



Food systems and the triple challenge

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- › Food systems include all elements and activities from farm to fork and beyond.
- › Globally, food systems need to meet the triple challenge of ensuring food security and nutrition for a growing population, providing livelihoods for farmers and others in the food chain, and improving the environmental sustainability of the sector.
- › Food systems have made remarkable achievements across all three dimensions, but they also face important challenges.
- › Better policies can help address the triple challenge. However, designing effective and coherent policies for food systems requires policymakers to navigate complex synergies and trade-offs between the different dimensions of the triple challenge.

What's the issue?

A food system consists of all elements and activities from farm to fork and beyond. This includes people, inputs, processes, or institutions related to the production and consumption of food, as well as their outputs, such as nutritional outcomes or socio-economic and environmental effects. There are many diverse food systems around the world that are interconnected with each other through, for example, international trade and global environmental challenges. While some aspects of food systems are global (e.g., international trade in agricultural commodities, or the contribution of food systems to greenhouse gas (GHG) emissions), others are highly localised (e.g., soil conditions or cultural traditions).

Globally, food systems are expected to deliver on a daunting triple challenge:

- providing sufficient, safe, and nutritious food to a world population that is expected to approach 10 billion in 2050,

- providing incomes to more than 500 million farmers and others in the food chain, and promoting rural development; and
- doing so sustainably, by using essentially the same amount of land and less water, while adapting to climate change and contributing to lower GHG emissions.

These three challenges are a crucial part of the broader challenges facing humanity as a whole. Of the 17 UN Sustainable Development Goals (SDGs), nearly all link directly or indirectly to food systems. Meeting the triple challenge by fostering more productive, sustainable and resilient food systems is thus key to achieving the SDGs by 2030.

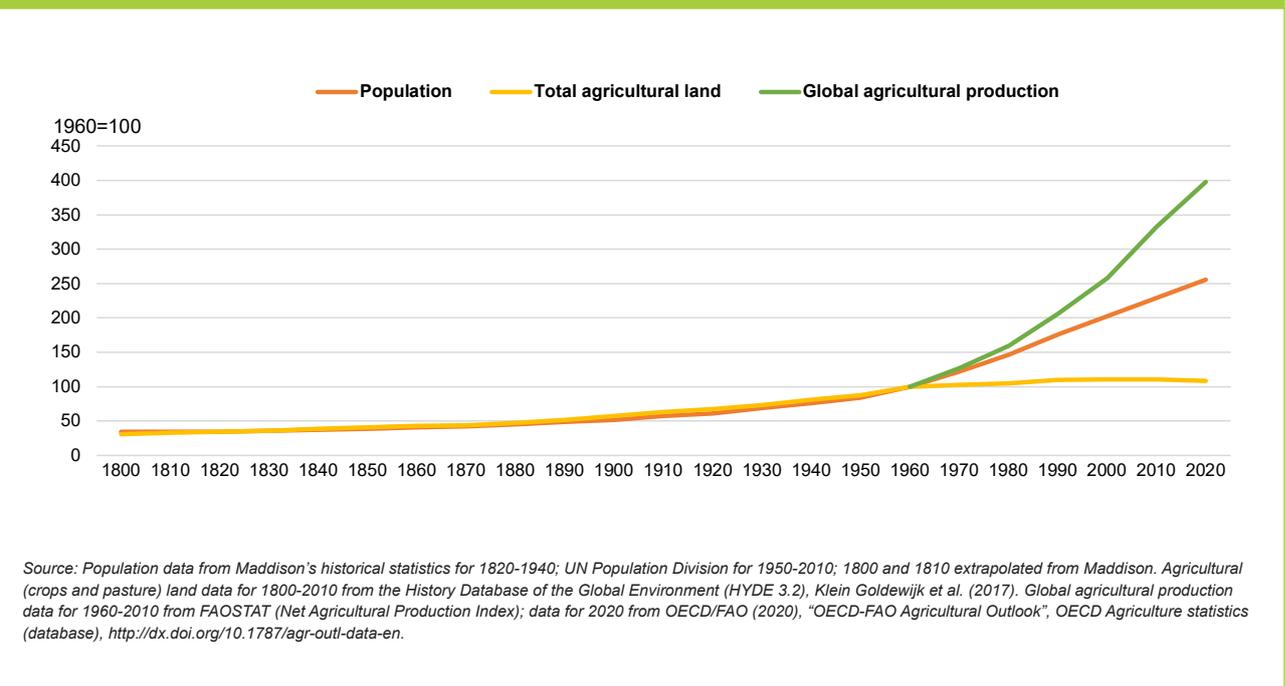
Yet, food systems around the world are not on track to achieve these goals. Globally, over 800 million people are undernourished, and an even greater number are either overweight or obese; these, and other forms of malnutrition, are associated with a rising public health





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Figure 1. Population, agricultural production and agricultural land use in the long run



and economic burden. In OECD countries, overweight and its related conditions will curb gross domestic product by an estimated 3.3% (OECD, 2019). While productivity growth has enabled lower food prices - a boon for consumers - it has also put pressure on the incomes of farmers who were not able to compete. In some countries, this has led to major rural-urban migrations. Food production also causes significant harm to the environment, with agriculture directly accounting for 11% of global GHG emissions, a share which doubles once the indirect effect of land use change is included.

These challenges, while serious, are sometimes viewed as evidence that food systems are completely "broken". However, this overlooks remarkable achievements across the three dimensions of the triple challenge. Since 1960, the world population has more than doubled (from 3 billion to about 7.5 billion today) (Figure 1). Food systems around the world have not only managed to increase agricultural production in line with population growth, but also to actually increase production per person by more than 45%, with important implications for nutrition and food affordability. Moreover, while total agricultural production has tripled, global agricultural land use has increased by only 10-15% as new techniques and technologies have allowed farmers to produce dramatically more food per unit of land.

A large part of this increase in production was initially due to more intensive use of inputs (fertilisers, pesticides, irrigation), which brought new environmental problems. In recent decades, however, the growth in agricultural production has been increasingly driven by innovation, efficiency gains, and technological progress, thereby reducing the environmental footprint per unit of food produced.

This productivity growth has also enabled a significant reduction in food prices, benefiting billions of consumers worldwide. Table 1 summarises the main achievements and shortcomings of food systems across the three dimensions of the triple challenge.

The outbreak of the COVID-19 pandemic in early 2020 has placed additional stress on food systems (OECD, 2020). However, the "triple challenge" existed before the onset of the pandemic, and will remain after COVID-19 has receded. So, while addressing the immediate issues raised by the pandemic, governments still need to continue to invest in policies to tackle the triple challenge over the medium and long-term (OECD, 2020).



Table 1. Main achievements and shortcomings of food systems across the three dimensions of the triple challenge

	Main achievements	Main shortcomings
Food security and nutrition	The world population has increased from 3 billion in 1960 to 7.5 billion today, and enough food is available	Over 800 million are undernourished, even more are overweight or obese, with a rising public health burden
Resource use and climate change	Production has increased through improved productivity rather than greater land use	One-third of the world's soils is degraded; half of the world's agricultural area is under water stress; and agricultural production contributes to 11-24% of global GHG emissions
Livelihood and rural development	Successful development has led to poor farmers being absorbed in other sectors	Farm incomes are under sustained pressure from lower prices; rural-urban migration pressures

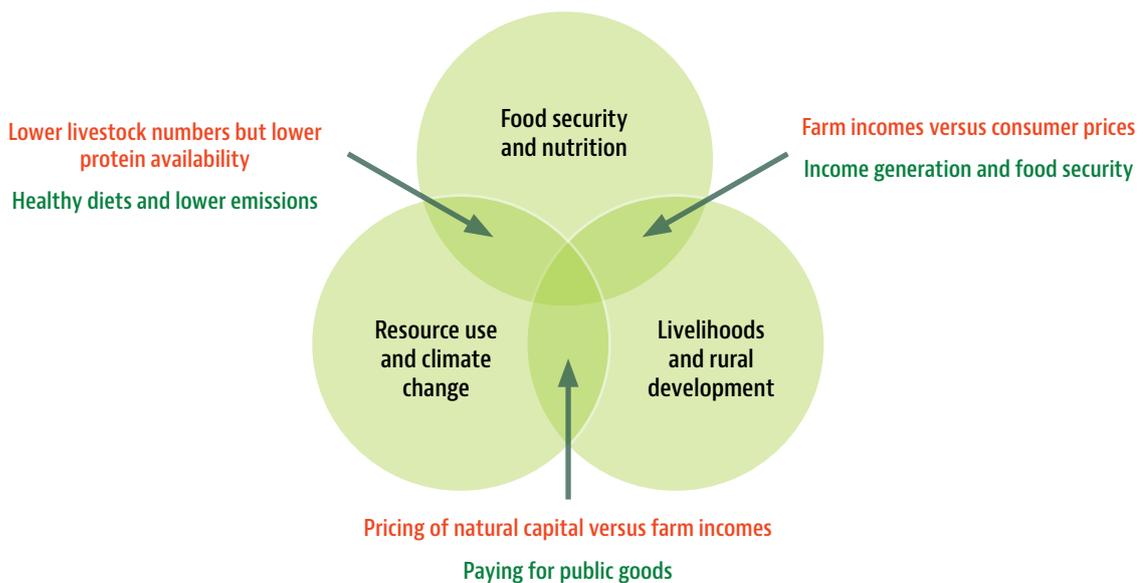
What should policy makers do?

At present, many agri-food policies fail to deliver good outcomes across the three dimensions of the triple challenge. The use of agricultural support policies is a good illustration of this lack of coherence.

Across the 54 OECD and non-OECD countries covered in the OECD's Agricultural Policy Monitoring and Evaluation, farmers receive USD 536 billion per year in public support; two-thirds of this is provided through

higher prices paid by consumers and through payments that are coupled to production, including variable input subsidies (OECD, 2020). Such policies that keep domestic prices above international price levels impose a high burden on poor consumers and can undermine food security. There is also evidence that coupled support can exacerbate environmental impacts by incentivizing farmers to expand production and intensify the use of environmentally damaging inputs

Figure 2. Examples of synergies and trade-offs in food systems



Note: Examples of synergies are noted in green; examples of trade-offs in red.
Source: OECD.



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(Henderson & Lankoski, 2019). It can also undermine efforts to adapt to climate change by locking farmers into producing certain crops even where conditions are becoming increasingly less suitable. Despite some progress made in the early 2010s in shifting towards better targeted and less distorting support measures (e.g., measures with a greater focus on innovation or technical advice to farmers), reform efforts have now largely stalled.

To meet the triple challenge, policies should not only be coherent but also sufficiently ambitious to deliver the best possible outcomes across all three dimensions. What makes this complicated are the significant interactions among the dimensions of the triple challenge, as policies in one area can have spill over effects on other dimensions.

The triple challenge provides a simplified organising framework for considering these interactions (Figure 2). As this framework suggests, while some objectives can be pursued more or less independently via targeted policies (the non-intersecting part of the diagram), there might be important synergies and trade-offs between the three dimensions of the triple challenge (the intersecting elements). For example, dietary guidelines in several countries suggest that people should limit their consumption of red meat. As these guidelines reduce demand for ruminant meat, they could also contribute to lower GHG emissions (a synergy). However, policies that lead to lower livestock production could also reduce protein availability in regions where intake is low (a trade-off) and negatively affect livelihoods (a trade-off).

These interactions between different policy objectives need to be taken into account when designing policies to avoid unintended side effects (in the case of trade-offs) or to be able to realise all possible benefits (in the case of synergies). One contribution of the triple challenge framework to the design of more effective and coherent policies for food systems is to highlight the synergies and trade-offs between policy domains that have historically often been treated in isolation.

Currently, there are wide gaps between policies that would be effective in addressing the triple challenge and the policies adopted in many countries. These gaps arise due to difficulties in identifying and addressing synergies and trade-offs (Brief No2), but can also reflect challenges in achieving better policies due to disagreements over facts, interests, or values (Brief No3).



Further reading

- OECD (2021), *Making Better Policies for Food Systems*, OECD Publishing, Paris, <https://dx.doi.org/10.1787/ddfba4de-en>.
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- OECD (2020-04-29), *COVID-19 and the food and agriculture sector: Issues and policy responses*, <http://www.oecd.org/coronavirus/policy-responses/covid-19-and-the-food-and-agriculture-sector-issues-and-policy-responses-a23f764b/>.
- OECD (2020-06-02), *Food Supply Chains and COVID-19: Impacts and Policy Lessons*, <http://www.oecd.org/coronavirus/policy-responses/food-supply-chains-and-covid-19-impacts-and-policy-lessons-71b57aea/>.
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- Henderson, B. and J. Lankoski (2019-05-13), "Evaluating the environmental impact of agricultural policies", OECD Food, Agriculture and Fisheries Papers, No. 130, OECD Publishing, Paris, <https://doi.org/10.1787/add0f27c-en>.

