

# Agriculture – managing risk and enhancing resilience

Climate change poses significant risks for the agricultural sector and for global food security. Resilience to the impacts of a warming world will be enhanced by keeping the inevitable rise in average global temperature below certain key thresholds.



## Agriculture in a Warming World

Recent extreme climatic events, such as heat waves, floods, droughts, and wildfires, are combining with long-term trends including rising temperatures and changes in precipitation patterns, with broad and deep implications for the agricultural sector.



Reduced security and quality of freshwater resources



Reduced crop yields for staples such as wheat, maize and rice



Higher prices and enhanced market volatility for agricultural commodities



Damage to agricultural production caused by pests



Destruction and/or disruption to agricultural infrastructure



Falls in labour productivity, particularly for manual labour in humid climates



Shifts in production areas of food and non-food crops



Threats to livestock, especially from heat stress



## Steps for Mitigation

Greenhouse gas (GHG) emissions from agriculture comprised about 10–12% of man-made GHG emissions in 2010. This is the largest contribution from any sector of non-carbon dioxide (CO<sub>2</sub>) GHGs such as methane, accounting for 56% of non-CO<sub>2</sub> emissions in 2005. The agricultural sector has significant potential to make cuts in GHG emissions.



## Steps for Adaptation

Adaptation is highly context-specific, and no single approach for reducing risk is appropriate across all regions, sectors, and settings. Farmers can adapt to some changes, but there is a limit to what can be managed. Agricultural companies can draw from a range of options to maximise adaptive capacity based on a solid understanding of risks.

## Resilience requires both mitigation and adaptation

We are currently on a path to a global mean temperature rise in the range 1.5 to 4.5°C by the end of the century. The higher end of this range would push agriculture far beyond manageable thresholds. The agricultural sector's own interests are best served by implementing ambitious approaches to mitigation to ensure that key temperature thresholds are not crossed, while also working to enhance adaptive capacity to inevitable temperature rises and associated climate events.



### Supply Side Options

- ▶ Improve feeding and dietary additives for livestock
- ▶ Improve agronomy, nutrient and fertiliser management for cereals
- ▶ Establish agro-forestry systems
- ▶ Replace fossil fuels by biofuels
- ▶ Integrate bioenergy production and food production



### Demand Side Options

- ▶ Reduce overconsumption in regions where it is prevalent
- ▶ Reduce loss and waste of food in supply chains
- ▶ Change diets towards less GHG-intensive food



### Livestock Options

- ▶ Match stocking rates with pasture production
- ▶ Adjust herd and water point management
- ▶ Use more suitable livestock breeds or species
- ▶ Manage livestock diet quality
- ▶ More effective use of silage, pasture spelling and rotation
- ▶ Monitor and manage the spread of pests, weeds and diseases



### Policy Options

- ▶ Index-based weather insurance
- ▶ Risk sharing and transfer mechanisms
- ▶ Public-private finance partnerships
- ▶ Payments for environmental services
- ▶ Improved resource pricing
- ▶ Trade reform



### Crop Options

- ▶ Improve tolerance of crops to high temperature
- ▶ Breed additional drought-tolerant crop varieties
- ▶ Use adaptive water management techniques
- ▶ Alter cultivation and sowing times
- ▶ Improve crop rotation systems



Global temperature increases of 4°C or more, combined with rising food demand, would pose large risks to food security globally and regionally.

3°C



Adaptive capacity is projected to be exceeded in regions closest to the equator if temperatures rise by 3°C or more.

1.5°C



Local warming of up to 2°C is expected to reduce average yields for the major cereals (e.g. wheat, rice, maize) in temperate regions.

0°C