Regional Hazard Events

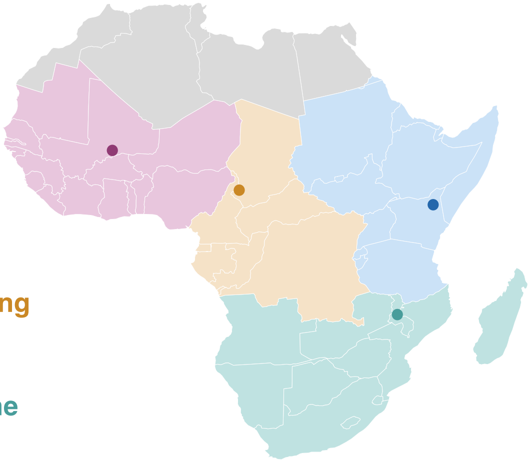
April 2026

Western Africa
Heatwave

Eastern Africa
Heavy Rains and Flooding

Central Africa
Riverine Flooding

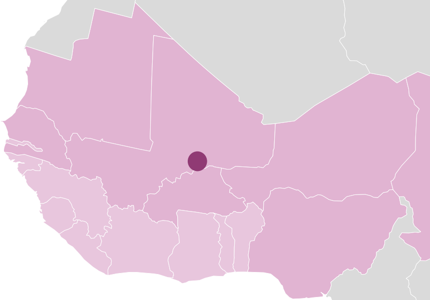
Southern Africa
Tropical Cyclone



Western Africa

The Sahel Heatwave

Sahel region, 2024



What happened

In late March and early April 2024, a large region across the Sahel and West Africa experienced **extreme heat**, with maximum temperatures in the Sahel exceeding 45°C in multiple locations. Kayes (Mali) reportedly reached 48.5°C on 3 April, and night-time temperatures remained exceptionally high, including reported minimum temperatures of 32°C in Burkina Faso (worldweatherattribution.org).

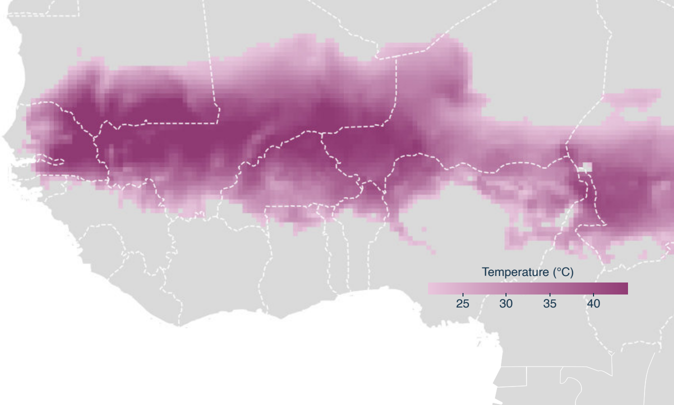
The extreme heat **coincided with Ramadan**, a period when fasting can increase dehydration risk, especially for people working outdoors or with pre-existing health conditions. At the same time, **power cuts** were reported in several countries during the heat episode, reducing access to cooling and increasing heat stress. Heat-related impacts are often difficult to quantify in real time, but during the peak period, Gabriel Touré Hospital in Bamako reported a surge in deaths, with 102 deaths recorded between 1 and 4 April, compared with 130 deaths over the entire month of April 2023. While formal cause-of-death statistics were not reported, hospital staff indicated heat likely contributed to a share of these deaths (preventionweb).

Photo source: Arfica Digest News

The role of forecasting

Shortly before the extreme heat reached its peak, the national meteorological agencies in Burkina Faso (ANAM-BF, 2024) and Mali (Mali-Météo, 2024) **issued public heatwave warnings**. In Mali, a national heatwave alert was issued on 1 April 2024 for the period 1–7 April, warning that maximum temperatures in parts of the country were expected to reach 40–47°C for at least three consecutive days. The alert also **included general protective guidance**, including advice for people observing fasting. Although this warning communicated the expected severity of the temperatures, it was issued **when some impacts of the heatwave were already being experienced**. In addition, the alert focused mainly on the forecasted temperatures and general health advice, offering **little information about potential human impacts or the most at-risk groups**. This points to the **absence of a more impact-based heat-health warning system**. A smart heat-health warning system would connect meteorological forecasts with expected health impacts, risk thresholds, and the identification of at-risk population groups (Chandra, 2025). While public heat warnings were issued, a **more targeted and population-specific approach could have better supported** timely preparedness and response.

ERA5 post-processed daily maximum near-surface air temperature, aggregated for 31 March to 4 April, showing the spatial extent and intensity of extreme heat across the Sahel



Data source for map: ERA5 post-processed daily statistics on single levels from 1940 to present

Moving forward

Looking forward, enhancing future heat preparedness necessitates **advances in forecast lead times as well as improved capacity to predict** the potential effects of heat through early warning systems. In this context, **sub-seasonal probabilistic forecasting** can support earlier heat risk awareness. Peer-reviewed evaluation of the European Centre for Medium-Range Weather Forecasts (ECMWF) ensemble extended-range system shows significant skill for predicting Sahelian heatwaves with a lead time of up to 2-3 weeks (Korhonen et al. 2025). Complementary analysis for West African cities indicates these sub-seasonal forecasts can be used for predicting heatwave onset up to about two weeks in advance (Ngoungue Langue et al. 2025). In practical terms, this means that **warning information could be available earlier**, allowing decision-making to be informed by forecast probabilities before conditions are already unfolding.

An important **operational gap**, however, remains between these sub-seasonal forecasts and the warnings issued while the event is already in progress. **Medium-range forecasts** can help bridge this gap by providing more actionable guidance several days ahead of peak conditions. ECMWF thermal comfort products, which combine temperature, humidity, wind, and radiation, are particularly relevant because they better reflect experienced heat stress than temperature alone. Together, these products could support a **more continuous warning chain**, from early probabilistic awareness to more targeted warnings as the event approaches and develops. To realise this potential, these forecast information across timescales needs to be translated through a **heat–health warning and action chain**, with locally relevant thresholds for forecast probability, duration, and thermal stress linked to context-specific early warnings. The 2024 event illustrates why this is important: when extreme heat arrives with limited effective lead time, protective actions may begin only after impacts are already being experienced. Probabilistic forecasting provides an opportunity to shift warning and response timelines earlier. In this regard, Strengthening Early Warning in Africa (SEWA) could support a **practical pilot** to develop an operational heatwave warning system in collaboration with the AGRHYMET Regional Centre.

Photo source: African Perceptions

The pilot could use ECMWF probabilistic heat forecasts and thermal comfort indicators, while also integrating available information on at-risk populations, to help National Meteorological and Hydrological Services (NMHSs) in the region issue earlier and more targeted warnings. This would align well with existing World Meteorological Organization (WMO) and World Health Organization (WHO) efforts on heat-health warning systems, including their joint guidance on warning-system development. Climate assessments indicate that across Africa, **hot days, hot nights, and heatwaves have become more frequent**, and that **heatwaves have become longer** with high confidence (IPCC AR6). This reinforces the **urgency of sustained investment** in improving early heat warning across Africa.

Photo source: Earth.org

Eastern Africa

Heavy Rains and Flooding

Burundi, Ethiopia, Kenya, Somalia, Tanzania, and Uganda, 2024

What happened

Between March and May 2024, **heavy rains developed into a major flood crisis** across Eastern Africa, affecting Burundi, Ethiopia, Kenya, Somalia, Tanzania, and Uganda. From mid-April to early May, the region experienced an exceptionally wet period, with seasonal rainfall totals in some areas of Eastern Africa reaching **around 200–300% of average climatological conditions** (FEWS-NET). By 30 May, OCHA reported that about 1.6 million people were affected, with **at least 528 deaths and more than 480,000 displaced**. Severe impacts extended across the region and communities faced damaged infrastructure, livelihood loss, and recurring flood events. Impacts were caused by **multiple sources of flooding**, including flash flooding, urban flooding, and river overflow, as well as landslides.

Photo source: Center for Disaster Philanthropy

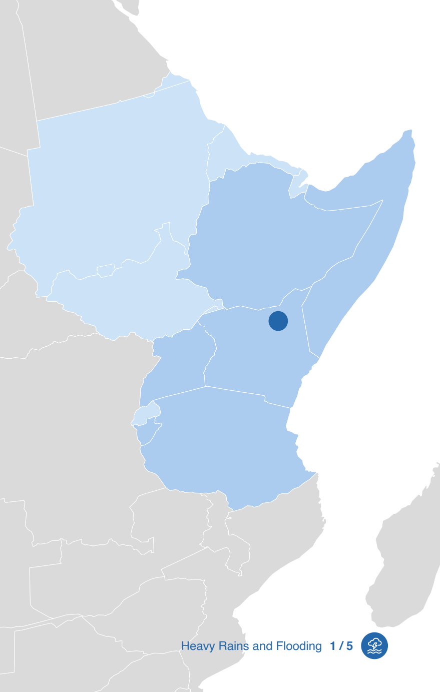
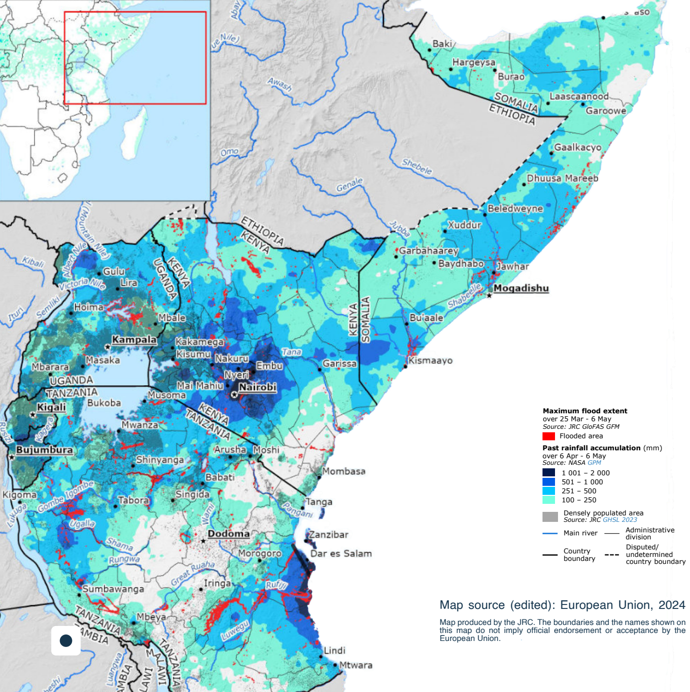


Photo source: Center for Disaster Philanthropy

What happened

The crisis **struck highly vulnerable populations**. Before the 2024 flooding, much of Eastern Africa had already endured a prolonged drought crisis from late 2020 to 2023 (WMO). Successive failed rainy seasons made this one of the region's worst droughts in recent decades, particularly in Somalia, Ethiopia, and Kenya. The drought caused crop and livestock losses, severe water shortages, displacement, and acute food insecurity, leaving **millions of people in a weakened and highly vulnerable state**. When the heavy rain finally arrived in 2024, they hit communities that had not yet recovered, turning a climate shock into a deeper, **multi-hazard humanitarian crisis**. Refugees and displaced populations were among the most exposed: UNHCR reported that nearly 20,000 people in the Dadaab refugee camps in Kenya were displaced, while around 32,000 refugees in Burundi were in flood-affected areas.



Map source (edited): European Union, 2024

Map produced by the JRC. The boundaries and the names shown on this map do not imply official endorsement or acceptance by the European Union.

The role of forecasting

At the regional level, there was a clear signal for potential flooding well in advance of the event. The Greater Horn of Africa Climate Outlook Forum (GHACOF) 66 regional climate outlook issued by ICPAC **predicted wetter-than-normal conditions** with probabilities of 55-65% over parts of Kenya, Somalia, Southern Ethiopia, Burundi, Uganda, and north-western Tanzania (GHACOF).

Importantly, the **regional outlook** did not only describe the hazard: it also **included sectoral impact and advisory information**, including health warnings linked to floods, waterborne disease risk, and advice to share advisories in good time and plan for wetter-than-normal conditions. At the **national level**, the Kenya Meteorological Department issued a county-specific March–May outlook **forecasting above-average rainfall** across much of Kenya and later issued repeated heavy-rainfall advisories in April (KMD).

The Tanzania Meteorological Authority forecast normal to above normal March-May (Masika) rainfall across much of the Lake Victoria basin and northern coast, explicitly noting that heavy rainfall events may occur and that river and dam levels were likely to increase (TMA). In Ethiopia, the national flood contingency plan, based on the Ethiopian Meteorological Institute forecast, anticipated both river flooding and flash floods during the February-May (Belg) season (Ethiopia Plan). In Burundi, Institut Géographique forecast above-normal rainfall countrywide and highlighted high flood risk in flood-prone areas (IGEBU).

The **main weakness** was therefore **not the absence of forecasts**, but the **difficulty of turning them into sufficiently local, actionable warnings**. These forecasts signalled heavy rainfall and flooding were possible, but they were less specific on which settlements, infrastructure, or health facilities were most exposed at short lead times. In that sense, the **warning system remained largely hazard-based rather than impact-based**. For a crisis of this scale, stronger forecasting would need to go beyond rainfall thresholds and **translate the forecast into expected impact** at a sufficiently local spatial resolution to become actionable for decision makers. This gap became even more pronounced because the floods struck communities were already weakened by the preceding drought, which amplified the humanitarian impacts and underscored the need for impact-based forecasting that can better capture risk from cascading hazards.

Photo source: Dialogue Earth (Gaspard Maheburwa)

Moving forward

The key lesson from this event is that **East Africa needs better translation of good forecast** signals **into useful local risk information**. This matters most where hazards interact and where exposure varies, for example in expanding urban areas,refugee settings, and where conflict and displacement push people into flood-prone environments. The 2024 floods showed how rapidly humanitarian risk can grow when intense rainfall hits communities already weakened by drought and displacement. The **impact data** that would most improve these services include **exposed population and settlement layers**, such as JRC's Global Human Settlement Layer (GHSL), **historical flood extent products** from Copernicus/JRC, and **locally relevant datasets** on drainage and low-lying urban hotspots, roads and bridges, schools and health facilities, flood thresholds, and gauge observations. These are the kinds of additional data that WMO identifies as necessary to move from forecasting "what the weather will be" to anticipating "what the weather will do".

Antecedent soil-moisture information is also relevant: Copernicus C3S satellite soil-moisture products are designed for hydrological and land-surface applications and can help characterise catchment wetness after drought, which is useful for understanding both flash-flood susceptibility and how quickly heavy rainfall is likely to translate into runoff and riverine flooding. This is also where Strengthening Early Warning in Africa (SEWA) is relevant: by supporting ICPAC, the RSMCs, and NMHSs to **combine upstream forecast guidance with exposure information and partner data**, enabling them to produce flood-risk information that is more relevant for decision-making.

Photo source: Reuters

Central Africa

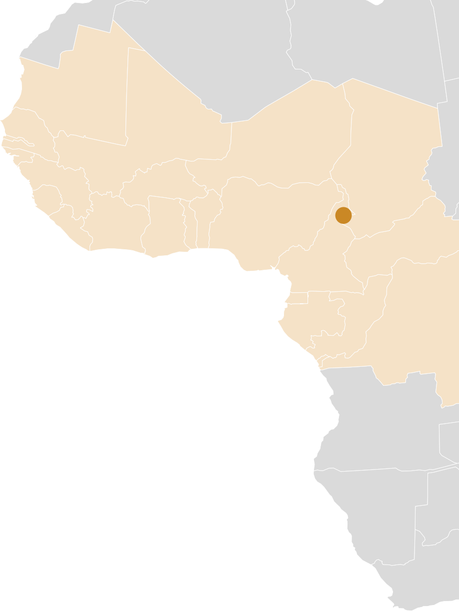
West and Central Africa Flooding

West and Central Africa, 2024

What happened

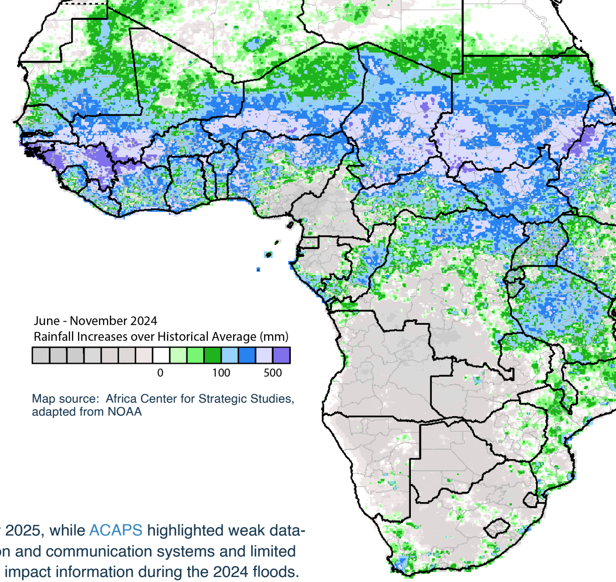
During the 2024 rainy season, repeated heavy rainfall and high upstream inflows led to severe river flooding across parts of West and Central Africa. Impacts were especially severe in **Chad and Cameroon's Far North region**. In Chad, Government figures cited by UNICEF reported that approximately 1.9 million people were affected, with 576 deaths as of 15 October 2024. In and around Chad's capital, N'Djamena, river levels reached exceptional values: The Chari River peaked at 8.42 m on 24 October, exceeding the maximum level recorded during the major 2022 floods. In Cameroon's Far North, DG ECHO and UNICEF reported at least 365,000 people affected and 155,000 displaced by late September. The floods also had cross-border consequences, with Cameroonian authorities reporting that at least 70,000 people were displaced from temporary camps in Cameroon, contributing to displacement into Chad.

Photo source: Internal Displacement Monitoring Centre



The role of forecasting

The 2024 season was challenging not because the forecasting system failed to indicate an approaching flood, but because **information remained fragmented and warning coordination remained limited**. Real-time assessments already pointed to a dangerous situation: UNICEF reported that a joint assessment by the Institut de Recherche pour le Développement (IRD) and the University of N'Djamena projected that the Logone River could rise to around 8.60 m, threatening parts of N'Djamena. Forecasts also provided a **warning signal strong enough to trigger anticipatory action**. On 9 October 2024, OCHA activated the Anticipatory Action Framework for flooding in Chad based on GloFAS forecasts, releasing US$5 million from CERF to support anticipatory action for approximately 230,000 people in the N'Djamena area. However, these **signals were not consistently turned into coordinated, targeted warnings** for communities. This broader pattern is reflected in wider system gaps: WMO reported that Chad issued its first Common Alerting Protocol (CAP) warning only in January 2025, while ACAPS highlighted weak data-collection and communication systems and limited detailed impact information during the 2024 floods.



Map source: Africa Center for Strategic Studies, adapted from NOAA

Moving forward

Moving forward, improving early warning will require more than strong hazard forecasts; it will require **better coordination and better translation of flood signals** into **targeted impact-based warnings**. In Chad, this matters because hydro-meteorological hazards increasingly disrupt a climate-sensitive economy and create cascading impacts across food and water security, health, transport, energy, and livelihoods. This calls for stronger impact-based forecasting and for stronger coordination across institutions. The Lake Chad Basin Commission (LCBC) can help support transboundary coordination in the Chari–Logone basin, while RCC ECCAS, hosted by CAPC-AC, can strengthen regional climate support for ECCAS members. Together, these mechanisms could help NMHSs turn fragmented hazard information into more coherent warnings. In that context, SEWA could support a pilot in collaboration with LCBC and RCC ECCAS to test how ECMWF, Copernicus, and other relevant **datasets can be combined with regional coordination mechanisms** to strengthen the upstream part of the warning chain.

Strengthening Early Warning in Africa (SEWA) can directly support testing and institutionalising this improved coordination by **piloting a regional forecast coordination and product-integration mechanism** through the RCC ECCAS.

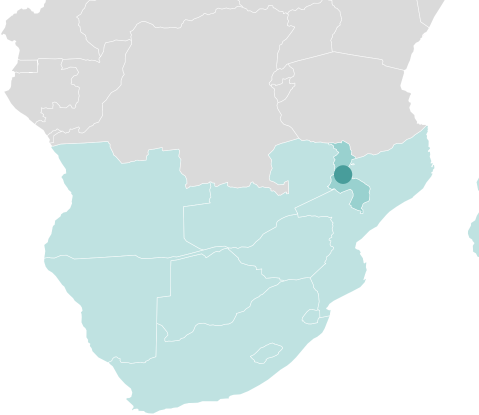
Concretely, SEWA could help RCC ECCAS **convene national services and humanitarian partners** around a shared procedure for flood situation updates and run a simulation during the flood season that integrates GloFAS signals with national monitoring and rapid mapping into **one harmonised cross-border risk picture**. This would strengthen the “forecast → map → decision” chain and provide evidence of the added value of coordinated regional climate services for early warning information.

Photo source: Afriquexxi

Southern Africa

Tropical Cyclone Freddy

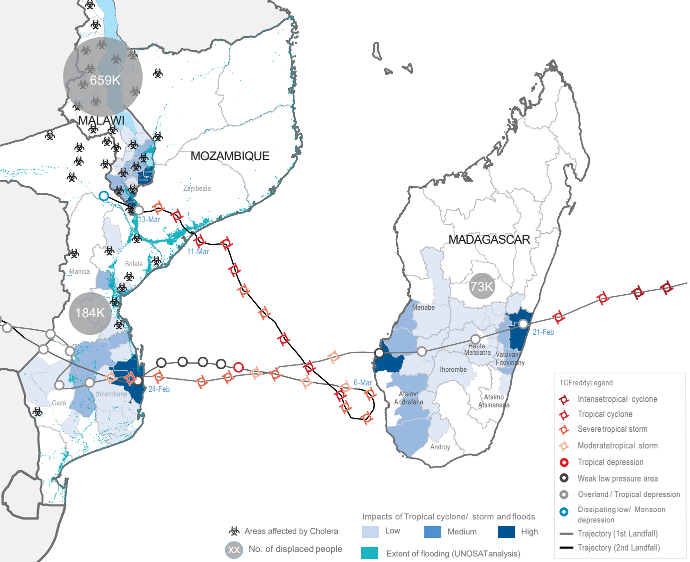
Malawi, 2023



What happened

In March 2023, after making its second landfall in Mozambique on 11 March, Cyclone Freddy moved inland to affect southern Malawi. Although the storm had weakened below tropical cyclone strength, it still carried an **exceptional rainfall load**. At Nkhulambe in Phalombe, 1,078 mm fell in four days, exceeding the station's average annual rainfall, with a peak intensity of 159 mm per hour attained on 14 March. The resulting floods and landslides destroyed houses, roads, bridges, and power infrastructure, and damaged crops that were close to harvest. Malawi was the worst-hit country in Freddy's final phase, although the wider event affected a **broad regional corridor** that included Madagascar, Mozambique, and Malawi (WMO).

Photo source: Thoko Chikondi



Map source: OCHA, 2023

The administrative boundaries and names shown and the designations used on this map do not imply official endorsement or acceptance by the United Nations.

The role of forecasting

Tropical Cyclone Freddy developed to the northwest of Australia on 4 February and persisted for 36 days before dissipating over Mozambique, making it the longest-lived tropical cyclone on record (WMO, 2024). The **forecast chain did identify the threat**. At the regional level, RSMC La Réunion tracked Freddy across the South-West Indian Ocean and issued cyclone guidance for countries in the basin. At the national level, Malawi's Department of Climate Change and Meteorological Services (DCCMS) warned on 10 March that parts of southern Malawi could receive more than 300–400 mm in 48 hours, with widespread flooding and flash flooding likely. By 12 March 2023 Malawi's disaster-management reporting indicated that rainfall accumulation in southern Malawi were projected to reach 400–500 mm within 72 hours (ReliefWeb).

These forecasts show that the **escalating rainfall hazard was identified**. The main issue was not the absence of a warning, but the **limits of the warning chain** under a fast-escalating multi-hazard event. The Government of Malawi's post-disaster assessment found that the system was not yet sufficiently multi-hazard, and that **discussions on responsibility for landslide alerts had been inconclusive**, with no clear agency mandate in place (Needs-assessment). It also reported **operational weaknesses** during the event itself: many river gauges were displaced or washed away, only two of six community-based flood early warning systems in the affected districts were fully functional, and some rain gauges overflowed above 200 mm, causing loss of record during the most extreme rainfall.

More broadly, a 2024 UNDRR forensic analysis concluded that early warning systems in the region identified the hazard risks, but **not all communities were able to receive and act on the warnings**.

Overall, Cyclone Freddy showed that although the rainfall threat was forecast, **important gaps remained in effective lead time, landslide-alert responsibility,** and the **ability of the early warning system** to address rainfall, floods and landslides simultaneously.

Photo source: Thoko Chikondi

Moving forward

Looking ahead, strengthening early warning for events such as Cyclone Freddy will require **better translation of rainfall forecasts** into flood, landslide, and impact. ECMWF forecast guidance could help identify where intense rainfall is likely to persist, while ECMWF soil-moisture monitoring and Copernicus C3S satellite soil-moisture products could help characterise antecedent wetness. **Antecedent conditions** matter in places such as southern Malawi, where saturated soils increase runoff and landslide susceptibility. In addition, a **regional or high-resolution model** could help refine the spatial distribution and intensity of rainfall over complex terrain, providing more locally relevant guidance for flood and landslide risk. Combined with local slope information, river-gauge data, susceptibility maps and exposure layers, these products could support a more useful multi-hazard warning framework for exposed areas. At shorter lead times, EUMETSAT nowcasting products offer an important complementary capability. Products such as Convective Rainfall Rate (CRR) and Rapidly Developing Thunderstorms (RDT) are designed to improve the real-time localisation and monitoring of intense rainfall, especially in the final hours before and during impact when the position and intensity of convection can still change quickly. **Nowcast information** is particularly relevant to events like Cyclone Freddy because it enables forecasters to update warnings as the weather situation evolves.

Together, these approaches could support a **stronger multi-hazard early warning system** in Malawi and across the wider Southern African region, combining longer-lead time and impact-oriented forecasting with improved short-term rainfall monitoring. The SEWA program could provide a **practical space to test** how ECMWF, Copernicus, EUMETSAT and national data might be combined to strengthen the upstream part of the warning chain, while RSMC La Réunion continues to provide **regional cyclone guidance**, and DCCMS remains responsible for **official national warnings.**

Photo source: Thoko Chikondi