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Editorial: Food systems evaluation methods and sustainability assessment

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Editorial on the Research Topic
Food systems evaluation methods and sustainability assessment

The Food System Countdown to 2030 was initiated to think about monitoring the food system transition toward "a future where all people have access to healthy diets, produced in sustainable, resilient ways, that restore nature and deliver just and equitable livelihood" (Fanzo et al., 2021). Recently, a food system indicator framework to track the transition was developed (Schneider et al., 2023).

The monitoring system is based on five pillars: (i) diets, nutrition, and health; (ii) environment, natural resources, and production; (iii) livelihoods, poverty, and equity; (iv) governance; and (v) resilience. In this context, the community of stakeholders and experts has identified 50 indicators that are valid *per se* and aligned with other indicator systems, including the Sustainable Development Goals, which are scheduled to be achieved before 2030 (Schneider et al., 2023).

Indicators are expected to reflect the complexity of the food system and the connectedness with several sectors concerning non-food components influencing the environment, social outcomes, and food consumption. The monitoring framework relies on data already collected and scheduled to be updated within the next 8 years (Schneider et al., 2023). During the observational period, the indicators can be integrated with other variables if considered relevant to the evaluation (Schneider et al., 2023). Therefore, in-depth insights can provide useful information to refine the monitoring framework.

The present topic collection comprises the originally considered topics (Table 1) as well as the themes of information and education as factors facilitating the food system transition. Specifically, it includes the information and education topic and the development of indicators to monitor specific aspects that have not yet been covered.

The literature review showed a limited availability of assessment methods for food system sustainability, which have only recently been developed (Fanzo et al., 2021; Sachs et al., 2023; Schneider et al., 2023). The article "*A scoping review of indicators for sustainable healthy diet*" focused on available methods to evaluate the sustainability of the food chain and its related impact on human health (Harrison et al.). The interest for alternative protein sources is increasingly growing, given the various recommendations for reducing meat intake for health and sustainability reasons. The article "*Alternative protein innovations and challenges for industry and consumer: an initial overview*" offers a preliminary overview for researchers and stakeholders in this field (Hefferon et al.).

TABLE 1 Topics related to food system evaluation considered in the Research Topic launch.

Integrated assessment of the entire food production and consumption from a life cycle perspective
Sustainability assessment case studies of specific industry segments
Consumer habits and perception survey
Integrated assessment of human health and environmental impacts of food production
Evaluation of the impact of traditional and innovative agricultural, farming, and fishing techniques
Food system components contributing to healthy and sustainable diets

The majority of published articles on this Research Topic are constituted by original research to try to identify overarching methods and indicators on specific aspects to disentangle innovative points at issue.

The approaches concerning the whole food system *per se* and in relation to climate change were discussed in two articles. A method based on a typical economic approach exploiting data from the global multi-regional input–output databases was used in the article "*Using input-output analysis to measure healthy, sustainable food systems*," providing indications for assessing the whole food system sustainability (Boylan et al.). The problem of estimating variables measuring environmental warming was discussed in "*Methane emissions from california dairies estimated using novel climate metric global warming potential star show improved agreement with modeled warming dynamics*" (Pressman et al.).

Specific components and approaches related to production innovation are analyzed in two articles: one dealing with primary production, such as agroecology in primary production ["Insights into agroecological farming practice implementation by conservation-minded farmers in North America" (Silva et al.] and another dealing with cropland ["*Estimating cropland requirements for global food system scenario modeling*" (Smith et al.]. Furthermore, the food consumption issue is the object of the article "*Assessing the diet quality, environmental impact, and monetary costs of the dietary transition in China (1997–2011): impact of urbanization*" (Chang et al.).

Finally, information and education to promote a healthy and sustainable diet are discussed in three articles: "*Simple eco-labels to nudge customers toward the most environmentally friendly warm dishes: an empirical study in a cafeteria setting*" (Slapø and Karevold), "*An approach for integrating and analyzing sustainability in food-based dietary guidelines*" (Mazac et al.), and "*Advancing an integrative framework to evaluate sustainability in national dietary guidelines*" (Ahmes et al.).

It is clear that production and consumption, i.e., the opposite extreme points of the food chain, are the most considered components in the food system transition. Moreover, information and education seem linked to healthy and sustainable food consumption but not to the production, distribution, or food service sectors.

Indicators included in the sustainability monitoring and assessment framework do not include the structure of the transformation or the distribution system at the national and/or international level, including trade agreements. Additionally, they do not include economics in general, except for the affordability of a healthy and sustainable diet (Sachs et al., 2023).

Industry and trade are crucial in supporting sustainability (OECD, 2022; Zimmermann and Rapsomanikis, 2023) because "trade is an integral part of our food systems. It connects people at all stages of agricultural and food value chains, linking farmers with consumers across the world. It also links nations to each other and thus scales up from the domestic to the global perspective. By moving food from surplus to deficit regions, trade promotes food security" (Zimmermann and Rapsomanikis, 2023). While creating economic opportunities for producers, including farmers and small and medium enterprises (SMEs) (OECD, 2022), "the diversity of foods available, and can affect preferences and diets. Trade impacts food prices and the allocation of resources, and thus is inherent to economic growth and interacts with the environment. At the same time, trade can create both winners and losers, resulting in inequality, and can generate negative social and environmental outcomes." (Zimmermann and Rapsomanikis, 2023). Trade enables food security while creating economic opportunities for producers, including farmers and small and medium enterprises (SMEs) (OECD, 2022). In this context, statistical data on economics can provide significant information. In this regard, the SUSFAN European research project approach (2015-2017) can be very helpful (SUSFANS Metrics, 2015).

In conclusion, integrating indicators from different suitable monitoring systems can provide comprehensive information. The Schneider et al. (2023) approach is characterized by openness to this option, which can be exploited as well.

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