



Evans School Policy Analysis and Research (EPAR)

CRIFS Technical Brief A food systems framework

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Key messages

- Existing frameworks fail to explicitly identify the role of small-scale producers (SSPs) in food systems.
- We adapted existing food system frameworks to focus on the inclusion of men and women SSPs throughout the production and value chains.
- The CRIFS food system framework can be used to generate hypotheses regarding risk, SSP decision-making, markets and policy systems, and available technology while understanding the numerous pre-conditions and enabling environments that affect the food system, including gender.
- CRIFS will work to build upon foundational knowledge of food systems, expand the evidence base, and communicate all research to key audiences and stakeholders, including SSPs.

Background

We define a small-scale producer (SSP) by the area of land operated and number of livestock kept. A SSP belongs to a farm household that operates on land no greater than 2 hectares in size AND keeps no more than 10 cows or buffalo AND no more than 10 goats or sheep AND no more than 50 chickens.
(See CRIFS Technical Brief of SSPs and Inclusion in Food Systems)

According to the World Bank, there are an estimated 500 million smallholder households globally, with estimates of upwards of 2 billion people (World Bank 2016).¹ While often overlooked in the context of global food systems, SSPs are central actors, particularly in low- and middle-income countries. Globally, SSPs represent only 12% of agricultural land but produce nearly 35% of global food (Lowder et al., 2021). SSPs produce an even higher share of output in low- and middle-income nations (Arulingam et al., 2022): 44% of the food production in low-income countries and 41% in lower-middle-income countries like India and Nigeria

Moreover, SSPs (<2 hectares) have greater crop diversity and predominantly allocate their crop production to food, with a substantial 55-59% of their yield directed towards it. In contrast, larger farms usually focus on processing and feed production (Ricciardi et al., 2018).

Due to low market power from low production, SSPs are often excluded from participating in global food systems and larger markets, indicating a need for interventions to encourage SSP integration (Arulingam et al. 2022).

¹ Please note EPAR prefers the term small-scale producers to smallholder due to its more inclusiveness of different agricultural livelihoods and does not imply land tenure as many farmers rent or lease land. Thus, this estimate provided by the World Bank may be greater once all SSPs are included.

EPAR uses an innovative student-faculty team model to provide rigorous, applied research and analysis to international development stakeholders. Established in 2008, the EPAR model has since been emulated by other UW schools and programs to further enrich the international development community and enhance student learning.

Please direct comments or questions about this research to Principal Investigator C. Leigh Anderson at cla@uw.edu.

Developing a food systems framework that considers risk and inclusion

A non-systematic review of thirteen frameworks made clear that existing frameworks fail to explicitly identify the role of small-scale producers (SSPs) in food systems, despite their importance to the food system, particularly in low- and middle-income countries.

Drawing on the food system definitions of HLPE (2017) and the World Bank, food systems are defined as all elements and activities related to the production, processing, distribution, preparation, and consumption of food that originate from agricultural, forestry, or fisheries, the market and institutional networks for their governance, and the socio-economic and environmental outcomes of these activities. A food system also interacts with other systems, such as healthcare, commerce, and education.^{2,3}

We adapted three frameworks to develop a supply chain-focused, conceptual framework of food systems that accounted for SSPs activities, outcomes, and linkages to other system actors: the UN High-Level Panel of Experts on Food Security and Nutrition (HLPE) in the Nutrition and Food Systems Report (2017); Fanzo et al. 2021, which builds on HLPE’s framework; and the UK FCDO’s framework (formally, DFID; Woodhill & Quak 2019). Following HLPE, we organize our framework around three elements: drivers, components, and outcomes.

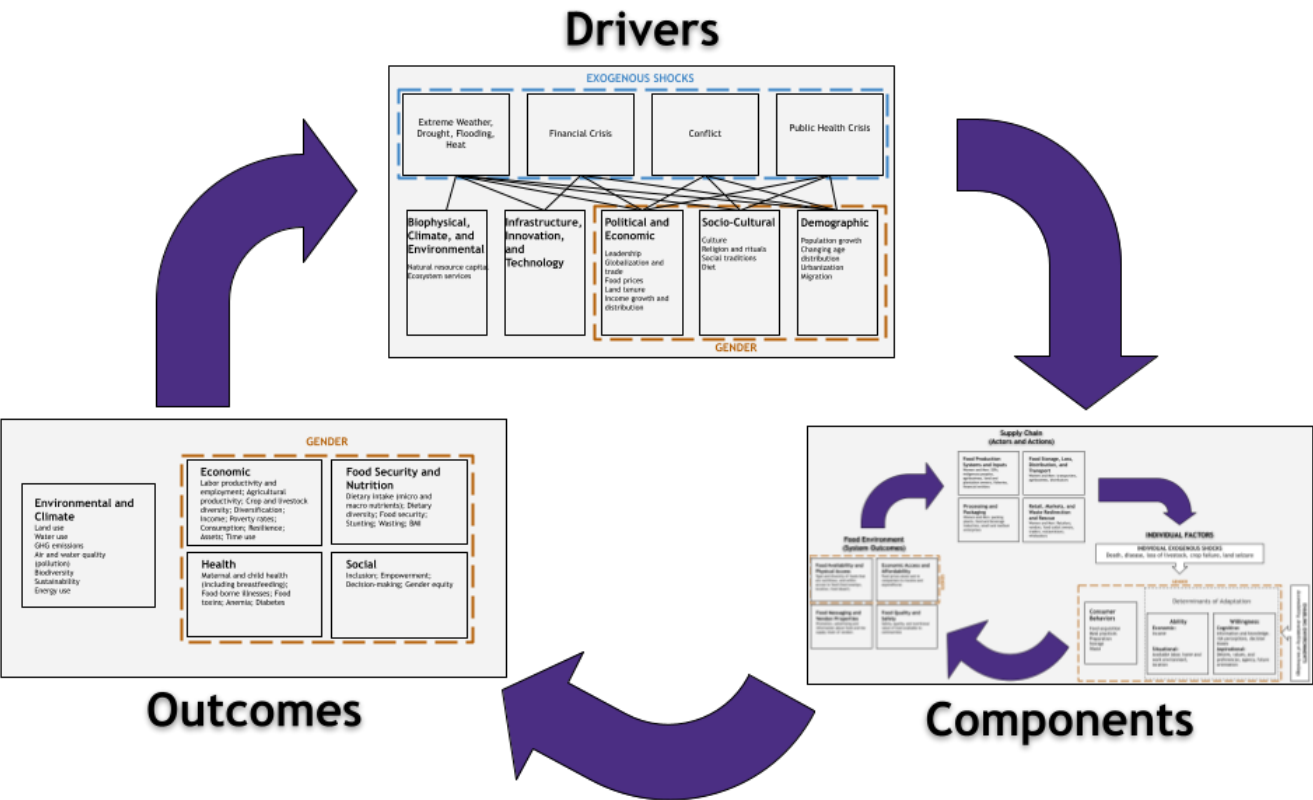


Figure 1. The CRIFS Food System Framework

² Please see Table 1 in the Annex for a complete list of the food system definitions sourced for this brief.

³ The High Level Panel of Experts (HLPE) represent the science and policy interface of the UN Committee on World Food Security (CFS).

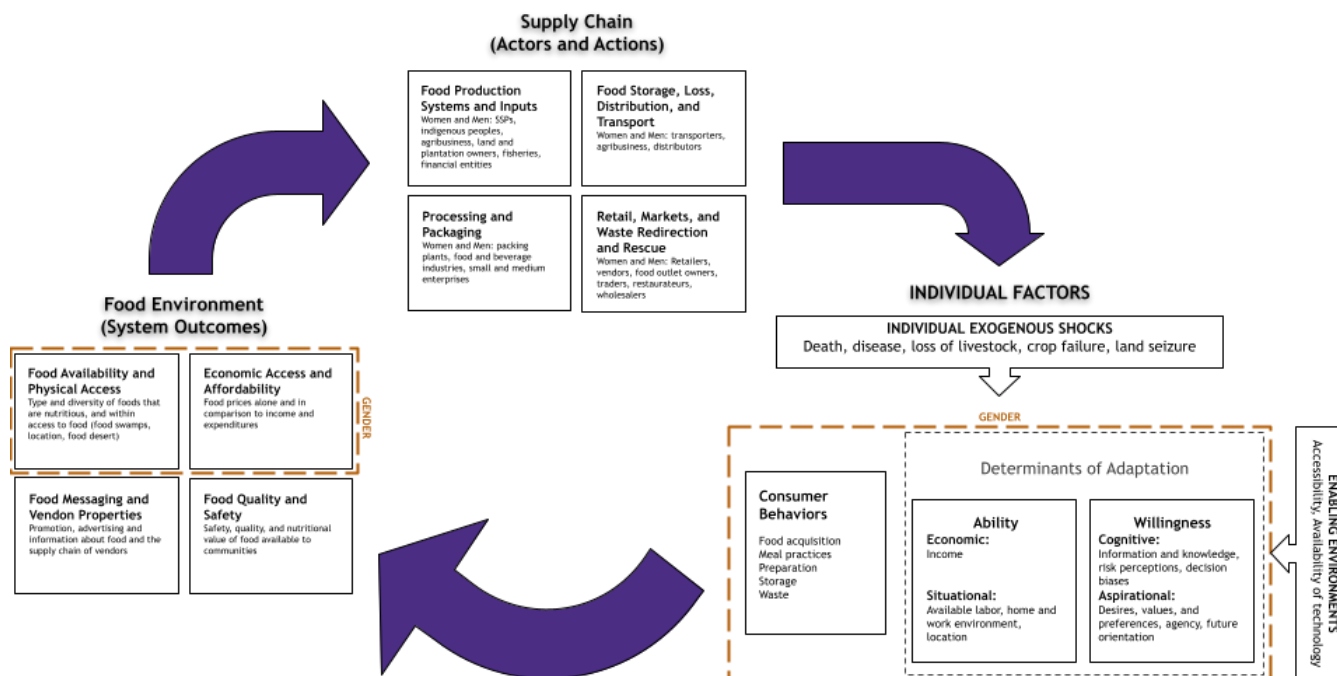


Figure 2. A focus on the food system components of the CRIFS Food System Framework.

The CRIFS food system framework augments existing frameworks by:

- Emphasizing the role of SSPs in production and the linkages to market and system actors
- Stressing gender and constraints differentially faced by women
- Incorporating enabling environments (markets, policies, and institutions)
- Recognizing idiosyncratic and aggregate exogenous shocks that affect SSP decision-making and system functions, particularly climate change and the uncertainty changes in climate will bring to the food system
- Tracing pathways, connections, and feedback loops between elements
- Specifying individual and household outcomes that are relevant to men and women SSPs

Use cases for the CRIFS food system framework

We envision the CRIFS food system framework will inform researchers approaches to:

- Generate hypotheses to test regarding:
 - Foundational knowledge, including risks, markets and policy systems, and appropriateness of technology
 - Determinants and bottle necks of adaptation, including factors that affect ability and willingness to adapt to evaluate gaps in the enabling environment (overall SSP decision-making)
- Examine food system functioning by component: by country, the policy environment, gender, risk exposure, etc.

Open questions on SSP risks and inclusion in food systems

CRIFS will advance foundational work as well as generate evidence on barriers and opportunities for SSP adaptation within food systems. Research questions include:

- To what extent are existing theoretical frameworks, methods, and indicators relevant to better accounting for risk and accelerating inclusion in South Asia and sub-Saharan Africa food systems?

- What is the evidence base on food systems risks and SSP adaptation, and to what degree do the upstream assumptions hold?
- To what extent do food system failures spill over to conflict and displacement?
- What are the most common and mutable bottlenecks to adaptation within food systems? Can these be segmented by the complexity of driving behavior change and the urgency given climate risk?
- At what level is scaling feasible, given heterogeneity within food systems and food system risks?
- What national and local infrastructure & institutional (market and policy) systems are critical to adaptation within a food system?

References

- Arulingam, I., Brady, G., Chaya, M., Conti, M., Kgomotso, P. K., Korzenszky, A., Njie, D., Schroth, G., Suhardiman, D. Small-scale producers in sustainable agrifood systems transformation. FAO. 2022. <https://www.fao.org/3/cc0821en/cc0821en.pdf>
- Brouwer, I., McDermott, J., Ruben, R. Food systems everywhere: Improving relevance in practice. Global Food Security. Volume 26, 2020. <https://doi.org/10.1016/j.gfs.2020.100398>
- Fanzo, J., et al. Viewpoint: Rigorous monitoring is necessary to guide food system transformation in the countdown to the 2030 global goals. Food Policy. Volume 104, 2021. <https://doi.org/10.1016/j.foodpol.2021.102163>
- FAO. 2023. The status of women in agrifood systems. 2023. <https://fao.org/documents/card/en/c/cc5343en>
- HLPE Nutrition and Food Systems. A Report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. FAO. 2017. <https://www.fao.org/3/i7846e/i7846e.pdf>
- Lowder, S., Sánchez, M., Bertini, R. Which farms feed the world and has farmland become more concentrated? World Development. Volume 142, 2021. <https://doi.org/10.1016/j.worlddev.2021.105455>
- Nesheim, M.C., Oria, M., Yih, P.T.. A framework for assessing effects of the food system. In: A Framework for Assessing Effects of the Food System. National Academies Press. 2015. <https://doi.org/10.17226/18846>
- Nugent, Rachel; Levin, Carol; Grafton, Daniel; Fanzo, Jessica; Remans, Roseline; Anderson, C. Leigh. Indicators for nutrition-friendly and sustainable food systems. In Global Nutrition Report 2015: Actions and accountability to advance nutrition and sustainable development. International Food Policy Research Institute (IFPRI). Chapter 7. Pp. 85-96, 2015. <http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/129442>
- Ricciardi, V., Ramankutty, N., Mehrabi, Z., Jarvis, L., Chookolingo, B. How much of the world's food do smallholders produce? Global Food Security. 2018. <https://doi.org/10.1016/j.gfs.2018.05.002>
- World Bank. A Year in the Lives of Smallholder Farmers. 2016. <https://www.worldbank.org/en/news/feature/2016/02/25/a-year-in-the-lives-of-smallholder-farming-families#:~:text=There%20are%20an%20estimated%20500%20million%20smallholder%20households%20globally%2C%20amounting,less%20than%20%24%20a%20day.>
- Woodhill, J., & Quak, E.-J. Changing Food Systems: Implications for DFID priorities. DFID. 2019. https://assets.publishing.service.gov.uk/media/5d9b5397e5274a5a148b40e1/K4D_Learning_Products1234-124_Changing_Food_Systems_Policy_Brief.pdf

Zou, T., Dawodu, A., Mangi, E., Cheshmehzangi, A. General limitations of the current approach in developing sustainable food system frameworks. *Global Food Security*. Volume 33, 2022.
<https://doi.org/10.1016/j.gfs.2022.100624>

Annexes

Annex 1

Table 1. Food System Definitions from Sources Utilized in Creating the Framework

Food System Definitions	
HLPE (2017)	Defines food systems as including all elements and activities related to the production, processing, distribution, preparation, and consumption of food, the market and institutional networks for their governance, and the socio-economic and environmental outcomes of these activities
World Bank	Food systems encompass the entire range of actors and their interlinked value-adding activities for the production, aggregation, processing, distribution, consumption, and disposal of food products that originate from agriculture, forestry, or fisheries. A food system is composed of several subsystems, such as an agricultural finance system or irrigation system, and it interacts with other systems, such as health care, commerce, and education.
FAO	The food system includes the related resources, inputs, production, transport, processing and manufacturing industries, retailing, and consumption of food, as well as its impacts on the environment, health, and society.

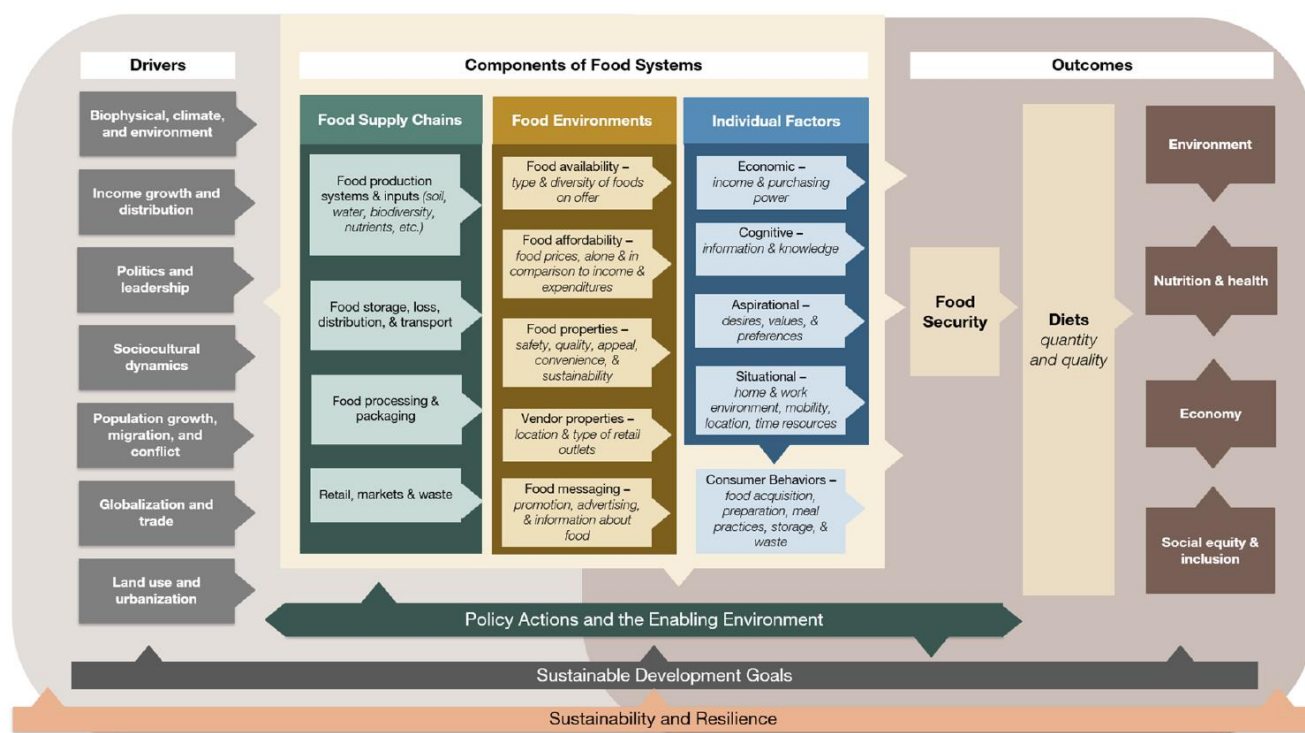
Annex 2.A

Approach to Framework Construction

We reviewed 13 conceptual frameworks from a list of multi-lateral and/or prominent organizations and selected peer-reviewed sources for relevance to the research agenda of CRIFS. We limited our review to diagrammatic conceptual frameworks that visualize ideas, theories, and relationships. concepts (Zou et al., 2021). We focused on frameworks that enable analysis of supply (with SSPs as key actors) and midstream value chains (that directly engage SSPs) with additional consideration of systems as pre-conditions and enabling environment (Brouwer et al., 2020). Supply-oriented analyses focus on sufficient long-term availability of food through greater food production efficiency under different conditions of population growth and climate stress. Midstream-oriented analyses consider the value chain as the link between food production and consumption and focus on better markets and institutions to reduce transaction costs and risks.

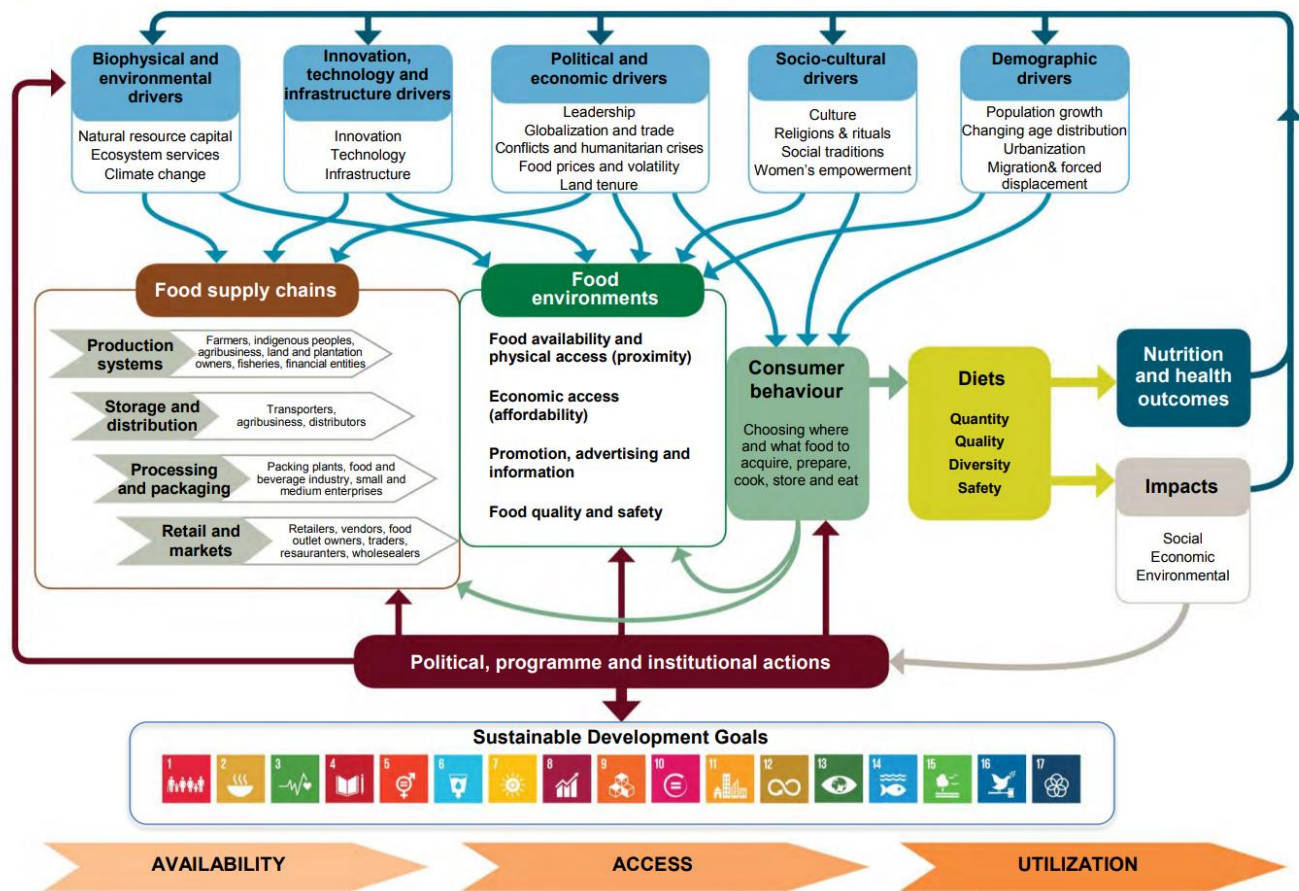
Annex 2.B

Primary Frameworks Consulted



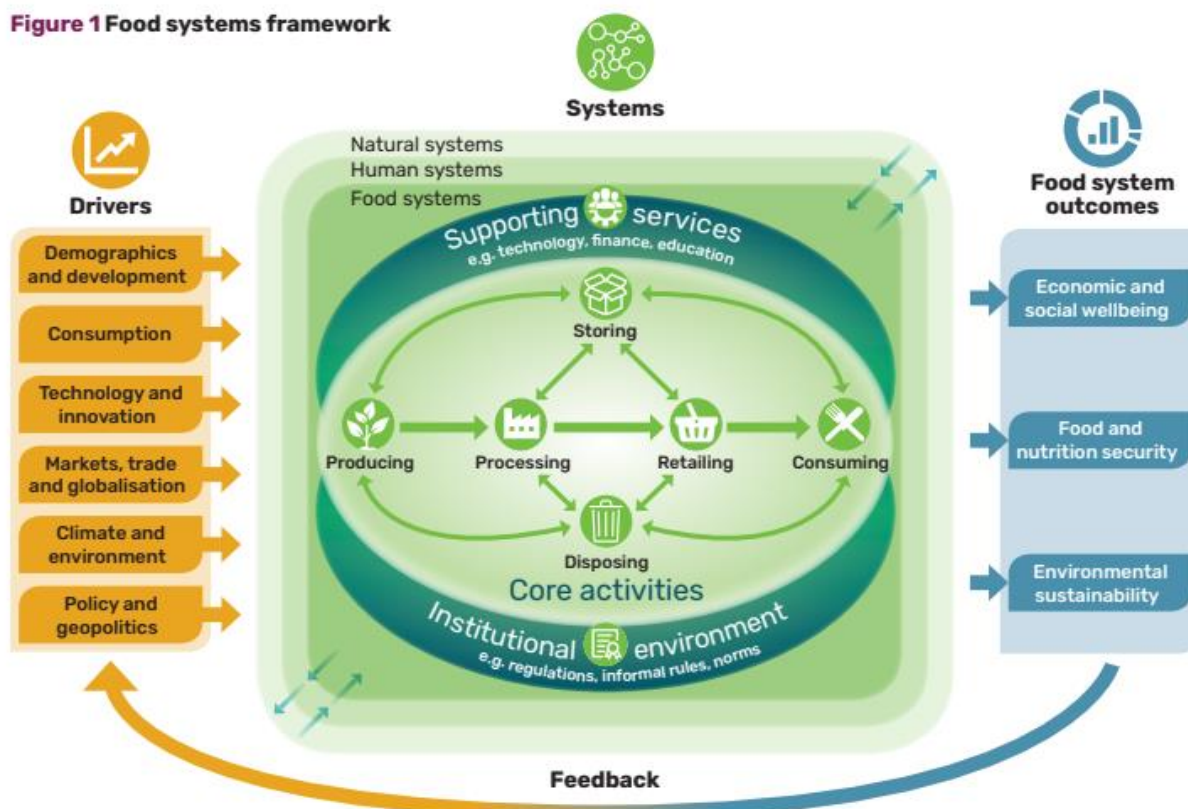
Fanzo et al 2021

Figure 1 Conceptual framework of food systems for diets and nutrition



HLPE 2017

Figure 1 Food systems framework



Source: Adapted from Woodhill and Hasnain, 2019.¹

Woodhill & Quak 2019 (DFID)

Annex 2.C

Full List of Food Frameworks Consulted

- Allen, T., Prosperi, P., Cogill, B., Padilla, M., & Peri, I. (2019). A Delphi Approach to Develop Sustainable Food System Metrics. *Social Indicators Research*, 141(3), 1307-1339. <https://doi.org/10.1007/s11205-018-1865-8>
- de Brauw, A., van den Berg, M., Brouwer, I. D., Snoek, H., Vignola, R., Melesse, M., Locketti, G., van Wagenberg, C., Lundy, M., Maitre d'Hotel, E., & Ruben, R. (2019). Food system innovations for healthier diets in low and middle-income countries (0 ed.). International Food Policy Research Institute. <https://doi.org/10.2499/p15738coll2.133156>
- Environment, U. N. (2016). Food systems and natural resources. United Nations Environmental Programme. <http://www.unep.org/resources/report/food-systems-and-natural-resources>
- Ericksen, P. J. (2008). Conceptualizing food systems for global environmental change research. *Global Environmental Change*, 18(1), 234-245. <https://doi.org/10.1016/j.gloenvcha.2007.09.002>
- Fanzo, J., Haddad, L., Schneider, K. R., Béné, C., Covic, N. M., Guarin, A., Herforth, A. W., Herrero, M., Sumaila, U. R., Aburto, N. J., Amuyunzu-Nyamongo, M., Barquera, S., Battersby, J., Beal, T., Bizzotto Molina, P., Brusset, E., Cafiero, C., Campeau, C., Caron, P., ... Rosero Moncayo, J. (2021). Viewpoint: Rigorous monitoring is necessary to guide food system transformation in the countdown to the 2030 global goals. *Food Policy*, 104, 102163. <https://doi.org/10.1016/j.foodpol.2021.102163>

<p>HLPE Nutrition and Food Systems. A Report by the High Level Panel of Experts on Food Security and Nutrition of the Committee on World Food Security. FAO. 2017. https://www.fao.org/3/i7846e/i7846e.pdf</p>
<p>Nguyen, Hahn. Sustainable Food Systems - Concept and Framework. FAO. 2018. http://www.fao.org/3/ca2079en/CA2079EN.pdf.</p>
<p>Njuki, J., Eissler, S., Malapit, H., Meinzen-Dick, R., Bryan, E., & Quisumbing, A. (2021). Food Systems Summit Brief Prepared by Research Partners of the Scientific Group for the Food Systems Summit, May 11th 202. IFPRI. https://bonndoc.ulb.uni-bonn.de/xmlui/bitstream/handle/20.500.11811/9132/fss_briefs_review_evidence_gender_equality.pdf</p>
<p>RFS Food Systems Conceptual Framework, July 2021. (2021). USAID. https://www.usaid.gov/sites/default/files/2022-05/RFS-Food-Systems-Conceptual-Framework-Summary-Guidance.pdf</p>
<p>Ruben, R., Cavatassi, R., Lipper, L., Smaling, E., & Winters, P. (2021). Towards food systems transformation—Five paradigm shifts for healthy, inclusive and sustainable food systems. Food Security, 13(6), 1423-1430. https://doi.org/10.1007/s12571-021-01221-4</p>
<p>van Berkum, S., & Ruben, R. (2021). Exploring a food system index for understanding food system transformation processes. Food Security, 13(5), 1179-1191. https://doi.org/10.1007/s12571-021-01192-6</p>
<p>von Braun, J., Afsana, K., Fresco, L., Hassan, M., & Torero, M. (2020). Food Systems - Definition, Concept and Application for the UN Food Systems Summit. United Nations. https://www.un.org/sites/un2.un.org/files/2020/12/food_systems_paper-draft_oct-25.pdf</p>
<p>Woodhill, J., & Quak, E.-J. Changing Food Systems: Implications for DFID priorities. DFID. 2019. https://assets.publishing.service.gov.uk/media/5d9b5397e5274a5a148b40e1/K4D_Learning_Products1234-124_Changing_Food_Systems_Policy_Brief.pdf</p>