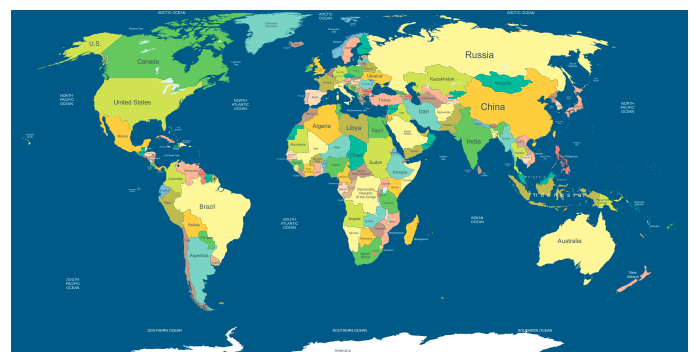




A case study of Tropical cyclone Freddy and its impacts on the communities in Malawi and Mozambique, Africa



During February–March 2023, the record-breaking tropical cyclone (TC) Freddy caused widespread flooding and damages across southeastern Africa (Perry et al., 2024). On average around three TCs impact Madagascar each year and of these, only about 5% have subsequently made landfall in Mozambique (Fitchett and Gabb, 2014). TC Freddy not only did this but recurved back to make a second landfall in Mozambique (Perry et al., 2024).

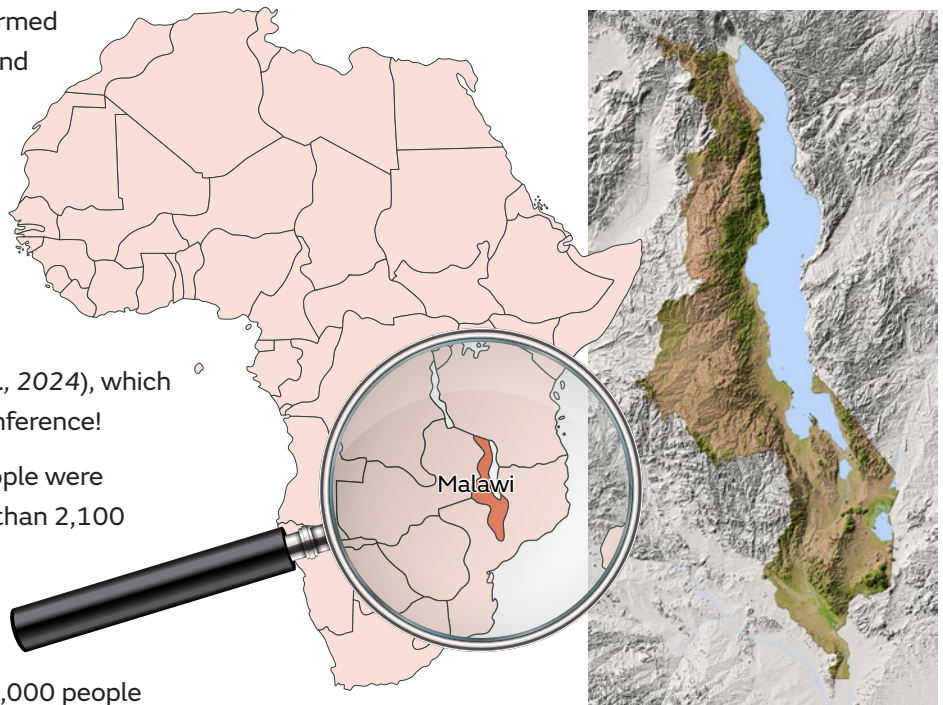


Cause: Tropical Cyclone (TC) Freddy formed northwest of Australia on 4 February and lasted 36 days before dissipating over central-northern Mozambique on 14 March, becoming the longest-lived TC in history (Earl-Spurr et al., 2024; Erdman 2023; Liu et al., 2023). Furthermore, TC Freddy travelled westward for 12,800 km across the Southern Indian Ocean (Earl-Spurr et al., 2024), which is nearly one-third of the Earth's circumference!

Primary impacts: More than 1,200 people were reported as dead or missing and more than 2,100 injured in Malawi (WMO, 2024).

In Mozambique, more than 1.3 million people were affected, with more than 180 deaths. In Madagascar, nearly 200,000 people were affected by the first and second landfall. The damage caused by Freddy is estimated at 481 million US dollars. (WMO, 2024). Freddy also impacted Mauritius and Zimbabwe (Earl-Spurr et al., 2024).

Secondary impacts: In Malawi, concerns for food security were raised when over 204,800 ha of crops were flooded, just before the harvesting period (OCHA, 2023; Perry et al., 2024). For over 2.2 million people in Malawi, flooding associated with TC Freddy also led to a high risk of cholera exposure (Braka et al., 2024; Perry et al., 2024). Some community leaders still report food shortages to this day.



“We still talk and dream about cyclone Freddy every day. The cyclone destroyed our schools, homes and agricultural capability. We still struggle to provide enough food to feed the town.”

Community Village Chief



The Village of Ndala, Mulanje District, Malawi where Cyclone Freddy killed 1 in 4 people. According to local guides, this area used to be heavily populated with houses. Cyclone Freddy triggered landslides and severe flooding, destroying homes and livelihoods and displacing boulders from Mulanje Mountain (pictured in the distance) which now replace this once populated settlement. Photographs taken in the village of Ndala, Mulanje District, Malawi by Joshua Macholl <https://www.metoffice.gov.uk/research/people/joshua-macholl>

Early warning systems:

Effective early warnings are key to prevent loss of life, however there are many challenges involved with developing effective early warning systems:

- Delivering messages on time and ensuring messages reach everyone.
- Ensuring there are safe options for people to relocate to.
- People need time to move their livestock and possessions and make important decisions about what to leave behind.

Early warnings can be disseminated through radio, though in many cases where technology is lacking, local community leaders are relied upon to communicate these messages.

Short-term responses:

In the case of TC Freddy, the World Meteorological Organisation (WMO) reported “advance advisories of the storm by the [WMO's Regional Specialized Meteorological Centre La Réunion \(Meteo-France\)](#) and warnings by the national meteorological and hydrological services of affected countries allowed the disaster management and humanitarian communities to mobilize in advance, with evacuations and pre-positioning of food supplies. Without these warnings, the casualty toll would have been even higher.” (WMO, 2024).

Longer term responses

TC impacts arise from multiple hazards. Strong winds can cause significant damage to infrastructure. Heavy and continuous rainfall leads to flooding and is detrimental to the materials used to build many houses in southern Africa, i.e. mud bricks.

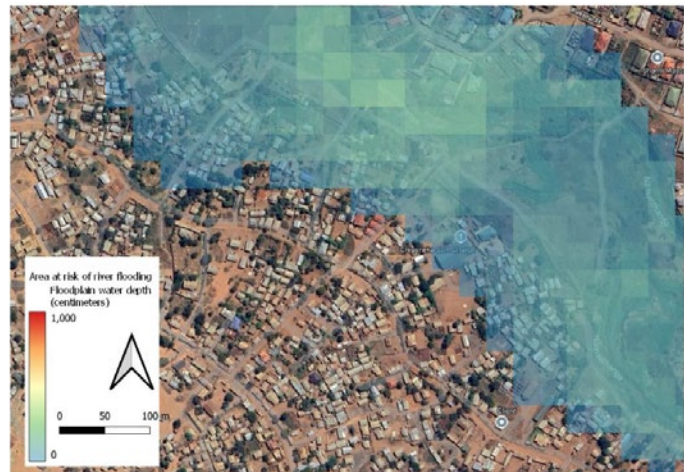
Therefore, reinforced housing infrastructure (where funding is available) and home development further away from riverbanks and flooding prone areas where possible are very effective long-term responses to mitigate against the impacts of TCs. However, people remain homeless whilst this new infrastructure is being built, as depicted in the photo.



Development Impact: Mozambique and Malawi rank in the bottom 5% and 11% respectively of countries listed on the Human Development Index (UNDP 2024), which makes impacts of TCs in this region more severe, as there is less capacity to develop resilient infrastructure.

“Overall, TC Freddy caused substantial damage and devastation across developing countries with weak economies, lacking proper infrastructure, poor communication channels, and a lack of adequate emergency response capacity.”
(Perry et al., 2024).

Climate change: Rising ocean temperatures due to climate change are expected to produce a greater proportion of intense cyclones (like Freddy), given warm oceans provide “fuel” for cyclones to develop (e.g. Seneviratne et al., 2021). The warmer the ocean, the more fuel available, which can lead to TCs with stronger winds and more intense rainfall. The increase in fuel could also support faster intensification, meaning that cyclones reach their maximum strength in less time, which makes preparation for impacts even harder.



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