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Editorial: Food loss and waste management, from the grave to the cradle: a new resource for the world

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Editorial on the Research Topic

Food loss and waste management, from the grave to the cradle: a new resource for the world

Increased demand for food related to population growth requires a consequent increase in production with intensive use of unsustainable environmental resources. Several adverse effects such as a loss of biodiversity, high water consumption, and a reduction in soil fertility are due to this approach. Moreover, food, by nature, is a perishable product and in most cases the spoilage time is quick. Therefore, the percentages of food loss and waste (FLW) during different stages, from harvesting until sale, are not insignificant. The potential for reuse of food losses and waste generated throughout the supply chain is great. In this perspective, the circular economy concept and waste-to-resource approaches are opportunities to re-use FLW and close the material and energy cycle, reducing using of new raw materials and considering environmental, social, and economic aspects equally important to ensure sustainability for future generations.

Consistent with the 2030 Agenda for Sustainable Development targets, new challenges and opportunities have been planned to reduce food loss and waste (FLW), providing greater efficiency when using natural resources. The food waste hierarchy management approach (Galanakis, 2015) highlights how priority actions based on sustainability are developed according to an ordering with prevention at the apex, followed by reuse for human consumption, reuse for animal feed, recycling for by-products, recovery for matter, recovery for energy and landfilling as the last option.

Starting on these pillars, literature research in the recent years has been focusing on the study and analysis of the most sustainable strategies that can reduce FLW (Silvestri et al., 2021) throughout the supply chain. According to this vision, in the vegetable sector, an interesting spatial and temporal analysis at the regional level in Catalonia, Spain, evaluates the economic benefit and social impacts generated by a food loss prevention strategy (Tonini et al.). The analysis shows food loss to be 26% of total production and 14% of the economic values of total agricultural production.

An appropriate combination of social and economic indicators provides key information at the decision-making level able to elaborate short and long-term FLW reduction strategies. Overcoming the FLW problem does not require the implementation of a single-bullet strategy because many stakeholders with different needs are involved. The study confirmed that the unharvested product is the highest contributor to the impact, followed by quality sorting and technical inefficiencies.

In addition to vegetable sector, livestock farming also has considerable room for improvement. In fact, quantitative data are scarce but critical for guiding improvement. A material flow analysis to track the amount of beef losses in the food supply chain at the farm level in Swedish shows an amount of 8.5% of the initial production (Strid et al.). The study highlights that dairy females have greater meat losses than dairy males of beef breeds and crossbreeds of both sexes, and their beef losses mostly occurred at 4–5 years of age.

A significant step of the supply chain where FLW prevention becomes influential is sales. The evaluation of consumer behavior on the advent food and food waste reduction is a topic of research in the literature (Liao et al.). Based on a survey of Chinese consumers, a structural equation and hypotheses tests were evaluated with specific simulation software. The results show how different factors, such as health concerns, utilitarian values, and impulse buying, affect the food waste reduction intention. Specifically, the negative influence on food waste reduction is related to price, utilitarian value, and hedonic value. The analysis provides managerial implication for policymakers, retailers, and platforms of advent food, to develop consumers' environmental concerns and decrease health risk perception through education, policy publicity, and information notification. In addition, retailers should take measures to balance the positive and negative effects of price concern on food waste reduction intention, and at the same time, trigger consumers' utilitarian value while discouraging impulse buying. The theoretical implications of the study are based on psychological perspectives analysing the main motivations on how to promote advent food consumption to protect the environment in the context of online sales. Moreover, the effect of impulse buying in association with consumer concern and values was evaluated, to reduce food waste.

Several opportunities need to be investigated for using the FLW generated in the processing stage as by-products in other processes. These by-products become new resources and reduce the use of raw materials. An example is the study of waste from the processing of Baru, a native fruit of the Brazilian Cerrado. The analysis proposes the potential use of normally undervalued by-products for the

alternative protein market (Egea et al.): the high protein content of this fruit allows the by-products to be used as raw material for extraction, separation, hydrolysis, isolation, and concentration of protein molecules to produce plant-based ingredients.

The analysis of the literature contributions highlights the trend toward preventing and reducing FLW through a circular economy approach and the defined goals of the 2030 Agenda (e.g., target 12.3—halved food waste and reduced early losses). In this way, an environmentally, economically, and socially sustainable method can be pursued in which fewer natural resources are used and by-products become new resources. It makes possible to implement a waste-to-resource supply chain and increase the sustainability of the involved processes.

Author contributions

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Conflict of interest

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