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Building Sustainable Food Systems - Current Dimensions and Challenges

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Abstract

Nowadays, there is a large consensus about the challenges our world is facing in different sectors, which are amplified by the precarious state of the global ecosystem. Various food and nutrition related issues are derived from changes in food production demand as a result of socio-economic, demographic and ecological trends which correlate with economic prosperity. In the last years, the need for a turning point in the way that food systems are functioning became obvious, as the world needs to rather be oriented towards a more sustainable future in terms of inclusiveness, health and climate-resilience.

This paper aims to emphasize the urgent nature of the need for transformation of existing food systems at all levels, underlining relevant implications and correlations, as this shifting remains the only solution to reaching relevant goals regarding both global food security and sustainability.

Keywords: *food system; sustainable food system; sustainability.*

JEL Classification: *Q18; P46; Q01.*

Sustainable Food Systems: Concepts and Dimensions - an Introduction

While the concept of "food system" goes back several decades (Béné et al., 2019a), it mostly has drawn increasing global attention of policy makers as well as the scientific community in recent years as a strong subject of interest. Different aspects should be taken into consideration when considering the context of a food system: rapid population growth, urbanization, growing wealth, changing consumption patterns and globalization as well as climate change and the depletion of natural resources (FAO, 2018).

In terms of defining a food system, there is not a generally accepted definition, but many organizations and scolars in the field of food sciences outlined common features of this concept which encompasses a wide range of aspects in the context of the need to feed a growing population number under multiple constraints. The global food systems could be regarded as a complex set of interconnected processes starting from input supply, production, postharvest storage, processing, distribution, marketing and retail, consumption and post-consumption, loss and waste management – all of which having a significant impact on health and well-being, cultural profile, governance, economics, and sustainability at all levels in the actual context. According to FAO (2018), a broad range of actors and their resulting interconnected activities

are together forming a food system: production, aggregation, processing, distribution, consumption and disposal of food products, also including parts of the broader economic, societal and natural environments they belong to. All these component parts form derivative sub-systems which interact with other key systems (e.g., energy system, health system etc.). The very complex nature of this network of interconnections means that any structural food system change may originate from and also impact another component system.

An extended coverage of a food system comprises "all the elements (natural resources, people, inputs, processes, infrastructures, institutions, produce, etc.) and activities related to the production, processing, distribution, preparation and consumption of food, as well as the outputs of these activities, including socio-economic and environmental outcomes" (HLPE, 2014; UNSCN, 2021).

According to the Organization for Economic Co-operation and Development (OECD), the term "food system" has a broad meaning since it refers to all the elements and activities related to producing and consuming food, and their effects, including economic, health, and environmental outcomes (OECD, 2021). A similar approach can be identified within the International Fund for Agricultural Development (IFAD) short-version definition of a food system, which is considered to include "all the aspects of feeding and nourishing people: growing, harvesting, packaging, processing, transporting, marketing and consuming food" (IFAD, 2021). Furthermore, IFAD specifies that a food system includes:

- the interactions between people and the natural world;
- the inputs, institutions, infrastructure and services that support the functioning of all food system aspects;
- the role of diets and cultural practices in shaping outcomes.

For more than a decade, sustainability with all its connections and implications became a key-point of global calls for shifting towards better patterns for the world functioning, and as a consequence the idea of sustainable food systems began to be more and more heard and advocated for. Oehen and Home (2017) underline that the multitude of drivers of anthropogenic pressures on the global environment include the current form of industrial agriculture and its current way of functioning jeopardize sustainability mainly due to its negative environmental impact but also because it does not provide optimum nutrition to consumers.

According to FAO's approach of defining a sustainable food system (SFS), such a system should "deliver food security and nutrition for all in such a way that the economic, social and environmental bases to generate food security and nutrition for future generations are not compromised" (HLPE, 2014; FAO, 2018; UN, 2021). SFSs can be considered as a fundamental prerequisite for ensuring food security and healthy diets of future generations (FAO and INRAE, 2020).

Adopted in September 2015 during a historical global summit, United Nations' Sustainable Development Goals (SDGs) are entirely based on the sustainable agriculture and food systems vision at all levels, which mean that significant reshaping needs to take place until 2030 in order to ensure food and nutrition security for all. Since systemic challenges need to be addressed al all levels - local, national, regional and global - realizing the SDGs related to food and nutrition - especially SDG 2, i.e., "to end hunger, achieve food security and improved nutrition, and promote sustainable agriculture" - cannot be possible, as the FAO and other global institutions warned, unless new approaches are implemented (FAO and INRAE, 2020; IFAD, 2021; El Bilali et al., 2021; UNSCN, 2021; (Loboguerrero et al., 2020; Khan et al., 2021). Consequently, the global food system needs to be reimagined by addressing systemic challenges through a combination of interconnected actions at all levels (UNECE, 2021).

Prefiguring this context, the United Nations has launched since 2012 The Zero Hunger Challenge, based on a vision reflecting five elements from within the SDGs which can create the conditions for building inclusive SFSs. United Nations member-states acknowledged that

the 2030 Agenda for SDG involves "a comprehensive, integrated and universal transformation" (UN, 2021) and its aspirations are closely linked to the objective of pursuing fundamental change of food systems (von Braun et al., 2021).

Underlining the need for food systems transformation, which is considered as "critical" (Béné et al., 2019b), IFAD (2021) also identifies the sustainability requirement, under its operational definition, which is oriented towards environmental health and the needs of future generations.

Current Approaches of Sustainable Food Systems in the Global Context. The need for Restructuring: Opportunities and Concerns

The need for food systems reshaping was already identified before the COVID-19 pandemic (Kaiser et al., 2021) (due to both the hunger affecting a large part of world population and environmental concerns), while the situation worsened in 2020, since nearly one in three people in the world did not have access to adequate food IFAD (2021). Research on the impact of COVID-19 pandemic has underlined the unprecedented stresses – shifts, difficulties, and disruptions imposed on current food systems – and highlights the importance of strengthening their resilience as a condition to effective recovery (OECD, 2021). On this matter, IUFoST also advocates the idea of designing future food systems able to give comprehensive solutions during crises such as the global pandemic (IUFoST, 2021).

According to Fanzo (2021) and Stancu (2021), the situations of food shortages resulting from disruptions in supply chains during the pandemic raised the interest about possible viable solutions reachable for a large number of consumers, such as shorter supply chains and alternative retail infrastructures. In the same regard, Kaiser et al. (2021) show that the mutisectoral crisis generated by the current global COVID-19 pandemic is also an opportunity for re-designing food systems frameworks and priorities based on food ethics transdisciplinary perspective.

Fan et al. (2021) explored economic perspectives and challenges of current food systems and stated that their strengthening as a response and recovering from such a crisis should involve:

- the expansion of social protection programs based on significant fiscal support and external assistance;
- using innovative distribution methods;
- investment in graduation programs designed to eradicate poverty, with emphasis on women's empowerment in the agri-food sector.

FAO underlines that, until now, the traditional approach was a production-focused one, tending to increase the food supply in order to achieve food security, which led to neglecting other relevant aspects and ignoring the associated risks. Recent developments in systems thinking (FAO, 2018) - for instance value chain development approach - aims to consider value creation in its entirety from all relevant stakeholders. Similarly, another solution - the market systems approach – regards markets and its complex linkages as factors of impacting multiple value chains. These types of approaches can be combined in order to overcome their limitations, while results can be evaluated directly al local level.

SFSs development stands for the FAO solution to the need of transforming food systems, based on a holistic approach of sustainability which takes into account all three dimensions simultaneously (Fig. 1):

1. Economic dimension – food system activities should generate commercially/fiscally viable activities and, as a consequence, specific benefits for all stakeholders (enterprises, workers, governments, and consumers);

2. Social dimension – equity needs to be a feature of economic value-added distribution and should accompany the advancement of important socio-cultural outcomes (health, nutrition, human and animal welfare);
3. Environmental dimension – the impact on the natural environment should be neutral or positive, taking into consideration biodiversity, environmental health and resource waste.

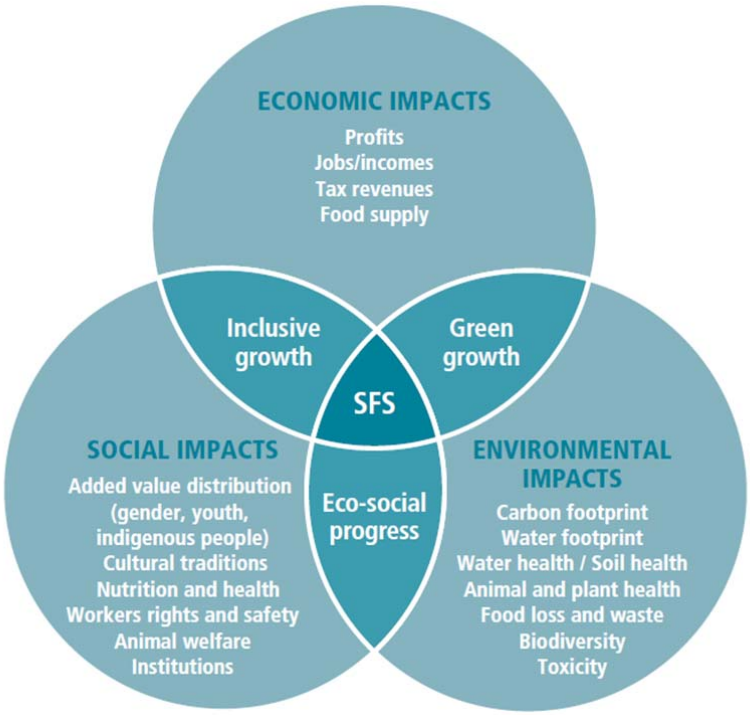

Fig. 1. Sustainability in food systems

Source: FAO, 2018.

In this aggregated context, any step or measure has to be implemented taking into consideration its impact on other components/dimensions of the SFS.

The OECD (2021) draws the attention on a triple challenge which world food systems are facing, being currently far from meeting properly and even less so in a resilient manner:

- ensuring food security and nutrition for a growing population;
- supporting the livelihoods of millions of farmers and others in the food chain;
- doing so in an environmentally sustainable way.

Von Braun et al. (2021) pursued an in-depth approach of terms used to designate SFSs reformulation and identified distinct relevant notions i.e. evolution, transition, and transformation, stating that most food systems need all three. As regards transformation, it is considered as "a never-ending process in food systems", while they are in a continuous state of change and adaptation.

An essential underpinning for a sustainable transformation of SFSs should be health and nutrition (Stancu, 2016; WHO, 2021) in view of delivering safe and nutritious food which pose no threat to consumers. Besides food safety, food nutritional value and adequate consumption patterns are also vital dimensions of a SFS.

As Camaréna (2020) stressed, designers of system innovations and transitions play a key role in designing future SFSs. According to Matos and Lopes (2021), the transition towards a SFS is associated with a wide range of relevant multiple and transdisciplinary topics which need to be

considered; aside from related concepts such as resilience and robustness, quantifying sustainability contributes to a complex understanding of what should be done in terms of designing and policies implementing.

The issue of measuring food system sustainability and the consequent trade-offs are also challenging for researchers and analysts (Sokil, Zhuk, and Vasa, 2018). In this regard, considering the multi-dimensional nature of the sustainability, Béné et al. (2019b) proposed an aggregate sustainability score based on 27 indicators organized into four dimensions: environment, social, food security & nutrition and economic whose computation delivers a global sustainability map covering 97 countries and 20 indicators.

In the same respect, according to the International Union of Food Science and Technology (IUFoST), acknowledgement from government policy makers of the need to incorporate food science and technology into education is a key-element for delivering resilient SFSs, as it contributes to capacity building, research and development that impact every sector embedded in a food system (IUFoST, 2021).

Regarding the sustainability perspective, Béné et al. (2019a) even argue that, although widely used, the concept of sustainability, remains poorly understood and applied and outline key-challenges summarized in the following three issues:

1. there is a need to better clarify what a SFS means, since some of its dimensions are insufficiently approached;
2. there is a need to clearly acknowledge the relevance of local-specific nature of food systems;
3. there is a need for better understanding the trade-offs and interactions of food system sustainability.

Building Sustainable Food Systems: What Should be Done?

Achieving the goal of creating sustainable, resilient, and efficient food systems will only be possible if all food systems actors (governments, the private sector, and civil society) act upon all their components (Haller, 2016; Drăgoi et al., 2018; Searchinger et al., 2018; Panait et al., 2020; Djokoto, 2021; Pirtea et al., 2021; Raimi et al., 2021).

In order that food producers provide adequate food for all while ensuring their livelihoods – thus also benefiting consumers, fundamental changes and enhancements need to take place within institutions, infrastructure, regulations, investments and markets so that food activities become more equitable and sustainable (IFAD, 2021). According to Kaiser et al. (2021), the necessary dialogue aiming at restructuring post-pandemic food systems for a both sustainable and ethical future should:

- be grounded on foundational considerations of food ethics;
- recognize values plurality of all stakeholders;
- manage trade-offs affecting diverse stakeholders along the global food value chain;
- be based on transdisciplinary science;
- reflect local and regional conditions rather than global benchmarks;
- be explicitly tied to people's value-landscapes or value priorities.

On the occasion of 2021 World Food Day Ceremony organized by FAO in 2021, Klaus Schwab outlined four ways to create healthier, more sustainable, more equitable and fairer food systems (Schwab, 2021):

1. integrated multistakeholder response is essential in order to systemically address structural risks;
2. solutions must include building scalable multistakeholder platforms al all levels;
3. economic, environmental, social and governance issues may act as levers of change for a better understanding the "true value of food";

4. innovation is a critical factor for successful transformation of food systems.

After a synthesis of the large literature regarding reconfiguring food systems, Loboguerrero et al. (2020) identified several approaches, based on different levers: changes in governance, use of natural resources, pro-poor and inclusive structural reconfiguration, gender-based approaches etc. Their perspective on required actions to reconfigure food systems considers that such an agenda should encompass four directions (Loboguerrero et al., 2020): finding new trajectories, dealing with the associated risks, limiting food systems environmental impact, and empowering the enablers of change.

"Thinking holistically" seems to be the foremost approach endorsed by the majority of organizations and researchers involved in finding solution to reconfigure actual food systems. As FAO (2018) pointed it out, this would mean:

- considering the food system in its totality, not confining it to single sectors or taking into account all the elements, their relationships and related effects sub-systems;
- analyzing particular issues as a result of interconnected processes;
- considering all relevant causal variables and impacts of the solutions;
- addressing the limitations of traditional sectoral approaches to improving food security and nutrition;
- facilitating multi-stakeholder collaboration and policy balanced coordination at all levels;
- identifying opportunities to simultaneously accomplish multiple objectives while dealing with inevitable trade-offs between key priorities of the food systems.

Considering the need to overcome trade-offs and build synergies between all aspects of food sustainability, Ruben et al. (2021) propose five paradigm shifts towards food system transformation which are based on the following elements: policy ambitions, production and consumption goals, connectivity, food system performance and governance.

According to Fanzo (2021), both policymaking and individuals' actions need to change in order to generate better food systems. While current food policies do not provide a holistic framework able to both ensure food/nutrition security and at the same time protect the environment, efforts should concentrate on bringing those policies together in a synergistic strategy addressing the entirety of a food system. Furthermore, several particular solutions were recommended to be considered by governments (Fanzo, 2021):

- improving public health and sustainability within food systems by promoting agricultural diversity;
- increasing access to a wider array of more resilient seed and breed varieties;
- supporting farmers' and community-based organizations.

Khan et al. (2021) identified the critical basic factors for a sustainable food and agricultural system as follows: fertile land, water, fertilizers, favorable climate conditions, and energy.
The food policy and research framework should move from agriculture-centered to a system approach, which would generate the centarl outcome of long-term food and nutrition security (Searchinger et al., 2018). Hebinck et al. (2021a) also acknowledge the need consolidated research moving from sectoral to a more integrated perspective, proposing four gaps to be addressed in the next decade.

1. Crossscale dynamics between coupled systems;
2. Social justice, equity and inclusion;
3. Sustainability transitions in low- and middle-income countries;
4. Cross-sectoral governance and system integration.

A particular approach which promotes using advanced technologies as instruments considers (Camaréna, 2020) artificial intelligence could help in the design of SFS transitions as a part of transdisciplinary solution, provided ethical questions are properly dealt with.

In as study focused on food system outcomes, Stefanovic et al. (2020) analyze the results from an extensive overview on the matter and summarize several leverage points for successfully transforming food systems using a systemic approach:

- strengthening rural-urban links;
- stronger emphasis on smallholders and rural communities;
- dietary shifts;
- agroecology and city-region approaches;
- inclusiveness of various stakeholders by returning to traditional knowledge and sustainable practices.

From the human health perspective, SFSs should deliver sustainable diets, allow for reducing food waste by changing consumer behavior, and use innovations to minimize the environmental impact of healthy food production (Lindgren et al., 2018). This could mean shifting towards plant-based diets that have been produced sustainably. In this regard, according to Cusworth et al. (2021) legumes can be considered as a solution for the creation of healthy SFSs due to their agronomic, nutritional and environmental benefits.

Transition towards sustainability of food system mean reconstruction of multiple activities which need complex skill sets top be accomplished in order to "act locally". Initiatives to support the necessary changes of local structures are also led by local and regional groups of innovators who decided to grow, share, sell and consume more sustainable foods in their local contexts (FAO and INRAE, 2020)

Campi et al. (2021) show that food specialization is particular issue in designing policies seeking to achieve food security and sustainability, revealing that, in specific contexts, both concentrating food production and coherent diversification could decrease the sustainability of food systems. That is why the need to place sustainability in the center of all relevant policies and initiatives led to considering that the most efficient approach needs to be tailored to local contexts. In the same regard, a part of the solution, at least in certain areas, could be short food supply chains, regarded as a particular viable alternative to globalized food supply chains within food systems (Ene, 2021).

In the same respect, Oehen and Home (2017) stated that the current food system should take into account that farmers, including small producers, are those who feed 80 percent of the world population, and, as a consequence they should receive much stronger support than highly diversified and vertically integrated international companies, which have more access to land and investment. It is estimated that in 2030 there will be 700 million small-scale agricultural producers but unfortunately such farmers are highly vulnerable and lack resilience to extreme events (Loboguerrero et al., 2020).

As there is large variability in farming systems and farm types, re-framing food systems should take into account beneficial solutions adapted to specific food actors. Loboguerrero et al. (2020) identified four types of farmers which need targeted intervention in the context of future sustainable food systems (Table 1).

Table 1. Main types of farmers need context specific interventions

Types of farmers	Estimated global number	Particular interventions needed
Larger-scale commercial farms	70 million	improving environmental goals
Small-scale farms	320 million	increasing their integration into local markets, with some farmers accessing digital information and making better decisions

Table 1 (cont.)

Extensive farm households	30 million	building assets and utilizing safety nets to increase their productivity and enhance their resilience
Lower-endowment small-scale farmers	150 million	revitalizing rural economies / providing economic opportunities in urban and peri-urban areas

Source: adapted from Loboguerrero et al. (2020).

At the same time, Fanzo (2021) states that strategies should be adapted to the level of food system modernization, as follows:

- for lower modernized food systems: logistic improvements to ensure food safety;
- for highly modernized food systems: innovative technologies.

Governments support for local food systems could imply improving market access through different types of food producers' hubs and networks as well as rethinking cities infrastructure to encourage and serve farmers' markets (mobile facilities, food centers etc.) (Fanzo, 2021).

Concluding Remarks

In the last decade, term "food system" as it is used in specific literature is meant to appoint all components and activities which are frequently considered separately, hence the need of "systems science" integration within scientific approaches of agri-food systems sustainability (El Bilali et al., 2021). On the whole, the notion of food system encompasses the entire range of actors and their intercorrelated value-adding activities (von Braun et al., 2021) which relate to food at any extent, while adding the sustainability dimension refers to safeguarding all the complex aspects of actual and future generations needs.

Unfortunately, virtually all assessments of current food systems which can be found in current specific literature show that current food systems are not capable of enabling the world to reach the Sustainable Development Goals by 2030. As multiple scientific evidence shows, achieving SDG 2 by 2030 imposes holistic, integrated and coordinated solutions that address the global food security and nutrition challenges, which could be successful if knowledge and expertise from diverse disciplines and intellectual traditions are put in practice (El Bilali et al., 2021; OECD, 2021).

Achieving transformational systemic changes implies defining an appropriate agenda for steps to be taken by development practitioners and policymakers whereas better policies are urgently needed to address the enormous challenges that food systems are facing today. Since many food security and nutrition challenges are complex, they need integrated actions which transcend all sectors and levels boundaries involving both public and private actors across multiple fronts (FAO, 2018).

A sustainable and food-secure future can only be attained by drastic changes at local and landscape levels and this urgently necessary reconfiguration should be based on a complex network perspective but also needs to be tailored to the diversity of farmer types (Loboguerrero et al., 2020). Also, Khan et al. (2021) showed that producing food sustainably implies an integrated approach using instruments such as ecosystem services, human capital, and advanced technologies.

As many organizations and researchers outlined in the vast literature on the subject, the necessary coherence and coordination may result from identifying synergies and trade-offs generated by all implied elements and actors starting from interdisciplinary and trans-sectorial policy integration, including consumers involvement (Zaharia et al., 2021), comprehensive

assessment frameworks (Hebinck et al., 2021b) , technological innovation (Herrero et al., 2020; Fan et al., 2021; Khan et al., 2021) and societal dialogue (Herrero et al., 2020).

Building and developing SFSs is a key prerequisite for overcoming interrelated challenges the world faces today in terms of climate charge, resources scarcity and health environmental impact.

Further researches should continue to investigate the impact and potential contribution of all food systems relevant actors – from governments to consumers - on multiple objectives of SFSs at local level with emphasis on dealing with trade-offs and specific interactions.

References

1. Béné, C., Oosterveer, P., Lamotte, L. *et al.*, 2019a. When food systems meet sustainability – Current narratives and implications for actions, *World Development*, Volume 113, Pages 116-130, https://doi.org/10.1016/j.worlddev.2018.08.011.
2. Béné, C., Prager, S.D., Achicanoy, H.A.E. *et al.*, 2019b. Global map and indicators of food system sustainability. *Sci Data* 6, 279. https://doi.org/10.1038/s41597-019-0301-5.
3. Camaréna, S., 2020. Artificial intelligence in the design of the transitions to sustainable food systems, *Journal of Cleaner Production*, Volume 271, 122574, https://doi.org/10.1016/j.jclepro.2020.122574.
4. Campi, M., Dueñas, M. and Fagiolo, G., 2021. Specialization in food production affects global food security and food systems sustainability, *World Development*, Volume 141, 105411, https://doi.org/10.1016/j.worlddev.2021.105411.
5. Cusworth, C., Garnett, T and Lorimer, J., 2021. Legume dreams: The contested futures of sustainable plant-based food systems in Europe, *Global Environmental Change*, Volume 69, 102321, https://doi.org/10.1016/j.gloenvcha.2021.102321.
6. Djokoto, J. G., 2021. Level of development, foreign direct investment and domestic investment in food manufacturing. *F1000Research*, *10*(72), 72.
7. Drăgoi, M. C., Andrei, J. V., Mieilă, M., Panait, M., Dobrotă, C. E. and Lădaru, R. G., 2018. Food safety and security in Romania–an econometric analysis in the context of national agricultural paradigm transformation. *Amfiteatru Economic*, *20*(47), 134-150.
8. El Bilali, H., Callenius, C., Strassner, C. *et al.*, 2019. Food and nutrition security and sustainability transitions in food systems. *Food Energy Secur*. 8:e00154. https://doi.org/10.1002/fes3.154.
9. El Bilali, H., Strassner, C. and Ben Hassen, T., 2021. Sustainable Agri-Food Systems: Environment, Economy, Society, and Policy. *Sustainability*. 2021; 13(11):6260. https://doi.org/10.3390/su13116260.
10. Ene, C., 2021. Are Local Food Systems Vectors of Sustainable Choices? *Economic Insights – Trends and Challenges*, Vol.X(LXXIII), No. 3/2021, ISSN 2284-8576, pp.73 – 82, doi: 10.51865/EITC.2021.03.07.
11. Fanzo, J., 2021. A Path to Sustainable Food Systems. *Current History*; 120 (829): 313. https://doi.org/10.1525/curh.2021.120.829.313.
12. Food and Agriculture Organization of the United Nations (FAO), 2018. *Sustainable food systems: Concept and framework*. Available through: http://www.fao.org/3/ca2079en/CA2079EN.pdf [Accessed 10 October 2021].
13. Food and Agriculture Organization of the United Nations (FAO), International Fund for Agricultural Development (IFAD), and World Food Programme (WFP), 2020 (and various years). *The State of Food Insecurity in the World*. FAO, Rome, Italy.
14. Food and Agriculture Organization of the United Nations (FAO) and National Research Institute for Agriculture, Food and Environment, France (INRAE), 2020. E*nabling sustainable food systems. Innovators' handbook*. Available through: http://www.fao.org/3/ca9917en/CA9917EN.pdf [Accessed 12 October 2021].
15. Haller, A., 2016. Globalisation, multinational companies and emerging markets. *Ecoforum*, Vol. 5, Issue 1(8).
16. Hebinck, A., Klerkx, L., Elzen, B. *et al.*, 2021a. Beyond food for thought – Directing sustainability transitions research to address fundamental change in agri-food systems, *Environmental Innovation and Societal Transitions*, Volume 41, Pages 81-85, https://doi.org/10.1016/j.eist.2021.10.003.

17. Hebinck, A., Zurek, M., Achterbosch, T. *et al.*, 2021b. A Sustainability Compass for policy navigation to sustainable food systems, *Global Food Security*, Volume 29, https://doi.org/10.1016/j.gfs.2021.100546.
18. Herrero, M., Thornton, P.K., Mason-D'Croz, D. *et al.*, 2020. Innovation can accelerate the transition towards a sustainable food system. *Nat Food* 1, 266–272. https://doi.org/10.1038/s43016-020-0074-1.
19. High Level Panel of Experts on Food Security and Nutrition (HLPE), 2014. *Food losses and waste in the context of sustainable food systems. A report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security.* Rome. 8 pp. Available through: http://www.fao.org/3/a-av037e.pdf) [Accessed 12 October 2021].
20. International Fund for Agricultural Development (IFAD), 2021. *Transforming food systems for all*. Available through: https://www.ifad.org/en/food-systems [Accessed 12 October 2021].
21. International Union of Food Science and Technology (IUFoST), (2021). Global governance and the role of food science and technology for sustainable food systems. Available through: https://sc-fss2021.org/wp-content/uploads/2021/04/Global_Governance_Food_Science_Technology_IUFoST.pdf [Accessed 16 October 2021].
22. Kaiser, M., Goldson, S., Buklijas, T. *et al.*, 2021. Towards Post-Pandemic Sustainable and Ethical Food Systems. *Food ethics* 6, 4. Doi: 10.1007/s41055-020-00084-3.
23. Khan, N., Ray, R.L., Kassem, H.S. *et al.*, 2021. Potential Role of Technology Innovation in Transformation of Sustainable Food Systems: A Review. *Agriculture* 2021, *11*, 984. https://doi.org/10.3390/agriculture11100984.
24. Lindgren, E., Harris, F, Dangour, A.D., *et al.*, 2018. Sustainable food systems-a health perspective. *Sustain Sci.* 2018;13(6):1505-1517. DOI: 10.1007/s11625-018-0586-x.
25. Loboguerrero, A.M., Thornton, P., Wadsworth, J. *et al.*, 2020. Perspective article: Actions to reconfigure food systems, *Global Food Security*, Volume 26, 100432, https://doi.org/10.1016/j.gfs.2020.100432.
26. Matos, J.V. and Lopes, R.J., 2021. Food System Sustainability Metrics: Policies, Quantification, and the Role of Complexity Sciences. *Sustainability*. 2021; 13(22):12408. https://doi.org/10.3390/su132212408.
27. Oehen, B. and Home, R. 2017. Sustainable Food Systems. *Culinary Turn: Aesthetic Practice of Cookery*. Bielefeld: transcript Verlag, pp. 87-90. https://doi.org/10.1515/9783839430316-013.
28. Organisation for Economic Cooperation and Development (OECD), 2021. *Understanding Food Systems.* Available through: https://www.oecd.org/food-systems/understanding/ [Accessed 12 October 2021].
29. Panait, M., Erokhin, V., Andrei, J. V. and Gao, T., 2020. Implication of TNCs in agri-food sector: Challenges, constraints and limits: Profit or CSR?. Strategic Management, 25(4), 33-43.
30. Pirtea, M. G., Noja, G. G., Cristea, M. and Panait, M., 2021. Interplay between environmental, social and governance coor-dinates and the financial performance of agricultural companies. *Agric. Econ.–Czech*, 67, 479-490.
31. Raimi, L., Panait, M. and Sule, R., 2021. Leveraging Precision Agriculture for Sustainable Food Security in Sub-Saharan Africa: A Theoretical Discourse. In *Shifting Patterns of Agricultural Trade* (pp. 491-509). Springer, Singapore.
32. Ruben, R., Cavatassi, R., Lipper, L. et *al.*, 2021. Towards food systems transformation—five paradigm shifts for healthy, inclusive and sustainable food systems. *Food Sec.* doi: 10.1007/s12571-021-01221-4.
33. Shenggen, F., Derek, H., Rue, C. *et al.*, 2021. Food Systems for Human and Planetary Health: Economic Perspectives and Challenges, *Annual Review of Resource Economics* 13:1, 131-156, https://doi.org/10.1146/annurev-resource-101520-081337.
34. Schwab, K., 2021. *How to build sustainable, healthier, more equitable food systems*, Speech as part of the World Food Day Ceremony at the UN Food and Agriculture Organization (FAO) on 15 October, World Economic Forum. Available through: https://www.weforum.org/agenda/2021/10/how-to-build-more-sustainable-healthier-more-equitable-food-systems/ [Accessed 30 October 2021].
35. Searchinger, T., Waite, R., Hanson, C. and Ranganathan, J., 2018. *Creating a Sustainable Food Future: A Menu of Solutions to Feed Nearly 10 Billion People by 2050: A synthesis report.* Washington DC. Available through: https://www.wri.org/research/creating-sustainable-food-future [Accessed 10 October 2021].

36. Sokil, O., Zhuk, V. and Vasa, L., 2018. Integral assessment of the sustainable development of agriculture in Ukraine, *Economic Annals-XXI*, 170(3-4), 15-21.
37. Stancu. A., 2016. Correlations and Patterns of Food and Health Consumer Expenditure. In J.V. Andrei, ed. 2016. *Food Science, Production, and Engineering in Contemporary Economies*. Hershey: IGI Global. pp. 44-101, https://doi.org/10.4018/978-1-5225-0341-5.ch003.
38. Stancu. A., 2021. Impact of COVID-19 Pandemic on International Agricultural Trade in European Countries. In V. Erokhin, G. Tianming, J.V. Andrei, eds. 2021. *Shifting Patterns of Agricultural Trade.* Singapore: Springer. pp.263-284, https://doi.org/10.1007/978-981-16-3260-0_11.
39. Stefanovic, L., Freytag-Leyer, B. and Kahl, J., 2020. Food System Outcomes: An Overview and the Contribution to Food Systems Transformation. *Front. Sustain. Food Syst.* 4:546167. doi: 10.3389/fsufs.2020.546167.
40. United Nations (UN), 2021. *Sustainable Food Systems*. Available through: https://www.un.org/zerohunger/content/sustainable-food-systems [Accessed 18 October 2021].
41. United Nations Economic Commission for Europe (UNECE), 2021. *Issue-based Coalition on Sustainable Food Systems.* Available through: https://unece.org/issue-based-coalition-sustainable-food-systems, [Accessed 12 October 2021].
42. United Nations System Standing Committee on Nutrition (UNSCN), 2021. *Sustainable Food Systems*. Available through: https://www.unscn.org/en/topics/sustainable-food-systems [Accessed 12 October 2021].
43. von Braun, J., Afsana, K., Fresco L.O. *et al.*, 2021. *Food Systems – Definition, Concept and Application for the UN Food Systems Summit.* A paper from the Scientific Group of the UN Food Systems Summit March 5. Available through: https://www.un.org/sites/un2.un.org/files/scgroup_food_systems_paper_march-5-2021.pdf [Accessed 30 October 2021].
44. World Health Organisation (WHO), 2021. *New coalitions announced at the UN Food Systems Summit to increase access to healthy diets from sustainable food systems.* Available through: https://www.who.int/news/item/23-09-2021-new-coalitions-announced-at-the-un-food-systems-summit-to-increase-access-to-healthy-diets-from-sustainable-food-systems [Accessed 30 October 2021].
45. Zaharia, A., Diaconeasa, M.-C., Maehle, N. *et al.*, 2021. Developing Sustainable Food Systems in Europe: National Policies and Stakeholder Perspectives in a Four-Country Analysis. *International Journal of Environmental Research and Public Health*, 18(14):7701. https://doi.org/10.3390/ijerph18147701.