



**Addressing Malawi's NAP recommendation for Medium and Long Term  
Adaptation Planning: *Integration of GEOGloWS-ECMWF Streamflow  
Forecasting into the Community-Based Flood Early Warning System in Malawi.***



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RCMRD

NAP Expo 2022  
Gaborone, Botswana





GOVERNMENT OF MALAWI

## Malawi's National Adaptation Plan Framework



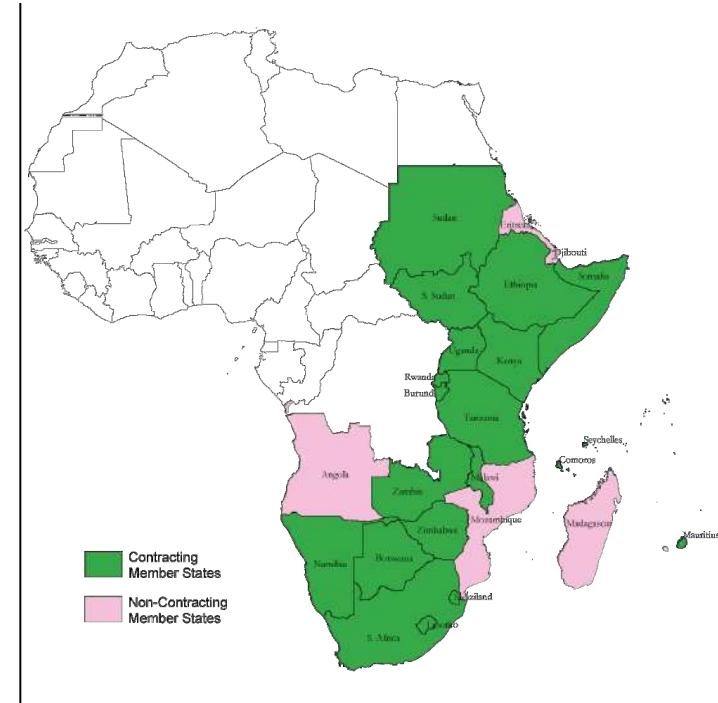
Ministry of Natural Resources, Energy and Mining  
Environmental Affairs Department

March 2020

## NAP Mandates

1. Improve community resilience to climate change through enhanced agricultural production, infrastructure development and disaster risk reduction and management. The activities are being led by :
  - a. The Ministry of Agriculture
  - b. Ministry of Water & Sanitation,
  - c. Ministry of Transport and Public Works;
  - d. Department of Disaster Management Affairs (DoDMA)

- ❖ Established in 1975 as an intergovernmental organization under the auspices of the United Nations Economic Commission for Africa (UNECA) and the then Organization of African Unity (OAU) now African Union (AU) with Head offices in Nairobi, Kenya.
- ❖ Twenty (20) Contracting member States
- ❖ Six (6) Non-Contracting member States
- ❖ Objective: To strengthen the members states capacity through generation, application and dissemination of geo-information and allied technologies for sustainable development.
- ❖ The Centre serves as the secretariat for AfriGEO, & a member of GEO.
- ❖ The Centre serves as the Hub for SERVIR Eastern and Southern African.





# The GEOGLoWS-ECMWF Streamflow Forecasting Service



## GEOGloWS ECMWF Streamflow Hydroviewer




[Log In](#)


Map Controls

Map Animation

Mon Jun 20 2022 03:00:00 GMT+0300  
(East Africa Time)



Find A Reach ID

Zoom to Lat/Lon Coordinates

Remove Map Marker

Switch to HydroShare Map

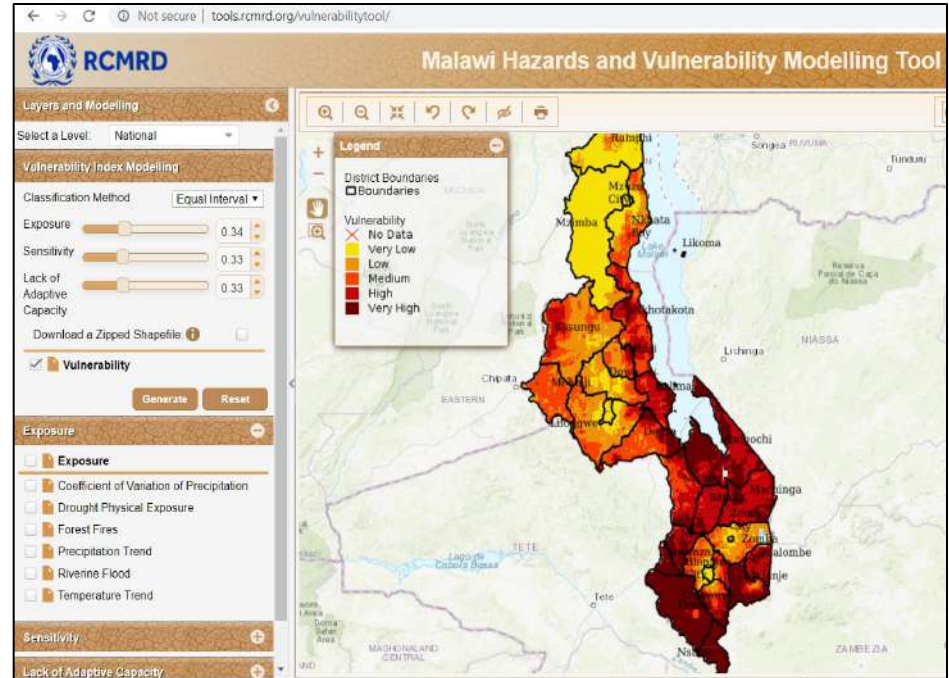
Stream Gauge Networks

Choose A Gauge Network



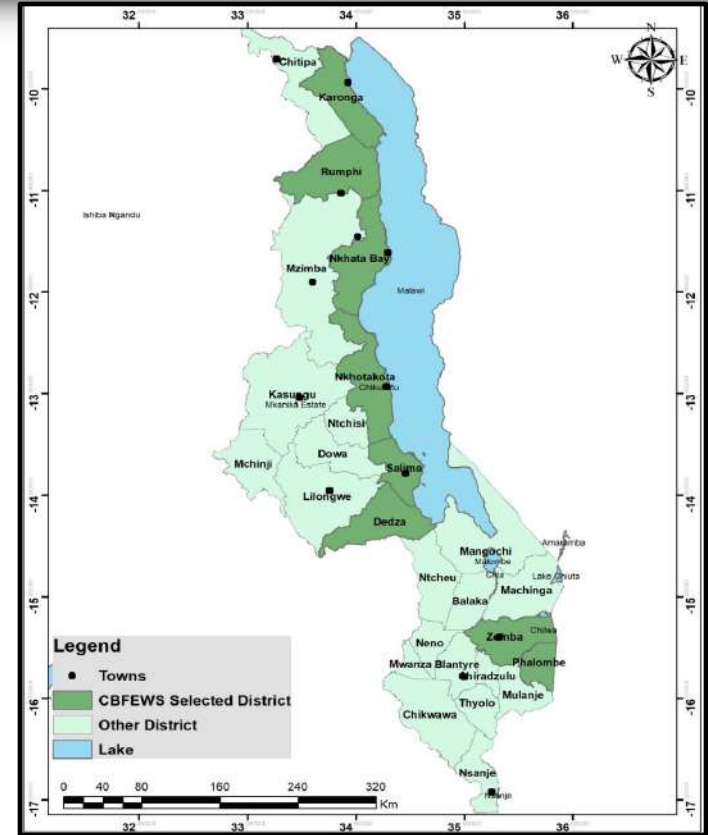
[About the Map Data](#)

- ❖ Hydrometeorological disasters (Flood & Drought) makes up more than 75% of all natural disasters occurring in Malawi. Observed data indicates that floods are increasing in frequency & magnitude.
- ❖ Destroy physical infrastructure hence reversing recent economic gains.
- ❖ Factors increasing Malawi's vulnerability;
  - Demographics trend in the country's vulnerable floodplains
  - Impact of climate change and variability,
  - Over-reliance on in-situ measurements for water resources monitoring and flood forecasting.
- ❖ With financial support from the GCF through UNDP, RCMRD partnered with the ICIMOD and SEE of Nepal and collaboration DoDMA, DWR & DCCMS to establish an integrated flood forecasting system using telemetric RGS and GEOGloWS-ECMWF streamflow forecast data for the flood-prone districts.

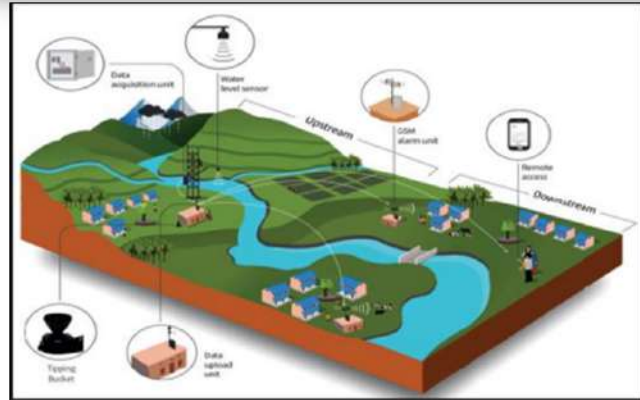


## Objectives:

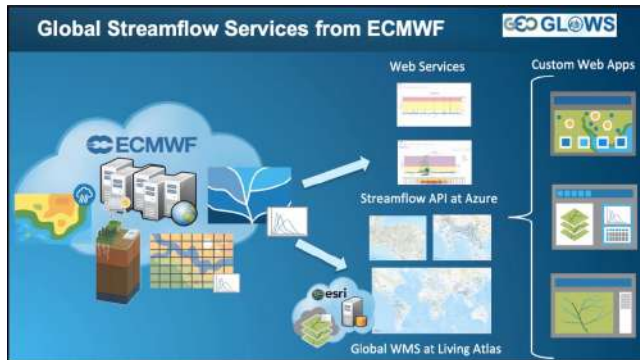
- ❖ To establish telemetric community-based flood early warning systems (CBFEWS) in 8 selected flood prone districts of:
  - **Karonga, Salima, Dedza, Nkhotakota, Nkhata Bay, Rumphi, Phalombe and Zomba.**
- ❖ Leverage the EOs and Satellite data to compliment telemetric CBFEWS.
- ❖ Strengthening the technical capacity building of government institutions in the use of the integrated system.







GSM Telemetry



REST API

## Community Based Flood Early Warning System for Malawi

**Data Watch**

As of: 2022-FEB-09, 14:43

Activate Siren on browser

Songwe River at Mwandenga, Karonga	448 cm	0 mm
Phalombe River at Mwangi, Phalombe	100 cm	0 mm
Linthipe River at M5 Road Bridge, Salima	160 cm	0 mm
Bua River at Bua Lodge	N/A	N/A
Kyungu River at Chisi, Karonga	N/A	0 mm
Levulezi River at M5 Bridge, Dedza	72 cm	0 mm
Lifidzi River at Chimoga, Salima	N/A	0 mm
Likangala River at Mikuyu turnoff trading center, Zomba	149 cm	0 mm
Limphasa River at Timbiri, Nkhatabay	N/A	N/A
Lingadzi River at Mwanza, Salima	80 cm	0 mm
Lipimbi River at Mpanje, Salima	N/A	0 mm

(1.) Water level Sensor (DA)



Data  
Transmission

(2.) Server Data Upload (DU)



Alarm Trigger

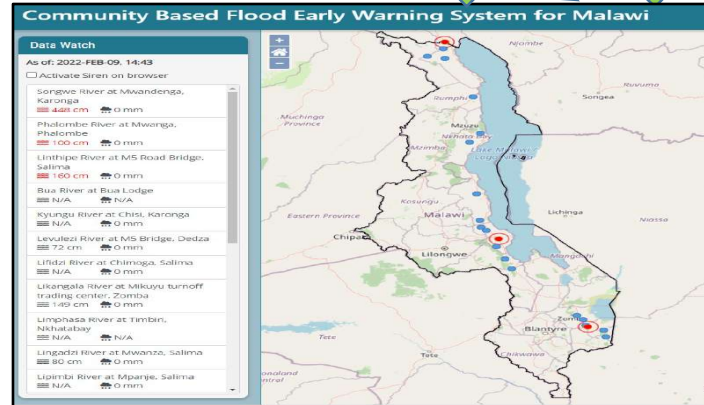
(3.) Alarm Unit (AU)



OC trigger

Alarm track

(6.) Operation CBEWS platform

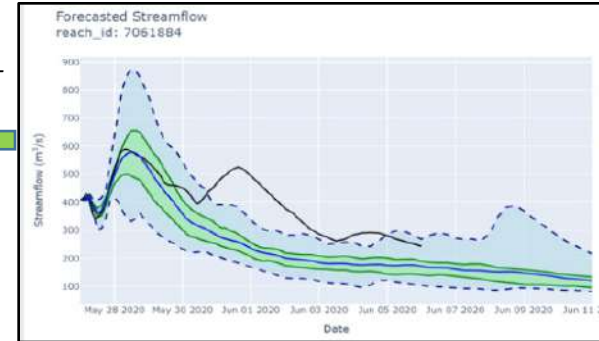


(4.) Manual River Staff Gauge



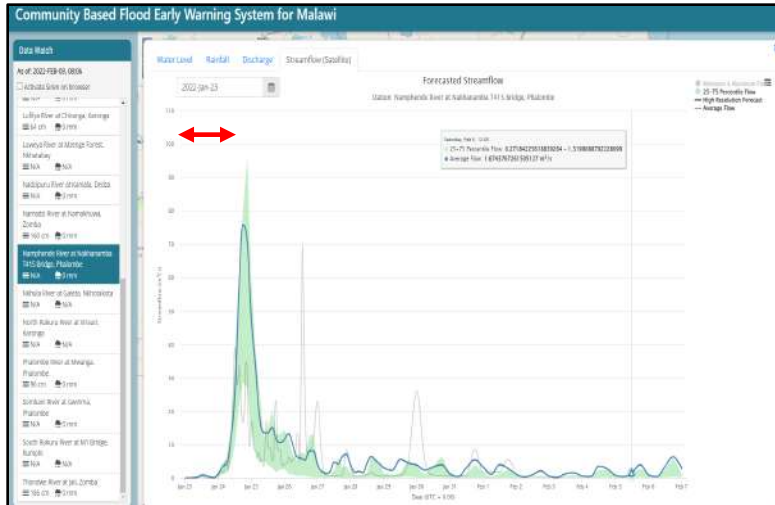
Warning &  
Alert levels  
calibration  
&  
validation

(5.) GEOGloWS Streamflow forecast data

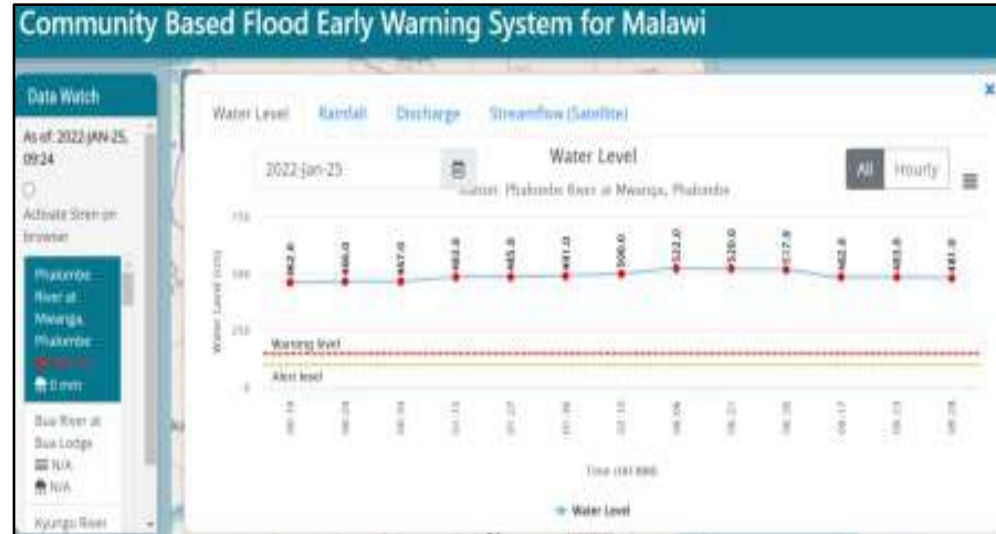


## Systems performance during Cyclone Ana in 22th - 25th January 2022 – Phalombe River, Phalombe District, Southern Malawi.

GEOGloWS Streamflow forecast data picked the of Cyclone Ana flood wave on 20th January.



Telemetric measure river water level above the Warning & Alert Levels by the 25th January.



**Post-Flood Assessment and Evaluation by Red Cross Society**

**Floods warning gadgets save lives in Karonga**

THE NATION  
TUESDAY, 24 MAY 2022

ANDREW MKONDA  
MALAWI NEWS AGENCY

People around Songwe River in Traditional Authority Mwakaboko in Karonga District have said early warning gadgets saved their lives and livestock from floods this year.

Speaking on Saturday when Malawi Red Cross Society officials appreciated the impact of the gadgets in the area, Mwakaboko Village Civil Protection Committee chairperson Moffat Mwaseya said previously, people were caught unawares by floods, thereby losing lives.

He said: "But this year, no single life has been lost as people were able to escape to the upland on time following alerts from the gadgets.

"Without the gadgets, we would have lost many



PHOTOGRAPH: ANDREW MKONDA, MANA

Mwaseya (R) explains how the warning system works

lives because Songwe River flooded beyond expectation."

One of the flood survivors, Dickson Ngonyi, whose house collapsed during the disaster, said his family fled to safety after hearing an alarm showing that the

river had flooded.

He said: "We were fast asleep when the alarm rang. We quickly woke up and left the house surrounded by water.

"No sooner had we left, than the house collapsed."

Malawi Red Cross Society disaster

preparedness and mitigation specialist Cecilia Banda said it was interesting to learn that community members were following warnings using modern equipment.

She said: "We are impressed with how people are using the gadgets. It shows that Modernised Climate Information and Early Warning System Project we are implementing is bearing fruits."

Community-based early warning system gadgets were installed in four rivers in the district with financial support from UNDP. The rivers are Kyungu, North Rukuru, Lufilya and Songwe.

Karonga is one of the disaster-prone districts in the country and this year, over 6 000 households were affected by floods in the district. ■

*"The system saved their lives and livestock from flood this year. Previous years people were caught unaware by floods thereby losing lives. But this year no single life has been lost as people were able to escape to the uplands on time following alerts from the gadget."*  
**Community Chairman – Karongo District**

*Tweet by the Vice President of Malawi, Dr. Saulos Chilima*



- ❖ The integrated system currently support the government's efforts the upscaling and expansion of the use of Modernized Climate Information and Early Warning systems (M-CLIMES) in Malawi to enhance community preparedness and resilience,
- ❖ GEOGloWS implementation has increased the warning lead time from hours to days and complements the telemetric water level sensors during the downtime period. This capability enhances community preparedness and leads to early action that significantly reduces the flood disaster risks, as demonstrated during Cyclone Ana.
- ❖ GEOGloWS forecast data has been useful for **ANTICIPATORY ACTIONS**
- ❖ The Government agency, DoDMA has planned to Upscaling the system into 10 Southern districts, frequently impacted by Cyclone related floods.
- ❖ Capacity building on GEOGloWS & EF5 for inclusion of inundation forecasting and Streamline the warning information to community level understanding is key
- ❖ More partnership and collaboration for scalability and transferability is still needed.



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