

Editorial

Sustainable Agriculture and Agri-Food

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Food production has an adverse impact on the environment. Agricultural production systems—defined as the inputs, processes, and infrastructure needed to produce and distribute food—represent one of the main causes of water consumption, soil degradation, greenhouse gas emissions (which have a negative impact concerning climate change), loss of biodiversity, and food loss and waste [1,2]. Current food systems contribute to opposite forms of malnutrition, including overconsumption and obesity, as well as undernutrition due to an inadequate intake of essential micronutrients [3,4]. As the global population continues to rise, the need for sustainable food production and consumption becomes ever more urgent, emphasizing healthy diets, reduced food waste, and a smaller environmental footprint [5–7].

These challenges necessitate the reimagining and restructuring of the entire food system, encompassing food production, processing, distribution, consumption, and governance [8]. In this context, the 2030 Agenda for Sustainable Development established by the United Nations in 2015, along with the 17 Sustainable Development Goals (SDGs), directs agri-food policies towards responsible production systems, as well as social policies and institutional changes aimed at enhancing environmental protection [9].

The urgency to transform the global food system has intensified due to transboundary diseases and epidemics that threaten food safety and security. In this context, a One Health approach is crucial for implementing transformative practices that enhance sustainability in agriculture while improving the overall health and well-being of humans, animals, and the environment [5].

Considering that agri-food production systems are indissolubly linked with nutrition, health, and the environment, multidisciplinary approaches involving farmers, consumers, researchers, and government agencies play an important role in influencing food safety policies and sustainable food production practices [10].

Five articles that concern the central role of the entire agri-food chain, with respect to ecological, health, demographic, socio-economic, and political changes are presented in this Special Issue on “Sustainable Agriculture and Agri-Food”. The contributions to this Special Issue, represented by three reviews and two original research articles, address different topics that provide an overall vision of the theme of sustainability in agriculture.

A very timely and innovative review by El Bilali et al. systematically analyzes the literature, addressing the complex impacts of the COVID-19 pandemic on agri-food systems in West Africa. The evidence gathered from the analyzed articles suggests that COVID-19 has affected all dimensions of agri-food systems—environmental, political, and socio-economic—especially in relation to food security and health. Many selected articles do not indicate specific agricultural sub-sectors, especially those discussing changes in food consumption patterns and diets, while articles focusing on specific sub-sectors typically address agricultural production, often neglecting animal production and fisheries. The pandemic has impacted the entire food chain; however, most of the analyzed papers focus on downstream stages of the food chain, such as consumption, largely ignoring upstream processes (such as production) and intermediate stages (including processing and packaging). The article highlights that COVID-19 has affected several dimensions of food access, mainly economic and physical inaccessibility to food in West African



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countries. This contribution demonstrates that research on the effects of the pandemic on agri-food systems is essential to create evidence-based policies that will improve the region's preparedness for current and future crises and disruptions.

The study and perspectives of the agri-food system's sustainability cannot ignore the challenges related to the reduction and management of food waste and loss, a central theme of international actions and programs [11,12]. In this regard, vital information emerges from the review by Rodrigues Lima et al., which aims to understand the updated status of the conversion of fruit residues, with the fruit agro-industry being one of the sectors that generates large volumes of waste.

The analysis of the bibliography reveals that the drying process is essential to obtain flour from fruit by-products, which shows great potential for inclusion in various food preparations. This process improves nutritional and functional characteristics, thanks to the benefits provided by bioactive compounds and intrinsic fibers in these foods.

The article highlights that while the flour obtained from fruit by-products offers advantages, such as a greater shelf life, convenience, and versatility, its use in human nutrition must comply with established standards of identity, quality, and safety. This indicates that further research is needed on the use of these co-products. Therefore, although, as the authors point out, the modern food industry plays a crucial role in efficiently managing the conversion of waste into by-products, a collaboration between research institutes, government, producers, and other actors in the food sector is essential for the sustainable use of these raw materials.

One of the central problems related to current food systems, especially in relation to climate change, is the increasing homogeneity among food groups and an over-reliance on a few staple crops, which could lead to risks related to micronutrient deficiencies [10].

In this perspective, Mu et al. studied the sustainability of Cu and Zn consumption through rice. As is known, rice is a staple food for half of the world's population and has been a significant icon of Chinese culture [13]. More specifically, the authors studied Cu and Zn concentrations within the soil/rice system in the main rice-producing regions of China, also examining the impact of soil characteristics on the uptake of these trace elements by plants. Furthermore, they calculated the daily intake of Cu and Zn derived from rice consumption to assess the adequacy of the human dietary intake of Cu and Zn, which are essential micronutrients essential in the human body to maintain various physiological functions. The study revealed that the intake of Cu and Zn was fully adequate, except for some sampling sites, suggesting the need to consume more foods rich in these trace elements. Furthermore, the authors found that soil properties are important factors affecting the uptake of Cu and Zn by rice, with the contribution of soil properties being different in the roots, shoots, and grains. This means that the effects of soil physicochemical properties on Cu and Zn deposition are different in plant parts.

The adoption of sustainable practices requires concrete incentives and support from governments and public-private partnerships at the national and local levels. However, the response to the adoption of sustainable agricultural practices depends on many factors, such as the conditions of the programs and the incentives offered, as well as farmers' environmental preferences, the economy, market trends, and farmers' cultural characteristics [14].

Barbosa et al., in a comprehensive review, studied how governments around the world support sustainable agricultural practices and reduce environmental impacts. The study found that subsidies are the most common support mechanism along with programs, regulations and laws, financial and technical assistance, advice, and training. However, very few studies were found that identify other support tools, such as research funds.

The literature review found that most government support tools are aimed at implementing sustainable practices, reducing environmental impacts, and supporting organic farming, industry progress, and rural development. Furthermore, the authors found that many studies were conducted in Asia, particularly China, with a small number of studies being carried out in South America. Several negative effects of inadequate government support within the sector were highlighted, with environmental protection, organic food

supply, and urban agriculture being more affected when government support was insufficient. This review is very useful for evaluating the use of public resources and planning future investments. In fact, it highlighted that a comprehensive strategy for sustainable agriculture, including government support, remains absent.

The study by Sardaro et al investigates the possible inefficiencies of regional wineries in Puglia, one of the most important Italian agricultural regions, which adhere to the Integrated Production Regulations (IPRs). This is a system that identifies agronomic strategies, such as the use of pesticides, fertilizers, and irrigation water, as well as soil and plant management. The results highlight that some measures in IPRs aimed at preserving local agroecosystems are efficient, thus allowing an increase in the value and quality of production. On the contrary, measures related to irrigation water and pesticide management decrease efficiency. The results indicate that although environmentally sustainable production processes are not always related to high economic performance for companies, there are valuable insights to improve regional Integrated Production Regulations in order to address the impacts of climate change and unique farm characteristics. The findings suggest that improvements are needed in line with the 2030 Agenda in Agriculture and they identify key short- and medium-term strategies that companies need to follow to comply with essential policy frameworks. As a result, policy makers are encouraged to implement more strategic measures that improve the economic outcomes of these regulations and facilitate a convergence of environmental and economic sustainability.

Overall, this Special Issue has shown that ensuring a sustainable future from a nutritional, social, economic, and ecological point of view depends on changing the dominant agri-food systems. Moreover, it has proposed how sustainable agriculture has the potential to directly contribute to several Sustainable Development Goals for 2030. This journal can be a valuable reference for agri-food experts and other actors, such as industry, research, policy, and healthcare.

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List of Contributions:

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