Food security and climate change, the pressing reality of Mozambique

WFP World Food Programme

SAVING LIVES CHANGING LIVES

In 2019, Mozambique was the most affected country world-wide by the impacts of extreme weather events. It scored fifth over the period 2000-2019 (Global Climate Risk Index 2021). While the country only contributes 0.1 - 0.2% to global emission, Mozambique is the 38th most vulnerable and the 13th least ready country to address the effects of climate change.

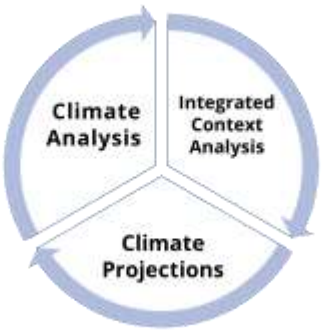
Historical trends indicate there is a strong relationship between food insecurity and exposure to climate hazards. As 70% of the population depend on climate-sensitive agricultural production for their food and livelihoods, increased frequency and intensity of storms, droughts and floods are likely to pose pressure on agricultural income undermining 25% of the country's economy, 70% of livelihoods, as well as the food and nutrition security of the whole country.

WFP has invested in a growing body of evidence on the impact of climate change in Mozambique. Three pieces of evidence have been published:

1. the **Integrated Context Analysis**
2. the **Climate Analysis**
3. **Climate Projections**, as part of the UK Met Office/WFP Joint Report "*Food security and livelihoods under a changing climate in Mozambique - Preparing for the Future*".

Through these pieces of analysis, WFP makes available information to understand the country's experienced climate and weather; identify the prevailing vulnerabilities; recognize the key hazards (& their relationship to vulnerabilities); project these complex relationships into the future; and, support the prioritization of actions, including livelihoods, geographies, hazards, etc.

Based on these, **WFP has partnered with the Government of Mozambique to develop tools and systems to better monitor and forecast drought events**, while also establishing forecast-based triggers that can be linked to contingency finance and plans that can incite early action and preparedness.



To operationalize these, WFP and the Government are prioritizing the use of existing national social protection systems and programs. The approach is aligned with the National Basic Social Security Strategy (2016–2024), which aims to make national social protection systems and programs better able to adapt and respond to natural disasters and climate shocks. The work is done in close coordination with the **National Disaster for Management Agency (INGD)** to ensure the adequate scale up of preparedness and early actions, where social protection is not present. By working with social protection and disaster risk management authorities, preparedness and early actions can be further linked to longer-term resilience initiatives, ensuring that there is a continuum across relief, recovery, and development interventions.

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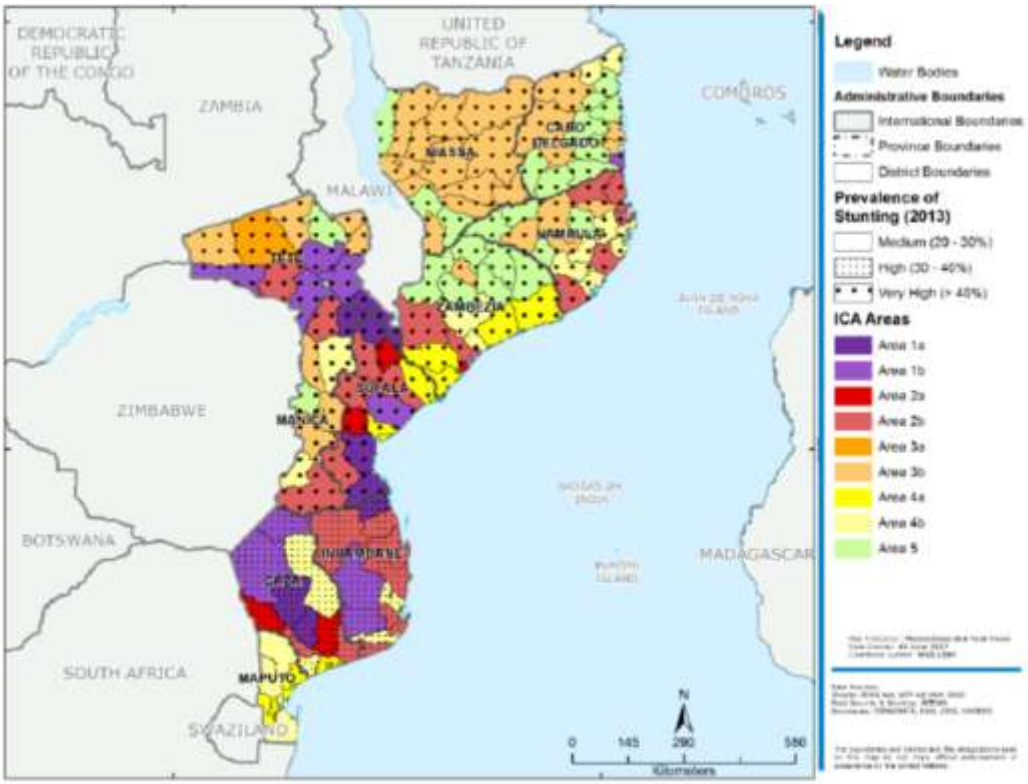
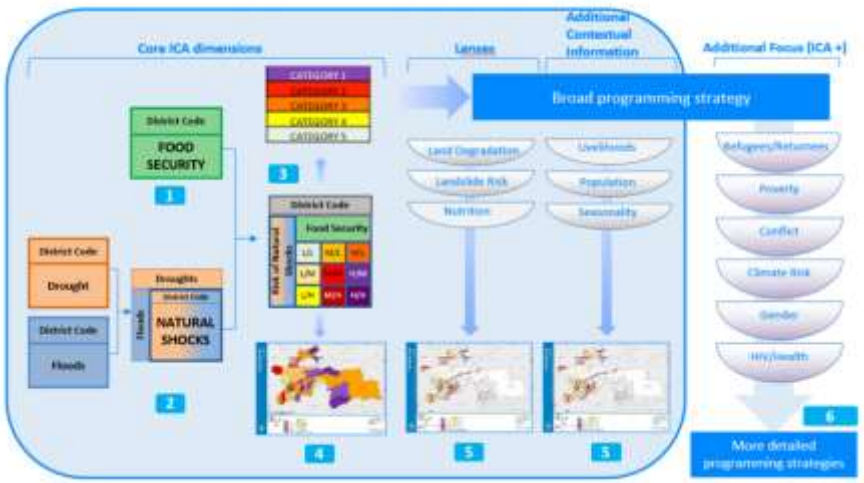
1. Integrated Context Analysis (ICA)



The ICA is an analytical process that contributes to the identification of broad national programmatic strategies, including resilience building, disaster risk reduction, and social protection for the most vulnerable and food insecure populations. In Mozambique, the ICA was elaborated in 2017, in cooperation with government bodies (including Technical Secretariat for Food and Nutritional Security, National Institute for Disaster Management, Ministry of Agriculture and Rural Development, Ministry of Land and Environment, Ministry of Health) and UN Agencies.

The ICA is based on principles of historical trend analyses across a number of technical and sectorial disciplines to provide an understanding of what has happened in the past and what may (or may not) be changing to act as a proxy for what may occur in the future, and where short, medium, and longer-term programming efforts may be required. It is based on two core factors: trends of food insecurity and main natural shocks (droughts, cyclones, and floods). The ICA provides a reading of the national map, it classifies the districts into categories with level from 1 (high recurrent and high exposure) to 5 (low recurrence and low exposure).

The ICA full report is available for download here.



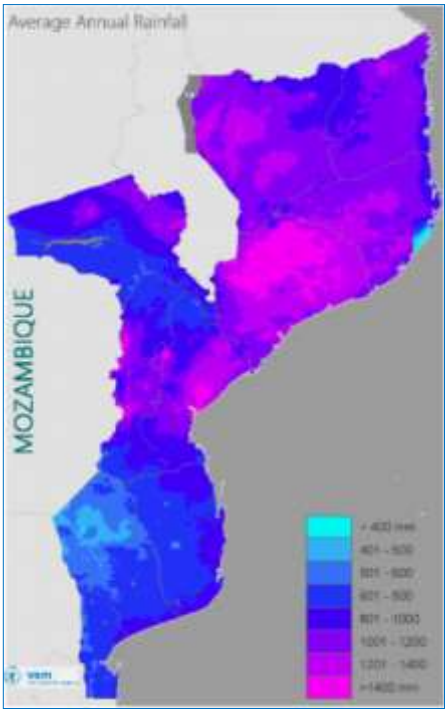
2. Climate Analysis

In 2018, WFP and IFAD jointly published a climate analysis, studying over 36 years (1981 to 2016) of climate data in Mozambique, including elements like temperature, rainfall, and vegetation to show the already evident impacts of a changing climate. The analysis has three main themes – averages, variability and trends. **Averages** describes the broad climate features. Inter-annual **variability** describes high frequency, year-on-year changes. **Trends** evaluate the degree and direction of longer term variations. Specific analysis for the start, end and length of rainfall season are included, so as to provide a detailed account of the patterns and tendencies of change in growing season timings. The effects of El Niño Southern Oscillation phases is also analysed through the mapping of the variations in rainfall between El Niño-La Niña dominated seasons versus neutral seasons.

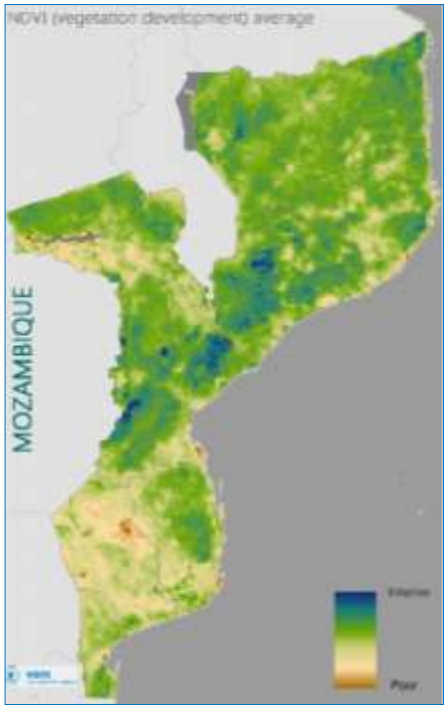
Detailed analysis for Mozambique for the period 1981-2017 indicates a warming of 0.1-0.25°C per decade, especially in the southern part of the country – where the country never recovered from the last El Nino in 2015 (WFP, 2018). During the same period, the areas of warming also experienced high rainfall variability, resulting in late starts to the rains, early cessation, and intense rains in short time periods. The combination of hotter and drier conditions is making the incidence of drought more common, negatively affecting vulnerable populations that rely on rainfed agriculture for their food and nutrition security.

The full report is available here.

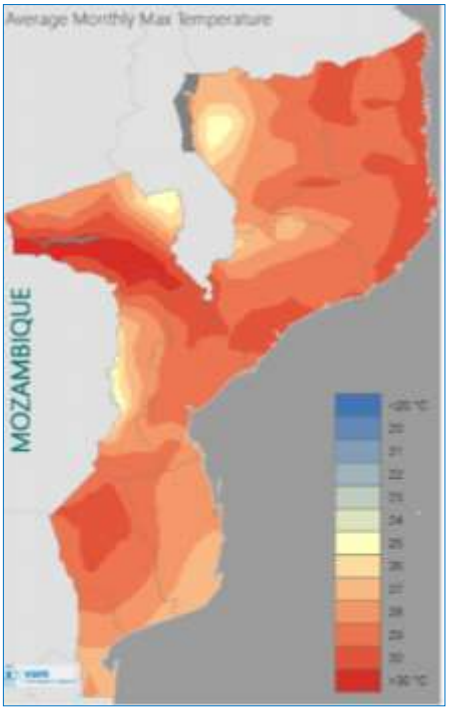
In 40 years, Mozambique already faced an average warming of +1°C



Rainfall: CHIRPS.
Near global gridded rainfall data. 10 day time step, 5 km resolution.
1981—present.



Vegetation: NDVI.
Global GIMMS NDVI. 15 days, 8 km resolution.
1981—2015.



Temperature: CRU.
Global gridded temperature data. Monthly (mean Tmax, Tavg, Tmin). 0.5 deg resolution.

3. *"Preparing for the future: Food security and livelihoods under a changing climate"*

In 2021, together with the UK Met Office, WFP signed a report with updated climate model projections for 2050 and potential impacts on future food security and livelihoods. Building upon the two other analytical pieces of work, two **scenarios of climate change** that span the range of plausible future climates for Mozambique were studied. Both scenarios showed increases in heat stress, reductions in water availability, and continued variability, resulting in more frequent and intense extreme weather events, which are already drivers of food insecurity across the country. In the absence of adaptation, food insecurity will increase under all climate change scenarios considered, with the scale of increase dependent on the scenario.

Identified actions are multi-sectoral, working across different locations and time-scales, requiring the strengthening of adaptation plans and processes, including design, implementation, and monitoring. Building on this, some adaptation barriers identified include the lack of information on suited practices for the future, limited investments in new techniques and technologies, poor coordination and collaboration across stakeholders, and limited capacity to plan with long term horizons.

Based on this, there is a need to develop tools and systems that will allow for anticipatory actions to be integrated with preparedness and early response to drought hazards. The complexity of drought requires national stakeholders from meteorological, hydrological and agricultural institutions at national and lower administrative levels to support early warnings and early actions to mitigate a potential drought's impact on lives and livelihoods by supporting at risk communities to act before impacts on food security materialize. WFP is supporting the **National Institute of Meteorology (INAM)** to improve their seasonal forecasts and strengthen the rainfall and drought monitoring system throughout the country. Together with the **Ministry of Agriculture (MADER)**, WFP is also fostering the use of remote sensing technologies and UAV (drones) for enhanced crop monitoring in the Provinces of Gaza and Tete.

The full report is available here.

All future scenarios predict that Mozambique will face increase of temperature up to +3°C by 2050

	Climate zone A (North Region)		Climate zone B (Centre Region)		Climate zone C (South Region)	
	Average annual rainfall	Average value of daily maximum temperature	Average annual rainfall	Average value of daily maximum temperature	Average annual rainfall	Average value of daily maximum temperature
Baseline	1164.7 ± 29.2 mm	29.7 ± 0.1 °C	937.0 ± 33.8 mm	29.9 ± 0.1 °C	677.2 ± 30.0 mm	30.0 ± 0.1 °C
Scenario 1	-181.5 mm (-15.6%)	+3.3 °C	-141.9 mm (-15.1%)	+3.5 °C	+0.2 mm (0%)	+2.8 °C
Scenario 2	+171.7 mm (+14.7%)	+2.2 °C	+134.6 mm (+14.3%)	+2.2 °C	+29.2 mm (0%)	+2.3 °C

Table 1. Projected change in the baseline climatology values (± standard error) for the 2050s (2041-2070) for Mozambique climate zones under the two future climate scenarios.
Scenario 1 represents a future that is hotter and drier compared to the baseline climate. Scenario 2 represents a future that is warmer than the baseline climate, slightly wetter on average and with more extreme rainfall events.

Baseline data for rainfall: CHIRPS; Funk et al., 2015. Baseline data for temperature Baseline: WATCH; Weedon et al., 2014

REFERENCES

WFP and Met Office, 2019. Food security and livelihoods under a changing climate in Mozambique

WFP, 2018. Mozambique: A climate analysis.

WFP, 2017. Integrated context analysis.