

Mitigating droughts and floods in agriculture

Market, policy and behavioural failures make it difficult to manage risks to agricultural production effectively. Climate change is expected to increase these risks. Governments can work to overcome these failures by adopting the right policies.

- Avoid policies that encourage risky production choices and increase vulnerability to droughts and floods.
- Strengthen the role of agriculture in drought management by allocating water rights to reflect sustainable use of water resources and, when possible, make use of economic instruments such as water markets and water pricing.
- Strengthen the role of agriculture in flood risk mitigation through the introduction of farm practices that regulate water flows or the use of agricultural land areas as floodplains.
- Develop flexible water shortage management tools, such as short-run markets in water rights, to reduce the cost of droughts to the agricultural sector.
- Foster the development of efficient insurance systems that reflect the true costs of droughts and floods through insurance premiums.

What are the issues?

Droughts and floods present significant and increasing risks for agricultural production. Projected increases in demand for food, feed and fibre will exacerbate competition for limited water resources in many regions, thereby increasing structural water stress and vulnerability to water shortages. Floods can also severely affect agricultural production in some regions, and rising urbanisation raises the question of how rural and urban areas should share flood risks. Climate change will likely increase the frequency and severity of droughts and floods in many regions, thereby exacerbating the challenge of managing these risks.

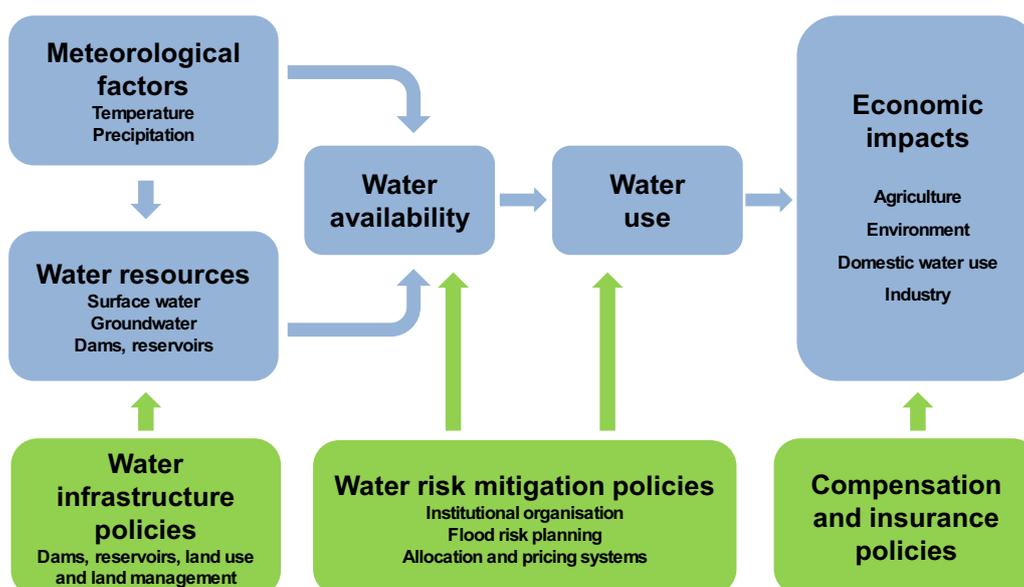
Droughts and floods create short, medium and long-term costs – both to markets and productivity – that are not always taken into account. The cost of droughts and floods not only includes direct and instantaneous losses, such as crop failures, but also a wide range of indirect and longer run costs which are often insufficiently taken into account by farmers, consumers and policy makers. For example, large and long-duration droughts can, by raising agricultural prices, destabilise the whole food-chain and not only local economies. A severe drought in a big commodity exporting country can lead to more volatile commodity prices, with potential chain reaction risks for world commodity markets. Large flooding can disrupt local economies, particularly in developing countries, where droughts and floods often more heavily affect low-income communities, and have long-lasting negative impacts on economic growth prospects.

A complex interaction of market, policy, and behavioural failures make it difficult to effectively manage drought and flood risks in agriculture. Users of water resources and water storage infrastructures are often allowed to access water with few restrictions, making the resource vulnerable to overuse unless there are appropriate policies for water allocation and price setting. In most OECD countries, farmers do not pay for the full price of water, and lack proper incentives to manage water in a way that maximises output while ensuring the resource's long-term sustainability. Some policies can exacerbate excessive risk taking, such as crop insurance subsidies or commodity price support. In addition, behavioural issues, such as underestimation of low-probability events, or distorted beliefs about the true costs of risks, complicate decision making and the adoption of adequate policy responses.

What should governments do?

Mitigating droughts and floods requires a structured combination of complementary policy instruments whereby each instrument targets a specific market failure. Government policies should be designed to comprehensively address these market failures at *various stages* in the formation of droughts and floods, i.e. the hydrological impacts, water allocation mechanisms, and insurance and compensation mechanisms (Figure 1). Governments also need to think beyond water and insurance policies to explore how other related policy areas – such as agriculture or land use policies – affect farmers' risk management decisions.

Figure 1: Mitigating droughts and floods in agriculture requires a combination of policy responses



Governments should identify and remove forms of farm support that encourage farmers to artificially increase their exposure to risk. Crop insurance subsidies, input subsidies, and commodity price supports can affect farmers' production decisions and, in certain circumstances, increase their exposure to drought and flood risks by encouraging them to cultivate high-risk land, high-risk crops or divert them from adopting a more diverse range of activities.

Governments should assess future water requirements and design policies to ensure long term sustainable water management. In many OECD countries, agricultural water remains under-priced, insufficiently reflecting the current and future imbalances between availability and usage. Innovative market-based solutions to managing water supplies, such as water markets, combined with high quality weather and hydrological information systems, have been proven in several OECD countries to substantially mitigate the costs of water stress and shortages. For flooding risks, governments could further foster the role of agricultural land as provider of floodplains and soil water retention services, which could increase the cost-efficiency of flood risk mitigation (as is done for instance in the Netherlands, United States, and United Kingdom).

Governments should improve crisis management of droughts and floods in agriculture by developing flexible instruments for water allocation. Allowing the trading of water rights among users could greatly reduce the cost of droughts in agriculture, by ensuring efficient allocation of water during water shortage events (e.g. Australia). For countries with less frequent or severe droughts, clearly laying out the order of priority among waters users in the event of a drought would be more cost-efficient. More flexible instruments may be needed in the future given the rising risks due to climate change and increasing water demand.

Governments have a role to play in tackling market failures in the provision of insurance products against water-related risks, by providing a clear framework for the allocation of risk-sharing and responsibilities, and by facilitating the development of insurance products. Insurance premiums should reflect the true costs and benefits of risk-taking to avoid artificially boosting demand for insurance and potentially increasing risk-taking behaviours by farmers. In some contexts, weather index-based insurance could also be developed to complete the existing set of market and policy responses. If necessary, government intervention should focus on catastrophic risk layers.

For more information

OECD. (2016), *Mitigating Droughts and Floods in Agriculture: Policy Lessons and Approaches*, OECD Studies on Water, OECD Publishing, Paris. <http://dx.doi.org/10.1787/9789264246744-en>