



# THE CLIMATE CHANGE THREAT TO FOOD SECURITY

*The food price crisis is one result of climate change, says Brett Parris, and we must tackle this crisis as part of a much larger, far greater global response.*

Climate change is already affecting food security and it is expected to have even greater impacts in coming years. In 2007, the Inter-governmental Panel on Climate Change (IPCC) released its *Fourth assessment report*, summarising the findings of the peer-reviewed scientific literature on climate change and what can be done in response.<sup>1</sup>

## HOW FOOD IS AFFECTED

There are at least four channels by which climate change affects food security:

- **Temperature increase.** Higher temperatures lead to heat stress for plants, increasing sterility and lowering overall productivity. Higher temperatures also increase evaporation from plants and soils, increasing water requirements while lowering water availability.
- **Changing patterns.** In many places, growing seasons are changing, ecological niches are shifting, and rainfall is becoming more unpredictable and unreliable both in its timing and its volume. This is leading to greater uncertainty and heightened risks for farmers, and potentially eroding the value of traditional agricultural knowledge such as when to plant particular crops.

- **Rising sea levels.** Rising seas contaminate coastal freshwater aquifers with salt water. Several small island states are already having serious problems with water quality, which is affecting agricultural productivity.

Higher seas also make communities more vulnerable to storm surges which can be 5–6 metres high. The storm surge from cyclone Nargis travelled 35 kilometres inland, killing 140,000 people and flooding around 14,400 km, an area one third the size of Switzerland.<sup>2</sup>

## Changes in ecology are leading to greater uncertainty and heightened risks for farmers

The IPCC projected a sea-level rise of less than one metre this century, emphasising that this does not take into account the dynamic processes in ice sheets related to ice flow. Once ice sheet dynamics are factored in, two metres is entirely possible this century, and we also could cross a threshold which guarantees several metres of sea-level rise next century. Even a one-metre sea-level rise would displace more than 145 million people and would contaminate drinking water and agricultural land for tens of millions more.<sup>3</sup>

- **Water.** The interactions between climate change, water scarcity and declines in agricultural productivity could lead to regional tensions and even open conflict between states already struggling with inadequate water supplies due to rising populations and over-pumping of groundwater.

The geo-political implications of water projections for Asia in particular are extremely serious. Increased glacier melt from the Himalayas and Tibetan Plateau in the next 20–30 years is likely to increase flooding, and by the late 2030s, glacier-fed river flows are expected to decrease dramatically as the glaciers shrink. The Middle East, Southern Africa and the Mediterranean basin also are expected to be afflicted by severe



An early rainy season allows farmers in the lowlands of Brooke's Point, the Philippines, to plant earlier than usual. In contrast, upland farming was been delayed because the land has not been cleared for planting. The emerging trends in climate variability have increased people's vulnerability to extreme weather events and sea-level rise. Villagers in Southern Palawan and Sorsogon province have complained about the ill effects of the erratic weather patterns on their livelihood. "The weather has become so unpredictable," a tribal leader said.

Photo: Diwa Gacosta/World Vision

### SOME OF THE LIKELY IMPACTS OF CLIMATE CHANGE (IPCC 2007):

- In the Sahelian region of Africa, warmer and drier conditions have led to a reduced length of growing season with detrimental effects on crops. In southern Africa, longer dry seasons and more uncertain rainfall are prompting adaptation measures. [p 9]
- The progressive acidification of oceans due to increasing atmospheric carbon dioxide is expected to have negative impacts on marine shell-forming organisms (e.g. corals) and their dependent species. [p 11]
- At lower latitudes, especially seasonally dry and tropical regions, crop productivity is projected to decrease for even small local temperature increases (1–2°C), which would increase the risk of hunger. [p 11]
- Increases in the frequency of droughts and floods are projected to affect local crop production negatively, especially in subsistence sectors at low latitudes. [p 12]
- Regional changes in the distribution and production of particular fish species are expected due to continued warming, with adverse effects projected for aquaculture and fisheries. [p 12]
- Africa: By 2020, between 75 and 250 million people are projected to be exposed to an increase of water stress due to climate change. ... Agricultural production, including access to food, in many African countries and regions is projected to be severely compromised by climate variability and change. The area suitable for agriculture, the length of growing seasons and yield potential, particularly along the margins of semi-arid and arid areas, are expected to decrease. This would further adversely affect food security and exacerbate malnutrition in the continent. In some countries, yields from rain-fed agriculture could be reduced by up to 50% by 2020. [p 13]
- Asia: Glacier melt in the Himalayas is projected to increase flooding, and rock avalanches from destabilised slopes, and to affect water resources within the next two to three decades. This will be followed by decreased river flows as the glaciers recede. ... Freshwater availability in Central, South, East and Southeast Asia, ... is projected to decrease due to climate change which ... could adversely affect more than a billion people by the 2050s. ... It is projected that crop yields could increase up to 20% in East and Southeast Asia while they could decrease up to 30% in Central and South Asia by the mid-21st century. [p 13]

water shortages. Widespread water shortages almost certainly would lead to widespread food shortages, which would trigger large movements of people and, potentially, major armed conflicts with staggering humanitarian and economic costs.

### PREPARING FOR UNAVOIDABLE CHANGE

Drastic reductions in greenhouse gas emissions are an essential component of a global food security strategy to prevent climate change from becoming catastrophic.

Our current trajectory is sending us towards warming of around 5–6°C above pre-industrial levels, which – if it continues for many more decades – would lead to famines beyond imagining and would almost certainly guarantee sea-level rises of around 12 metres.

The IPCC concluded that to have an even chance of keeping warming to around 2°C – not a safe level but possibly tolerable – the rich countries need to reduce their emissions by 25–40% below 1990 levels by 2020 and 80–95% below 1990 levels by 2050; developing countries also need to reduce their emissions below their “business as usual” rate.<sup>4</sup>

Developing countries urgently need more assistance to help them prepare for the impacts of climate change that are unavoidable. Such assistance should include transfer of the industrialised countries’ best energy efficiency and renewable energy technology and assistance with disaster preparedness, agricultural productivity improvements, water management, conflict prevention, reforestation, preventing deforestation and critical infrastructure.

It would be a mistake to treat the most recent food price crisis as an isolated short-term phenomenon. Much larger and longer-term forces are at work that demand urgent action. Sustained and systematic attention is crucial if we are to avoid a humanitarian catastrophe – a phrase that I do not use lightly. ■

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<sup>1</sup> IPCC, “Summary for policymakers”, in *Climate change 2007: Impacts, adaptation and vulnerability. Contribution of Working Group II to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. M L Parry, O F Canziani, J P Palutikof, P J van der Linden and C E Hanson, Cambridge University Press, Cambridge & New York, 2007

<sup>2</sup> J Luetz, *Planet prepare: Preparing coastal communities in Asia for future catastrophes*, World Vision International, Asia-Pacific Regional Office, Bangkok, 2008, p 12, [http://www.wvasiapacific.org/downloads/PlanetPrepare\\_LowRes.pdf](http://www.wvasiapacific.org/downloads/PlanetPrepare_LowRes.pdf)

<sup>3</sup> D Anthoff et al., “Global and regional exposure to large rises in sea-level: A sensitivity analysis”, *Working paper 96*, Norwich, Tyndall Centre for Climate Change Research, 2006, [http://www.tyndall.ac.uk/publications/working\\_papers/twp96.pdf](http://www.tyndall.ac.uk/publications/working_papers/twp96.pdf)

<sup>4</sup> S Gupta et al., “Policies, instruments and co-operative arrangements”, in *Climate change 2007: Mitigation. Contribution of Working Group III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change*, ed. B Metz, O R Davidson, P R Bosch, R Dave & L A Meyer; Cambridge University Press, Cambridge & New York, pp 745–807, 2007, Box 13.7, p 776