

BOOSTING INNOVATION FOR SUSTAINABLE PRODUCTIVE AND RESILIENT AGRICULTURE AND FOOD SYSTEMS

Highlights

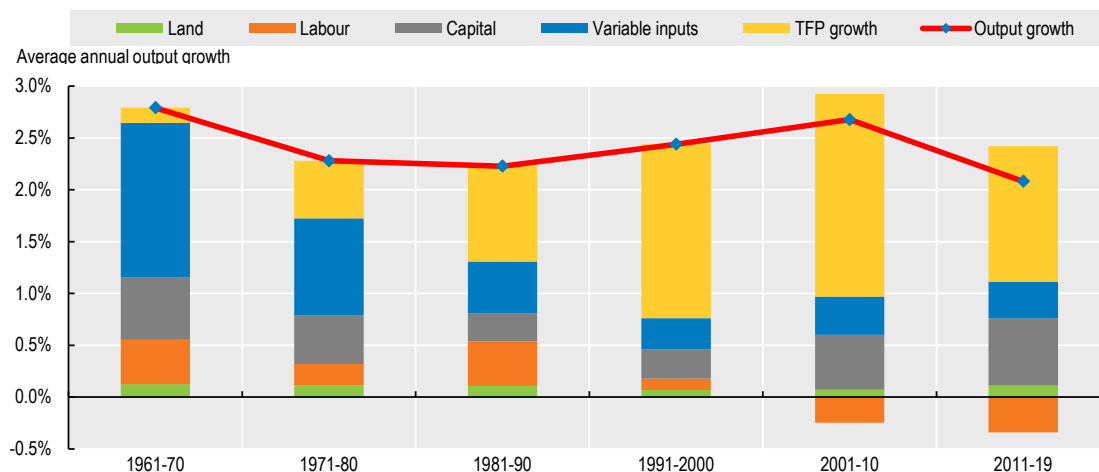
- Food systems need higher sustainable productivity growth to meet the triple challenge.
- Productivity growth makes it possible to produce more with less. This happens when innovations lead to technological change and a more efficient use of inputs and natural resources while sustaining viable livelihoods.
- According to the [OECD-FAO Agricultural Outlook 2022-2031](#), to achieve the Zero Hunger target while keeping agricultural emissions on track to reach the Paris Agreement targets, average global agricultural productivity would need to increase by 28% over the next decade.
- Governments have several policy levers to promote the drivers of sustainable productivity growth along the food supply chain. Well-functioning markets and a sound and stable regulatory and policy environment are key.
- Despite well-documented benefits, public spending on agricultural R&D and innovation has been slowing in OECD countries, representing only 0.7% of agricultural value added in 2020-22. Governments must urgently boost these investments to generate sustainable productivity growth.

What's the issue?

Food systems are expected to meet a triple challenge of providing healthy, safe and nutritious food for a growing population, while providing livelihoods for millions working along the food chain, while improving environmental sustainability (i.e. preserving land, water and biodiversity resources and contributing to lower GHG emissions). Sustainable productivity growth is essential to meeting this triple challenge.

Greater agricultural production can come from using more land or other inputs, or from improving the technology or the efficiency in the use of inputs. The latter is also known as Total Factor Productivity (TFP) growth. By making it possible to produce more with less, TFP growth is key to reconciling output growth with environmental sustainability. Luckily, since the 1990s growth in global agricultural production has been mainly driven by innovations such as improved farm management practices, new crop varieties and breeds, and digitisation, which increased TFP (Figure 1). As a result, the environmental impact per unit of food produced has fallen over time, as reflected in, for example, a falling GHG emissions intensity. However, after decades of increasing productivity growth, a slowdown is underway in several major countries posing serious risks, as it reduces the ability to adapt to climate change and other shocks. Lower productivity growth also puts pressure on resources including land, with potential negative implications for global biodiversity and deforestation. Those are worrying trends. Yet they can be reversed if governments renew their commitment to sustainable productivity growth.

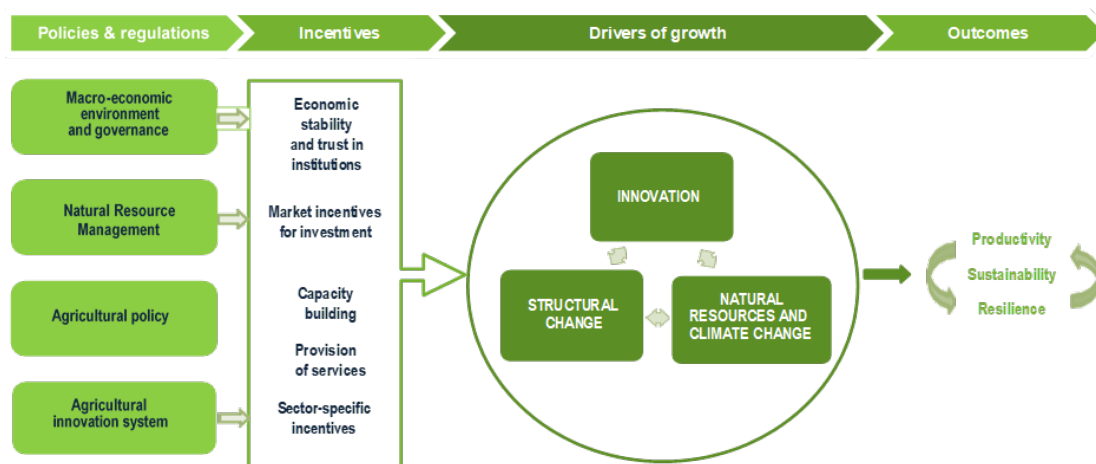
Figure 1. In recent decades, global agricultural production growth was mainly driven by TFP growth



What should policy makers do?

Analysis by the OECD has demonstrated how decisions by policy makers affect the productivity, sustainability, and resilience of food systems (Figure 2). These outcomes depend on trends in innovation, structural change, and natural resources use and climate change. In turn, these growth drivers are influenced by incentives, both economy-wide and sector-specific. The landscape of incentives in turn depends on more fundamental levers: again, some of these are economy-wide (such as the macro-economic environment) while others are sector-specific (such as agricultural policies).

Figure 2. Agricultural productivity and innovation



The [OECD Agro-Food Productivity-Sustainability-Resilience Policy Framework](#) has been successfully applied in [thirteen in-depth country reviews](#) and related OECD analysis. Based on this analysis, it is possible to identify four major policy priorities to boost sustainable productivity growth resiliently.

First, many policies still lock farmers into uncompetitive and low-income activities, which often harm the environment, stifle innovation, slow structural and generational change, and weaken resilience. Rolling back these policies is an important first step.

Second, governments should consider repurposing budgetary support towards investment in human capital, R&D and innovation with a focus on long-term productivity and sustainability. Available evidence indicates that governments are persistently under-investing on this front. For example, while the 54 countries covered by [OECD analysis](#) provided USD 817 billion per year in support to the agricultural sector from 2019-21, only 13% of this support goes to investments in agricultural innovation, infrastructure, and other public goods, down from 16% two decades earlier. Support for agricultural innovation in particular is only 0.7% of the value of agricultural production in these countries, despite its importance for meeting the triple challenge.

Third, governments can magnify the impact of public funding by making agriculture innovation systems more responsive. Successful innovation systems are collaborative, form clear strategic objectives in consultation with stakeholders, and use rigorous evaluation. All actors must work together to produce innovations that the sector needs and can use. Mechanisms are needed to bring new ideas into practice and to help farmers build the required skills, for example through advisory services or initiatives where farmers can learn from each other.

Fourth, governments should ensure a stable and enabling policy and regulatory environment conducive to long-term investments, including in infrastructure and skills. Well-functioning markets and a sound regulatory and policy environment are key to harnessing evolving market opportunities.

Moreover, governments should improve overall policy coherence, ensuring the right incentives for the provision of environmental sustainability outcomes, build trust and increase policy effectiveness and efficiency for the whole agro-food supply chain.

Further reading

Bureau, J. and J. Antón (2022), Agricultural Total Factor Productivity and the environment: A guide to emerging best practices in measurement", *OECD Food, Agriculture and Fisheries Papers*, No. 177, OECD Publishing, Paris, <https://doi.org/10.1787/6fe2f9e0-en>.