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FOOD SYSTEMS AT RISK

NEW TRENDS AND CHALLENGES





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Sandrine Dury,
Pauline Bendjebbar,
Étienne Hainzelin,
Thierry Giordano
and Nicolas Bricas (Eds)

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CHAPTER 1.2

THE SIX MAIN CATEGORIES OF DRIVERS SHAPING FOOD SYSTEMS

Pauline Bendjebbar¹ and Nicolas Bricas¹

SUMMARY

This chapter explores the different drivers that might affect the future of food systems, their role and impact on food systems and their outcomes..

In the near future, many different drivers are going to challenge food systems. Until now, many reports have emphasised the future trends and challenges for food systems around the world (Caron *et al.*, 2018; Claquin *et al.*, 2017; FAO, 2017; HLPE, 2017; Jahn *et al.*, 2018; van Berkum, Dengerink and Ruben, 2018; WRI, 2018), while this report concentrates on the future risks for food systems in Low-Income (LI) and Lower Middle-Income (LMI) countries, which might be the most vulnerable nations in the years to come.

Depending on how they look at food systems, authors define different types of drivers (Caron *et al.*, 2018; Claquin *et al.*, 2017; FAO, 2017; HLPE, 2011). Some authors consider two sets of drivers (socioeconomic and environmental) (van Berkum, Dengerink and Ruben, 2018), while others consider five groups of drivers: (1) biophysical and environmental; (2) innovation, technology and infrastructure; (3) political and economic; (4) socio-cultural; and (5) demographic drivers (HLPE, 2017). We will define and describe how these can affect food systems.

For our study on risks, we will distinguish six main categories of drivers shaping food systems in LI and LMI countries: demographic, biophysical and environmental, innovation, technology and infrastructure, sociocultural, economic and political (*cf.* Figure 3). We choose six over five, because we prefer to separate political drivers from economic ones as they refer to different dynamics.

Biophysical and environmental drivers

These drivers refer to the natural resources available, pollution and climate. They shape food systems mainly on the production side because food production is highly reliant on the availability of natural resources (water, land, biodiversity etc.).

Natural resources refers, according to the UN, to all “natural assets (raw materials) occurring in nature that can be used for economic production or consumption.” These elements are soil, land, water, fish, biodiversity (plants, animals, microbes etc.), forest and the minerals present in nature. The UN definition distinguishes four categories: mineral and energy resources, soil resources, water resources and biological resources. Some are fossil-based and can be considered as a finite stock and non-renewable (for example, mining phosphate). They are “exhaustible natural resources such as mineral resources that cannot be regenerated after exploitation.” Some others are renewable, which means that these natural resources “after

1. CIRAD, UMR MOISA, F-34398 Montpellier, France; University of Montpellier, F-34090 Montpellier, France.

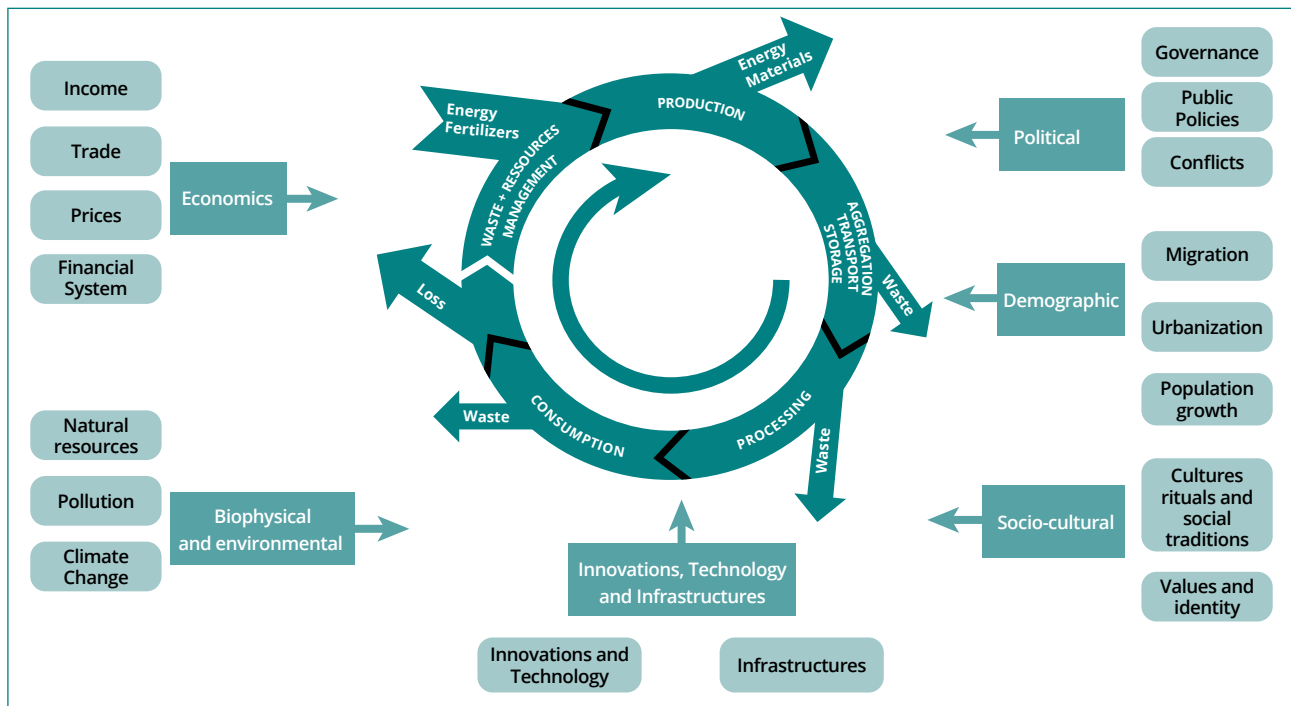


Figure 3: Blueprint of the drivers affecting different parts of the food systems.
Source: Authors.

exploitation, can return to their previous stock levels by natural processes of growth or replenishment.” Among renewables, the UN definition distinguishes two types: conditionally renewable, which refers to natural resources that “after exploitation eventually reaches a level beyond which regeneration will become impossible” (for example, forests and fish) and fully renewable (for example, sunlight). The availability and cost of these resources determine the shape and nature of food systems since many of them are inputs in the agricultural production process (UN, 1997).

Climate refers to “the average weather, or more rigorously, as the statistical description in terms of the mean and variability of relevant quantities over a period of time ranging from months to thousands or millions of years.” The IPCC defines climate change as “a change in the state of the climate that can be identified (e.g. by using statistical tests) by changes in the mean and/or the variability of its properties... typically decades or longer” (IPCC, 2018). We choose to define it using the United Nations definition: climate change is “a change of climate which is attributed directly or indirectly to human activity that alters the composition of the global atmosphere and which is in addition to natural climate variability observed over comparable time periods” (United Nations, 1992). It affects food quality and availability. Climate change also affects the geography of food production and of plant and animal diseases. This might affect agricultural outputs since it will reduce and put pressure on the resources available for production.

This means it might reduce crop yields and forest and animal productivity (FAO, 2017).

Demographic drivers

These drivers refer to population growth, urbanisation, migration and population displacement. They have a crucial influence on demand, in terms of the quantity of food needed, but also on the quality and type of food consumed, as well as the food environment.

Population growth refers to the increasing number of people in the world. This will have an impact on future food demand (FAO, 2017).

Urbanisation refers to the concentration of populations in cities and the way of life it induces: reduced agricultural production for self-consumption, access to food mainly through the market and high-density population. Urbanisation is a big driver that shapes consumer behaviour and the food environment. Urbanisation induces changes in diets (more processed food, animal products and diversity) and in food habits (more purchases and out of home consumption). Urbanisation also has consequences for consumers’ food environments as well as for the organisation of the supply of food (FAO, 2017).

Population displacement and migration will shape food systems. Displacement of people can be defined as “an individual who has been forced or obliged to flee from his home or place of habitual residence... in particular as a result of or in order

to avoid the effects of armed conflicts, situations of generalized violence, violations of human rights or natural or human-made disasters, and who have not crossed an internationally recognized State border (according to the Guiding Principles on Internal Displacement)" (UNHCR, 2019). There are many causes of displacements: armed conflicts, natural disasters, famine, and developmental and economic changes. Displacements can be internal and external. A migrant is defined by the International Organization for Migration (IOM) as "the movement of a person or a group of persons, either across an international border, or within a State. It is a population movement, encompassing any kind of movement of people, whatever its length, composition and causes; it includes migration of refugees, displaced persons, economic migrants, and persons moving for other purposes, including family reunification" (FAO, 2019).

Innovation, technology and infrastructure drivers

Innovation, technology and infrastructure are major drivers of food systems. They influence both supply, for example, by improving system productivity, and demand (van Berkum, Dengerink and Ruben, 2018). They can produce major shifts in food systems.

Innovation, technology include a wide range of more-or-less sophisticated 'tools' affecting agricultural and post-harvest activities and the productivity of labour and land. They also include new ways of managing and organising production, processing and marketing, and waste management, all along food chains and food systems (HLPE, 2017).

Infrastructure as a driver of food systems refers to transport and water and energy supply as they facilitate access to inputs and provide an outlet for produce. Infrastructure also includes marketplaces, storage warehouses, harbours, slaughterhouses and communication networks (mobile phones and internet). The nature of infrastructure provides different opportunities for some specific food systems to extend their operations: for example, cooling devices (cold stores and freezers etc.) providing long-term conservation of minimally processed fresh products (fish, vegetables and meat) (HLPE, 2017).

Economic drivers

Economic drivers include different elements such as incomes, globalisation and trade, prices and financial systems. These drivers affect all aspects of food systems from production to demand. They provide opportunities that enable supply to meet demand or, on the contrary, can disrupt systems, for example through price crises.

Incomes have a big influence on diet composition. When incomes increase, consumption of more expensive food, such as animal products and processed food, also increases. Incomes also includes that of farmers and food producers, affecting their ability to invest in order to increase productivity. Many technologies are widely available but are not broadly disseminated because of the poverty among a major portion of the rural population. Finally, incomes can also concern State revenues. In this case, it determines a government's capacity to invest in the agricultural sector, to implement policies and to regulate the sector.

Trade and globalization refer to the exchange of agricultural and food products at the local, regional and international scales. Trade not only takes place on physical markets but can also operate through virtual ones, such as futures markets. Trade has an impact on food and nutrition security because it affects different key variables such as food production prices, employment and government revenues. It also affects private and public investment in the longer term (FAO, 2016). International trade has grown strongly thanks to the standardisation of products and the definition of grades, making it possible to exchange goods without seeing the product. Such commoditisation exists mainly for products exchanged on international markets. Globalisation shapes the food environment, in particular through the development of standardised industrial food products and the expansion of supermarkets through companies with a global reach (Claquin *et al.*, 2017; HLPE, 2017).

Prices of inputs, such as energy and fertiliser, have a big influence on the way food systems develop. The level of food prices and their fluctuation also affects different parts of food systems, determining not only income and labour costs, but also consumption and investment decisions.

Financial system refers to the exchange of funds in which food systems are embedded and is linked to non-food markets. This means that a crisis in a financial system has consequences for agricultural and food products in terms of both prices and investments.

Socio-cultural drivers

These drivers refer to culture, religions and rituals, social traditions, education and health and values and identity. They affect mainly diets and the food environment by influencing lifestyles, social norms, attitudes and cultures embedded in food.

Cultures, rituals and social traditions: Food is a means of building and promoting one's identity, of expressing one's belonging to a community. All societies are defined as much by their diet and foodways as a language. Social norms, values and

practices evolve with increasing influences between societies. These acculturation processes have a strong influence on the organisation of food systems. They affect not only consumer demand but also the way business is done and the values attached to production or processing processes (HLPE, 2017).

Values and identity: Food is “central to individual identity, in that any given human individual is constructed, biologically, psychologically and socially by the food he/she chooses to incorporate” (Fischler, 1988).

Education and healthcare are also drivers of food systems (FAO, 2017). Education refers to the level of educational programme the person has completed, through school or training. Education has a strong impact on food systems, especially for consumers seeking access to information about products. In addition, education also has an impact on production, affecting farmers’ practices, and on economics in terms of employment and innovations. Health refers to “a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity” (WHO, 2019). If this state is not attained, food systems are under threat, either through the provision of agricultural labour or in support of consumer health. Healthcare is also important for food systems, driving the general health of consumers and labour forces, and ensuring well-functioning employment.

Political drivers

These drivers refer to governance, public policies, conflicts and humanitarian crises. They affect many of the drivers in food systems.

Governance “mechanisms at different scales are crucial for the design, enforcement and implementation” of food system support policies. Governance refers to the ways public decisions are discussed and considered. But governance also involves multiple stakeholders from the private sector and NGOs (HLPE, 2017).

Public policies influence food systems through many tools, such as regulations and laws, investments, subsidies and taxes, information and legitimation or support for actors involved in food systems. While most countries have agricultural policies, few have food policies, or limit these policies to food availability and food safety (HLPE, 2017).

Conflicts and civil unrest refer to political crises and civil or international wars with violence. Conflicts are a key driver of severe food crises and recently re-emerged famines, while hunger and undernutrition are significantly worse where conflicts are prolonged and institutional capacities are weak. But conflicts also play an important role in population migration and displacement. Regions that welcome migrants can experience a rapid rise in population with a disruptive effect on food systems (HLPE, 2017).

Drivers can be internal to food systems and are interrelated

These drivers are intimately interrelated. These interrelations induce possible synergies, which amplify or accelerate their effects.

While external drivers shape food systems, development options and the kinds of food systems chosen by some countries also have an impact on drivers. For example, production based on the massive use of energy and non-renewable resources, which prevails in industrialised countries, depletes natural resources, contributes to climate change and greenhouse gas emissions and increases inequalities. These drivers affect food systems, not only in the countries that have chosen these economic development options, but globally. These food system pathways can be considered as internal drivers. Food system configurations create path dependency, such as routines, social habits, infrastructure, food habits, organisational logics etc. This can cause inertia and halt potential changes in food systems.

External drivers evolve and some of their trends drive food system pathways. However, while they are evolving, food systems have their own intrinsic inertia, innovative pathways and trends which influence their own potential to change.

In this report, we focus mainly on the major consequences and risks caused by external drivers to actual food systems. We focus on drivers that put food systems under pressure. We assume that some parts of the world, such as LI and LMI countries, are under a specific threat due to the unprecedented combinations of trends in drivers. ●

References

- Caron, P., Ferrero y de Loma-Osorio, G., Nabarro, D., Hainzelin, H., Guillou, M., Andersen, I., Arnold, T. et al.** 2018. Food systems for sustainable development: proposals for a profound four-part transformation. *Agronomy for Sustainable Development* 38: 41. <https://doi.org/10.1007/s13593-018-0519-1>
- Claquin, P., Martin, A., Deram, C., Bidaud, F., Delgoulet, E., Gassie, J. & Hérault, B.** 2017. MOND'Alim 2030, panorama prospectif de la mondialisation des systèmes alimentaires. Paris, La Documentation française.
- FAO.** 2017. *The future of food and agriculture – Trends and challenges*. Rome. 166 pp.
- FAO.** 2019. *FAO Migration Framework – Migration as a choice and an opportunity for rural development*. Rome. 128 pp.
- Fischler, C.** 1988. Food, self and identity. *Social Science Information*, 27(2): 275-292.
- HLPE.** 2017. *Nutrition and food systems*. Report 12 by the High Level Panel of Expert on Food Security and Nutrition of the Committee on World Food Security. Rome.
- IPCC.** 2018. Annex I: Glossary [R. Matthews, ed.]. In V. Masson-Delmotte, P. Zhai, H.-O. Pörtner, D. Roberts, J. Skea, P.R. Shukla, A. Pirani et al., eds. *Global warming of 1.5°C. An IPCC Special Report on the impacts of global warming of 1.5°C above pre-industrial levels and related global greenhouse gas emission pathways, in the context of strengthening the global response to the threat of climate change, sustainable development, and efforts to eradicate poverty*. In Press.
- Jahn, M.M., Jayamaha, B., Mulhern, W.S., Ross, D.E., Rose, M.A., Treverton, G.F.,** 2018. *Global Food System. Stability and Risk. At the Nexus of Defense and Development*. Thomson Reuters Research Report. 30 p.
- UNESCO.** *Glossary of Migration Related Terms*. [online] <http://www.unesco.org/shs/migration/glossary>
- UNHCR.** 2019. Glossary. In: *UNHCR, The UN Refugee Agency, Global Focus* [online]. Geneva. [Consulted June 2019]. <http://reporting.unhcr.org/glossary/i>
- United Nations.** 1992. *United Nations framework convention on climate change*. Rio de Janeiro, UN (also available at: <https://unfccc.int/resource/docs/convkp/conveng.pdf>).
- United Nations Statistics Division (UNSD).** 1997. Glossary of environment statistics, studies in methods. Series F, 67, New York, United Nations.
- van Berkum, S., Dengerink, J. & Ruben, R.** 2018. *The food systems approach: sustainable solutions for a sufficient supply of healthy food*. Economic Research Memorandum 2018-064. Wageningen, Wageningen University.
- WHO.** 2019. Constitution. <https://www.who.int/about/who-we-are/constitution>.