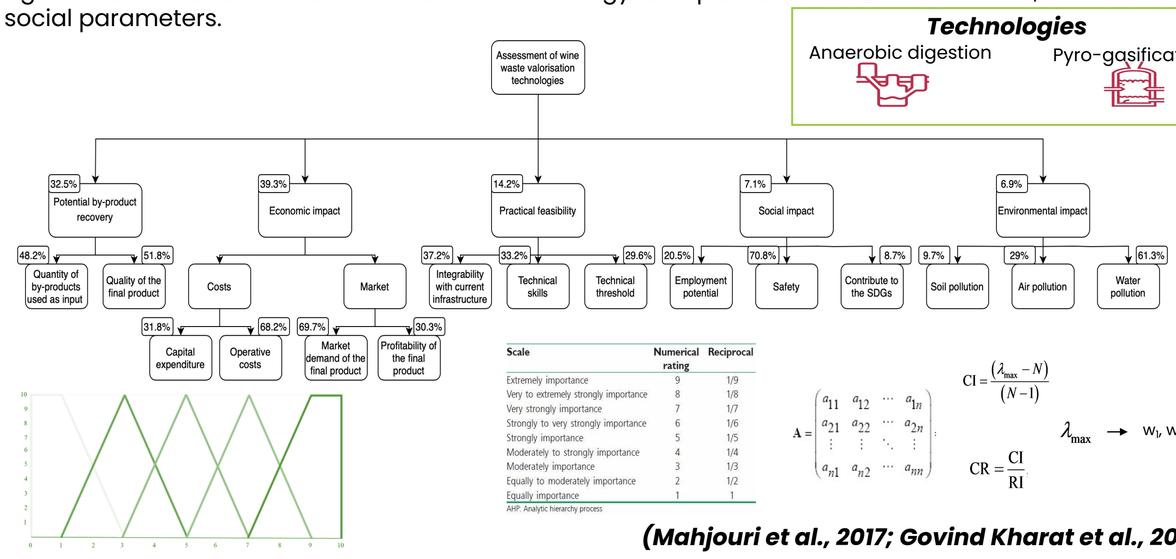


Our findings reveal the complexities of waste management practices within the Italian wine industry and underscore the potential benefits of industrial symbiosis exchanges.

Comparing Food Waste-to-Value Technologies: A Hybrid AHP-fuzzy Approach

The objective of this study is to develop a system for evaluating technologies to valorise waste in the agrifood sector and to determine the best technology to implement based on economic, environmental, and social parameters.

Technologies
Anaerobic digestion
Pyro-gasification



Scale	Numerical rating	Reciprocal
Extremely importance	9	1/9
Very to extremely strongly importance	8	1/8
Very strongly importance	7	1/7
Strongly to very strongly importance	6	1/6
Strongly importance	5	1/5
Moderately to strongly importance	4	1/4
Moderately importance	3	1/3
Equally to moderately importance	2	1/2
Equally importance	1	1

AHP: Analytic hierarchy process

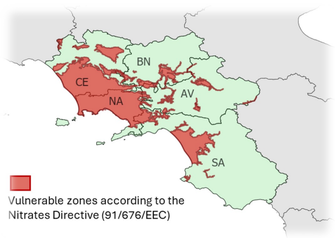
$$A = \begin{pmatrix} a_{11} & a_{12} & \cdots & a_{1n} \\ a_{21} & a_{22} & \cdots & a_{2n} \\ \vdots & \vdots & \ddots & \vdots \\ a_{n1} & a_{n2} & \cdots & a_{nn} \end{pmatrix}; \quad CI = \frac{(\lambda_{max} - N)}{(N-1)}; \quad \lambda_{max} \rightarrow w_1, w_2, w_3, \ldots, w_n; \quad CR = \frac{CI}{RI}$$

(Mahjouri et al., 2017; Govind Kharat et al., 2019)

The **Mozzarella di Bufala Campana** PDO holds primary significance in terms of socioeconomic impact and tradition

The production location of Mozzarella is susceptible to **nitrates pollution**, emphasizing the critical importance of **buffalo manure management**.

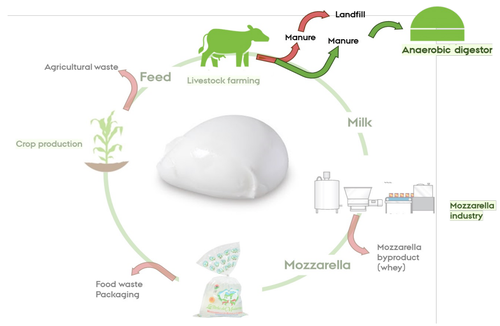
Record production of **54 million** kilos of Mozzarella di Bufala Campana DOP in 2021
168'710 buffalo milk reared in Campania only
70'000 hectares
DOP buffalo mozzarella generates a turnover of **1 billion** and **218 million** euros
DOP accounts for **1.4%** of the total GDP of the two provinces
11'000 employees



Vulnerable zones according to the Nitrates Directive (91/676/EEC)

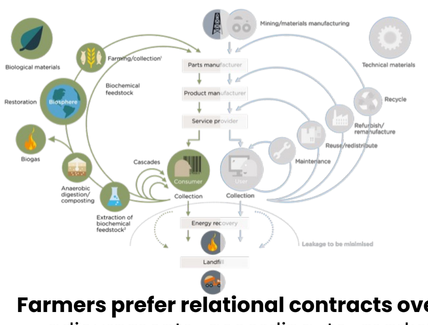
Sustainable Solutions for the Mozzarella di Bufala Sector: Integrating Biogas Production and Denitrification Processes in Campania, Italy

Our study aims to classify and quantify the Ecosystem Services produced by a biogas plant that manages buffalo manure using anaerobic digestion



Section	*Division*	*Group*	*Class*
Provisioning (Biotic)	Biomass	Reared animals for nutrition, materials or energy	Fibres and other materials from reared animals for direct use or processing (excluding genetic materials)
			Animals reared to provide energy (including mechanical)
Regulation & Maintenance (Biotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of wastes or toxic substances of anthropogenic origin by living processes	Bio-remediation by micro-organisms, algae, plants, and animals
		Mediation of nuisances of anthropogenic origin	Smell reduction
	Regulation of physical, chemical, biological conditions	Regulation of baseline flows and extreme events	Control of erosion rates
		Pest and disease control	Pest control (including invasive species)
			Disease control
		Regulation of soil quality	Decomposition and fixing processes and their effect on soil quality
		Water conditions	Regulation of the chemical condition of freshwaters by living processes
		Atmospheric composition and conditions	Regulation of chemical composition of atmosphere and oceans
Regulation & Maintenance (Abiotic)	Transformation of biochemical or physical inputs to ecosystems	Mediation of waste, toxics and other nuisances by non-living processes	Mediation by other chemical or physical means (e.g. via Filtration, sequestration, storage or accumulation)

Designing Relational Contracts to Transition into a Circular Bioeconomy



Transitioning into a circular bioeconomy (CBE) in agri-food supply chains and bio-based industries poses **governance challenges** associated with **intensified inter-organizational collaborations and network relations.** Traditional contract farming models in the context of CBE activities may be inadequate to regulate CBE transactions. Our study addresses how to design acceptable and relationally enriched contractual arrangements that incorporate farmers' perspectives (200 farmers performed a choice experiment on contractual alternatives)

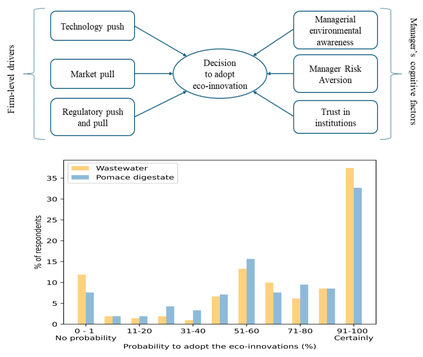
Farmers prefer relational contracts over standard contract farming:
- adjournments according to market contingencies (e.g. base price and minimum price),
- adapting and learning (e.g. training)
- and the possibility of negotiating the contract both ex-ante (negotiation)
- and ex-post (re-negotiation).

Exception: contract duration (shorter lengths are preferred and variance in preferences is larger for longer durations) **(Swift Relational Contracting)**

Drivers for the adoption of circular eco-innovations in Agriculture: Insights from a Field Experiment on Olive Growers

Two sustainable innovations studied:
- **Wastewater for irrigation**
- **Olive pomace digestate for fertilization**

Our study addresses farmers' propensity to adopt based on farm- and farmer-level drivers



Biordered probit model - Results

Explanatory variable	*Wastewater Adoption Intention*		*Pomace Digestate Adoption Intention*	
Technology push drivers				
R&D	0.288 (0.207)		0.129 (-0.203)	
Human Capital	-0.024 (0.193)		-0.006 (0.193)	
Advisor	-0.220 (0.181)		-0.560 (0.180)	***
Collaboration index	0.128 (0.095)		0.041 (0.094)	
Market pull drivers				
Corporate Social Responsibility index	0.010 (0.064)		0.077 (0.064)	
Adoption of product origin labels	-0.223 (0.179)		0.072 (0.174)	
Regulatory push/pull drivers				
Subsidies	0.666 (0.207)	***	0.568 (0.202)	***
Manager cognitive drivers				
Environmental risk awareness	0.329 (0.123)	***	0.383 (0.120)	***
Environmental cost-benefit awareness				
Trust in public and private institutions	-0.175 (0.107)	*	-0.102 (0.103)	
Environmental risk awareness	0.139 (0.063)	***	0.091 (0.062)	
Environmental cost-benefit awareness				
Trust in public and private institutions	-0.036 (0.021)	*	0.022 (0.020)	

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