



High-End cLimate Impact and eXtremes (HELIX)

What is HELIX?

The [High-End Climate Impact and Extreme initiative \(HELIX\)](#) is a multi-disciplinary research consortium project which aims to assess the long-term impacts of extreme climate change, including food security. HELIX brings together 16 organizations including: national meteorological agencies, universities and research institutes, as well as stakeholders such as the World Food Programme (WFP), which use climate information for planning.

HELIX seeks to make adaptation more understandable and manageable for decision-makers by providing a set of credible and coherent views of what the impacts of high levels of global warming will be on the world's bio-physical and socio-economic systems.

The initiative has developed global scenarios, representing different adaptation pathways. For each of these scenarios, the project is assessing the biophysical impacts and adaptation at specific warming levels of 1.5, 2, 4, and 6°C on land and coastal resources and implications for food security, health, water security, energy security, ecosystems, and human migration. In addition to global-level assessments, the project also provides more in-depth analysis of impacts for three focus regions in East and West Africa, Europe, and South Asia.

Why is it relevant to WFP?

Climate change poses a particular threat to food security and nutrition. Findings from the Fifth Assessment Report (5AR) of the Intergovernmental Panel on Climate Change (IPCC) indicate that climate change could increase the risk of hunger and malnutrition by up to 20 percent by 2050.

In this context, a better understanding about the long-term impacts of climate change on food security and nutrition will contribute to enhance WFP's operations around adaptation and resilience building. Therefore, initiatives such as HELIX will allow WFP to integrate enhanced understanding into local, national and global policy and planning processes and improve capacities of vulnerable food-insecure countries and communities to better address the impacts of climate change on food security and nutrition.

Within HELIX, WFP's focus is on assessing impacts on food security at the global level as well as for the East Africa and South Asia regions more specifically; contributing to research efforts contained in work package 5, 8 and 9 of the HELIX initiative.



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Work Package 5: Global scale assessment of socio-economic impacts

The impacts of food security at global level are analyzed by adapting the Hunger and Climate Vulnerability Index (HCVI) -based on Krishnamurthy et al 2014- at 1.5, 2 and 4°C using the high-resolution global climate model data produced under HELIX and including the global trade patterns of main staple crops to assess the role of trade to national food security. Other assessments are being conducted related to socio-economic impacts in terms of changes in agricultural productivity, GDP, welfare and other aspects. **WFP is currently testing the integration of part of these results to corporate analytical tools** such as the Fill the Nutrient Gap (FNG) to assess how climate change could affect the affordability and availability of nutritious diet.

Work Package 8: Regional focus Sub-Saharan Africa

Climate vulnerability to food security is studied through downscaling the HCVI at the district level within the East Africa. Vulnerability to climate change is analysed based on the relationship between the degree of climate stress on populations (exposure), the degree of responsiveness to stress (sensitivity) and the ability of populations to adjust to the climatic changes (adaptive capacity). The composite index incorporates socioeconomic and environmental indicators that are highly correlated and most relevant to food insecurity. The index shows that most of Kenya is highly sensitive to climate variability, as well as Puntland and Somaliland of Somalia, south-western Ethiopia, some areas in central / southern parts of South Sudan and Sudan.

In-depth analysis is being conducted in Ethiopia by HELIX partners, using the HCVI framework to qualitatively assess relative vulnerability across different livelihood types. Preliminary results indicated that coffee, teff and sorghum are at risk due higher temperatures. Once HELIX reaches the final results **WFP in the region is planned to conduct a consultation process with partners to develop adaptation options.**



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Work Package 9: Regional focus South Asia

Understanding of current and potential vulnerabilities on food system and livelihoods in Bangladesh is the focus for WFP. The research has been conducted by UK Met Office, and WFP has provided socio-economic and food security information and facilitate a consultation process with food security and climate experts of Bangladesh. The preliminary results study indicates:

- Climate models for the 2050s and 2080s show strong agreement for an increase in temperatures across the country but rainfall projections are less robust.
- Exposure to climate impacts varies regionally: inundations and salinity intrusion due sea-level rise, could affect the coastal region, while droughts have been identified to be particularly important in the Northwest / western region, and pre-monsoon flash flooding in the Southeast. Water logging problems and spread of waterborne diseases, related to flooding from increases in monsoon rainfall, are of concerns in urban areas.
- Food security in Bangladesh will be challenged by climate change, predominantly as a result of the direct impacts of higher temperatures, the combined impacts of water scarcity through both changes in rainfall and temperature and water demand, and along the coast as a result of sea level rise.
- Shrimp and fish farming, Boro and aman rice crop are projected to be main the livelihoods affected. Salt production could be negative affected by changes in the lengths of monsoon and winter season; except in the Southeast, where increases in evaporation might be beneficial to salt production.
- Vulnerable groups included seasonal migrants, landless and subsistence agriculture. The major food security concerns are focused on the Northeast and Northwest region.

WFP - Bangladesh is also planning to share final results with stakeholders to enhance programmes and strategies to address the challenges of climate change to food systems in the country.

Finally, HELIX partners are developing HELIXscope high-end climate atlas where data related to the results of this initiative will become available. The purpose of HELIXscope is to help engage and make accessible potential future climates, uncertainties and data to support users and decision-makers wanting trusted climate knowledge. WFP has been providing inputs in order to make information accessible to practitioners and decision-makers. HELIXscope will be live towards the end of 2017.