Assessing flood impact on agricultural production

Agro-ecological Zoning information in support to natural disasters impact assessment

Context
The agriculture sector is a mainstay of Mozambique’s economy, accounting for about 81 percent of labour force and contributing approximately 31.8 percent to the GDP. Agriculture is highly vulnerable to climate change and hydrometeorological disasters especially for rain-fed and small-scale farming systems along the coastline during the wet season, aggravated by floods and cyclones which has compromised economic development.

It is important to have agricultural information on lowest administrative level to assess the impact of hazards caused by floods and cyclones. There is, therefore, a critical need to revitalise the agricultural sector, by providing accurate and updated information about agricultural vulnerability, using and adapting innovative geospatial technologies, tools, platforms open-source data hubs through the project Agro-Ecological Zoning (AEZ) information in support to natural disasters impact assessment to assess the damages/loss caused by current hazards and better preparedness to manage future hazards.

On 23 January 2021, the tropical cyclone Eloise hits the central Mozambique with severe impact on crop production with several thousands of hectares of farmland submerged by floods caused by the storm, with winds up to 160 kilometres per hour. This rapid assessment was conducted in support to local emergency response programmes.

Actors and stakeholders
The Ministry of Agriculture and Food Security (MASA), Ministry of Land, Environment and Rural Development (MITADER), Mozambique Agriculture Research Institute (IIAM), Ministry of Economy and Finance (MEF), National Council on Sustainable Development (CONDES), National Metrological Institute (INAM), National Institute of Disaster Management (INGC) and National Institute of Irrigation (INIR)1 are working together to implement the project.

Replicability and upscaling
The processes developed and piloted based on open-source software and data will be upscaled and replicated across all Mozambique at national scale. A two-way loop with improved national capacities, ground truthing and future national preparedness programmes and information system will be improved through available datasets.

Objectives
• Build on the Global Agro-Ecological Zones (GAEZ v4) to prepare national data and information in support to flood assessment.
• Guide, through improved access and use of robust and updated data and information, national plans and strategy for agricultural development and sustainable land management.
• Provide access to the most current, consistent, documented, and reliable information on agro-ecological zoning potential, sustainable land management at national level and high-resolution disaggregated information for the provinces of Mancia and Sofala.
• Inform national partners, considering the latest international standards for data documentation and information and communications technology development.
• Use the data for planning, implementing and monitoring multi-objective land and water management and development activities.
• Enhance national capacities in monitoring land, water and agricultural information.

Challenges

- Developing an innovative and integrated approach combining field and remote sensing, biophysical and socio-economic aspects while access to consistent, accurate and updated data is challenging.
- Challenges to the sustainability of agro-ecological zoning and monitoring land degradation and sustainable land management include financial and technical sustainability. Management.

Impact

- Maize is one of the crops selected for the flood impact assessment in this area (Figure 2). As there was no national statistics of crops so the first overall crop vulnerability result was calculated based on population density and flooded cropland at admin level 3 (Figure 3-A).
- The second vulnerability assessment was based on GAEZ data (maize yield and harvested data) and flooded crop land (Figure 3-B). This result provides the impact of flood on maize crop using harvested and yield data.

Related resources


Amit G. et al., 2021. A rapid remote sensing and geospatial analysis for the flood impact assessment of Cyclone Eloise on crop production in Mozambique, Phase 1 of the flood impact assessment for the duration of 22nd January – 28th February 2021 in Mozambique under SFERA Needs Assessment and Programme Development Window, FAO, Rome, Italy

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Figure 1. Methodological approach for flood impact assessment

Figure 2. Area of Interest in Mozambique for flood impact assessment

Figure 3: Crop vulnerability assessment (left) and vulnerability of maize productivity (right)

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Results show that at level 3 (posto), Mafambisse (rank 3) and Tica (rank 2) are the most vulnerable posto having 144 869 ha and 58 362 ha maize production loss.

The results are part of the first phase of the rapid flood impact assessment and are being complemented with additional field data collection and emergency response actions.

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