

# What a 2°C and 4°C warmer world could mean for global food insecurity

Based on research on extreme climate projections for food security

## 1. Using science to inform adaptation options

Many scientists are warning it is becoming increasingly unlikely that the world will be able to remain within the warming threshold of 2 degrees. To prepare for this possibility, decision-makers need to be able to plan to adapt to a world with higher levels of global warming. In order to help inform these adaptation decisions, the European Commission supported a scientific research project known as High-End Climate Impact and eXtremes (HELIX),

which aimed to assess and present the long-term impacts of extreme climate change across different temperature increases and adaptation efforts scenarios. HELIX brought together 16 organizations to provide a set of credible, coherent, global and regional views of different worlds at **1.5, 2, 4 and 6°C**. The initiative also had a regional focus on Northern Sub-Saharan Africa, South Asia and Europe.

**WFP's focus on this project** was to understand the long-term impacts of climate change on **food security and nutrition**, in order to support governments, communities and humanitarian actors to better plan and invest in adaptation measures to address these concerns.

## 2. Impacts of extreme climate change on global food insecurity

**Vulnerability to food insecurity as a result of climate-related hazards is measured by:**



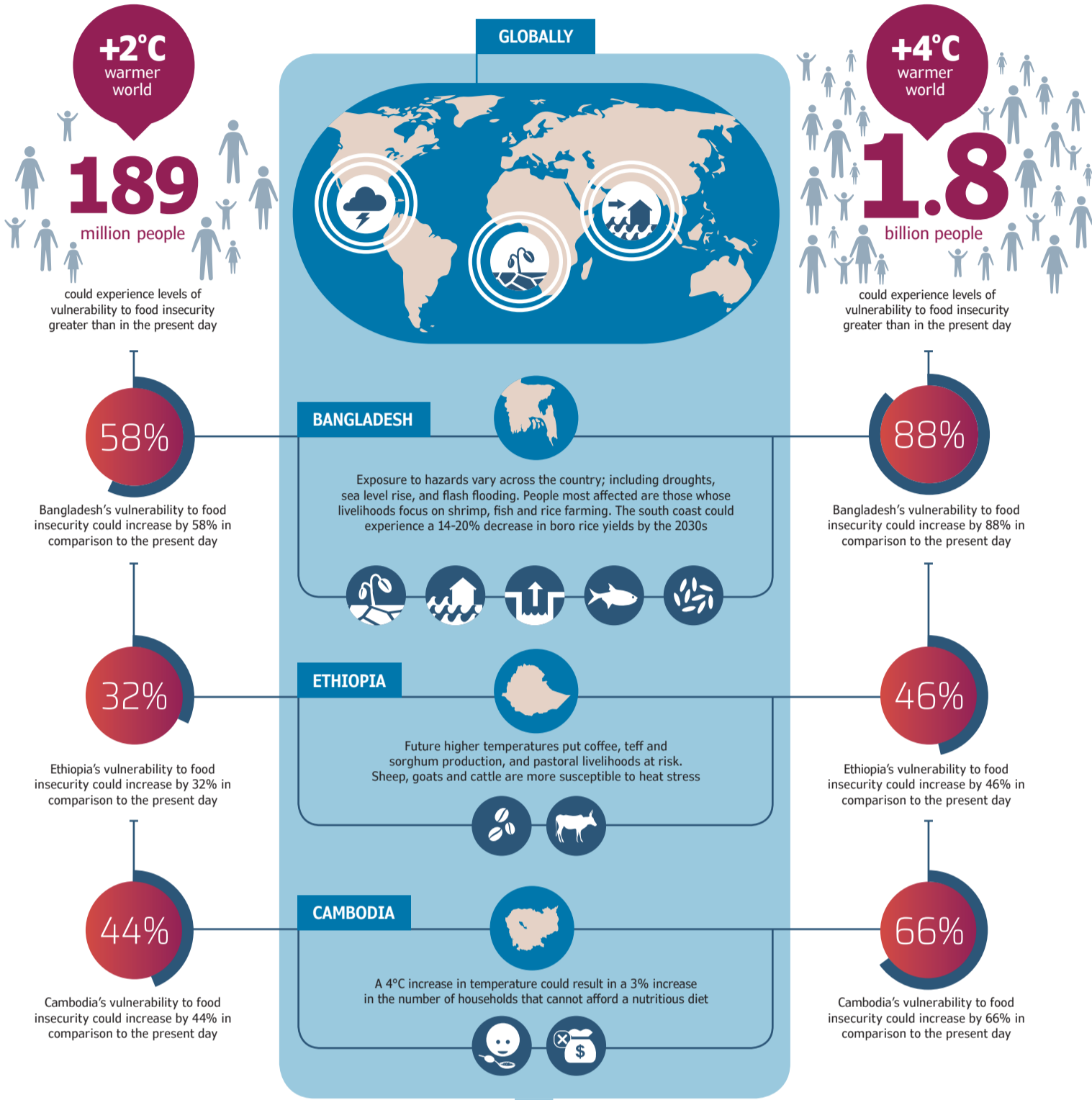
**Exposure to climate-related hazards**



**Sensitivity of national agricultural production to climate-related hazards**

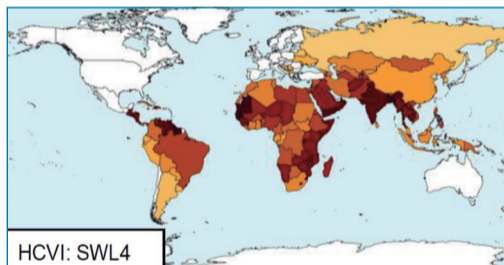


**Adaptive capacity:** a measure of capacity to cope with climate-related food shocks



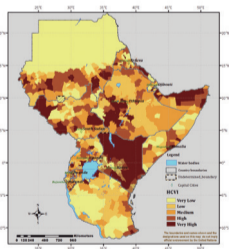
## 3. Methodology: New research in food security and nutrition analysis for extreme climates

### GLOBALLY



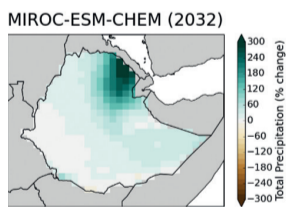
Vulnerability to food insecurity was measured using the Hunger and Climate Vulnerability Index (HCVI); a scaled index comprising national level information about exposure to climate-related hazards, sensitivity of the agricultural system, and ability to cope with climate-related shocks. The numbers presented here use the high-resolution HELIX climate model simulations (HadGEM3) used to drive the HCVI.

### EAST AFRICA



The HCVI was downscaled to a sub-national level by integrating a range of detailed socio-economic information with geospatial data to analyse the level of vulnerability to food insecurity experienced in the region.

### ETHIOPIA

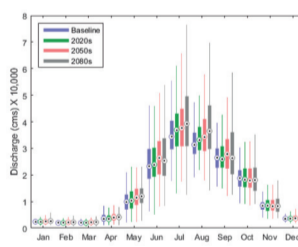


An alternative sub-national HCVI method was applied which used a qualitative approach to assess vulnerability across different livelihood activities. This approach took into account the impact of climate change on vulnerability using the HELIX model data, in the absence of adaptation.

### SOUTH ASIA

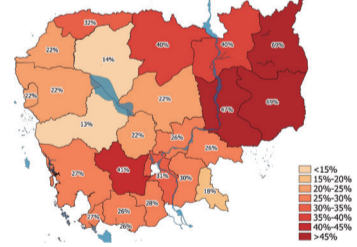


### BANGLADESH



An assessment of the impacts of extreme climate scenarios on food systems, livelihoods and people's food security was made using multiple outputs across the HELIX project. These included an in-country stakeholder engagement workshop, analysis of the HELIX high-resolution global climate model simulations, and outputs from regional climate impact models.

### CAMBODIA



WFP is testing the integration of results from global HELIX models into its innovative Fill the Nutrient Gap tool to explore the impacts of extreme climate change on nutrition. Results from HELIX's report on global economic impacts of climate change at 4°C (in terms of changes in GDP and yields) have been incorporated to study the effects on access to a nutritious diet in Cambodia.

## 4. WFP: Helping countries address the impacts of climate on food security and nutrition

### CLIMATE RESILIENCE TOOLS

Rural financial services	Climate analyses and assessments	Community and livelihood resilience	Climate information services	Emergency preparedness and response
<ul style="list-style-type: none"> <li>Enabling vulnerable people to diversify their livelihoods through better financial inclusion and access to credit</li> </ul>	<ul style="list-style-type: none"> <li>Analysing the impacts of climate change on food security and nutrition, assessing community needs and institutional capacities for climate risk management</li> </ul>	<ul style="list-style-type: none"> <li>Reducing disaster risks through awareness-raising, skills development, alternative livelihoods, agricultural practices and community assets</li> </ul>	<ul style="list-style-type: none"> <li>Producing, translating and tailoring climate information that can be easily understood by communities and governments, strengthening their decision-making when confronted with natural hazards</li> </ul>	<ul style="list-style-type: none"> <li>Integrating climate information into early warning systems, supply chains, coordination preparedness and response capacities</li> </ul>
<ul style="list-style-type: none"> <li>Safety nets &amp; social protection</li> </ul>	<ul style="list-style-type: none"> <li>Energy services</li> </ul>	<ul style="list-style-type: none"> <li>Environment and natural resource management</li> </ul>	<ul style="list-style-type: none"> <li>Strengthening of institutional capacities and systems</li> </ul>	<ul style="list-style-type: none"> <li>Insurance</li> </ul>
<ul style="list-style-type: none"> <li>Developing and enhancing social protection systems and safety nets to be responsive and adaptive to climate shocks and slow onset change</li> </ul>	<ul style="list-style-type: none"> <li>Addressing the environmental and health risks associated with cooking and access to energy, including the Safe Access to Fuel and Energy (SAFE) cookstoves initiative</li> </ul>	<ul style="list-style-type: none"> <li>Forecast-based finance</li> </ul>	<ul style="list-style-type: none"> <li>Building the capacity of public and private institutions and systems to anticipate, adapt and respond to climate shocks and stresses</li> </ul>	<ul style="list-style-type: none"> <li>Climate finance</li> </ul>
<ul style="list-style-type: none"> <li>Policy support</li> </ul>		<ul style="list-style-type: none"> <li>Triggering action with climate forecasts so humanitarian system resources are mobilised before climate disasters strike</li> </ul>		<ul style="list-style-type: none"> <li>Unlocking multilateral climate funds to implement innovative climate adaptation programmes</li> </ul>

## REFERENCES

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Salmon K; Richardson K; Lewis K and Bradshaw C. (2017). Climate change and food security in Bangladesh. HELIX Deliverable 9.5: Policy briefing detailing the results from the adaptation assessment and the implications for socio-economic vulnerability.

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