



## Agriculture and Water

### Highlights

- The agricultural sector is the largest and often one of the most inefficient users of water. At the same time, agriculture is also a major source of water pollution. These factors not only negatively impact the environment in many regions, but also affect the viability of the agricultural sector itself and that of other water users.
- In order to facilitate a transition to a more sustainable and productive agricultural sector that is resilient to water risks, governments should act at the farm, watershed and national levels to, for example:
  - Create incentives for farmers to improve the efficiency of water use and better manage the use of polluting agricultural inputs.
  - Enforce existing water regulations and remove policies that support excessive use of water and polluting activities.



### What's the issue?

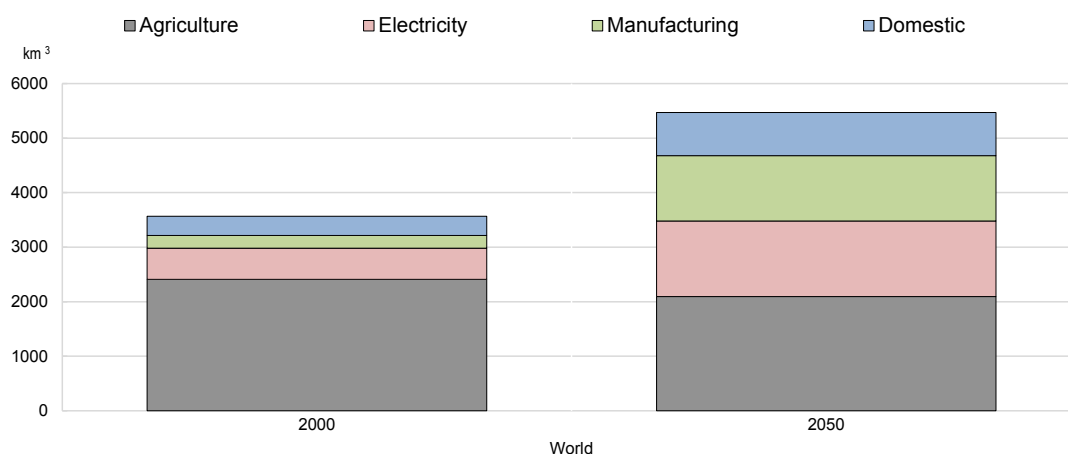
Agricultural regions in the OECD have been subject to extensive and increasing water constraints in recent years. Major droughts in Chile and the United States, for example, have affected agricultural production while diminishing surface and groundwater reserves.

This trend is expected to continue. Projections reveal that agricultural production will have to rely on much less freshwater resources than before. Climate change is predicted to increase fluctuations in precipitation and surface water supplies and reduce snow packs and glaciers. Extreme weather events, like droughts and floods, are also expected to be more frequent. Coupled with these changes, farmers in many regions will face increasing competition from non-agricultural users due to rising urban population density and water demands from the energy and industry sectors.

Finally, water quality is also likely to deteriorate in many regions, due to the growth of polluting activities, salination caused by rising sea levels and the abovementioned water supply changes. These water challenges are expected to strongly impact agriculture – a highly water-dependent sector – undermining the productivity of rain-fed and irrigated crop and livestock activities in many regions. These changes could in turn further impact markets, trade and broader food security.

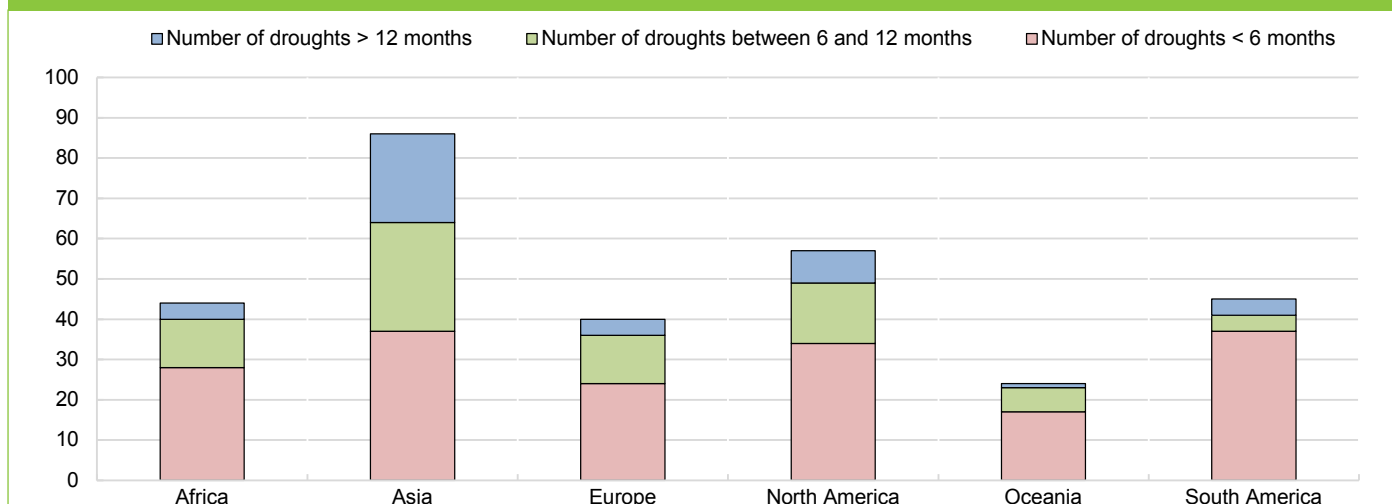
For as much as agriculture is impacted by these changes, it also contributes to these problems as a major – and often inefficient – user and polluter of water resources in many regions. As such, agriculture has a central role to play in addressing these challenges. Irrigated agriculture remains the largest user of water globally, accounting for 70% of global water abstraction and over 40% in many OECD countries.

FIGURE 1. GLOBAL WATER USE IS PROJECTED TO SUBSTANTIALLY INCREASE IN NEAR FUTURE



**FIGURE 2. THE NUMBER AND DURATION OF DROUGHTS VARY ACROSS REGIONS**

Number and duration of major drought events, 1950-2000



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

This trend is encouraged by the fact that irrigating farmers in most countries do not pay for the full cost of the water they use. Intensive groundwater pumping for irrigation depletes aquifers and can generate negative environmental externalities, leading to significant economic impacts on the sector and beyond. In addition, agriculture remains a major source of water pollution: agricultural fertiliser runoff, pesticide use and livestock effluents all contribute to the pollution of waterways and groundwater.



### What should policy makers do?

The challenges that lie ahead are both extremely complex and locally diverse. It will be important to focus on policies that increase the overall efficiency of water use by the agricultural sector, reduce the sector's impact on freshwater resources, and improve its resilience to water risks. To this end, multiple policy responses are needed at different levels, each adapted to specific water resource systems.

#### At farm level, the following actions are needed:

- Establish farm-level information systems on water resources, water quality and risks.
- Encourage uptake by farmers of water-efficient and water risk-resilient technologies and practices.
- Foster better farm management practices that internalise environmental costs by means of the polluter-pays principle.

#### At watershed level, governments should:

- Improve information systems on surface and groundwater quality and flows, help to assess risks, and implement programmes tailored to specific challenges.
- Define property rights attached to water withdrawals, water discharges and ecosystem provision, and ensure that these sustainably reflect water availability.
- Develop flexible and robust water allocation systems that allow both price and quantity to fluctuate – via market mechanisms, for instance – in response to seasonal conditions and shocks.
- Use regulatory, economic, and collective measures to control intensive agricultural groundwater use and water pollution.

#### At national level, the enabling environment should be improved by:

- Enforcing existing regulatory provisions on water use and water pollution, ensuring that sanctions and penalties are effectively imposed in the event of non-compliance.
- Ensuring that charges for water supplied to agriculture at least reflect full supply costs, and ideally cover the opportunity cost of water withdrawals. Social and adjustment policies should be used to compensate the poorest farmers or to facilitate necessary consolidation in the affected sectors.
- Designing risk management instruments that effectively increase the resilience of farmers to the uncertainties associated with weather events and climate change.
- Removing non-water related price-distorting policy measures, such as agricultural and energy subsidies.
- Fostering transparent and open markets that allow food to be produced where it is economically efficient and environmentally sustainable to do so, and that pool risks by enabling yield losses in a given region to be offset through imports.



### Further reading

This document is based on the evidence and analysis found in a number of OECD reports and papers published in recent years:

- **Mitigating Droughts and Floods in Agriculture: Policy Lessons and Approaches**
- **Drying Wells, Rising Stakes: Towards Sustainable Agricultural Groundwater Use**
- **Adapting Agriculture to Climate Change**
- **Compendium of Agri-environmental Indicators**
- **Policy Measures Addressing Agri-environmental Issues**
- **Farmer Behaviour, Agricultural Management and Climate Change**

A complete list of relevant books and papers can be found at <http://oe.cd/taking-stock> or on the Agriculture Ministerial website at [www.oecd.org/agriculture/ministerial](http://www.oecd.org/agriculture/ministerial).