

# Earth observation capabilities to enhance early warning systems and climate services in Malawi

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## Vulnerability:

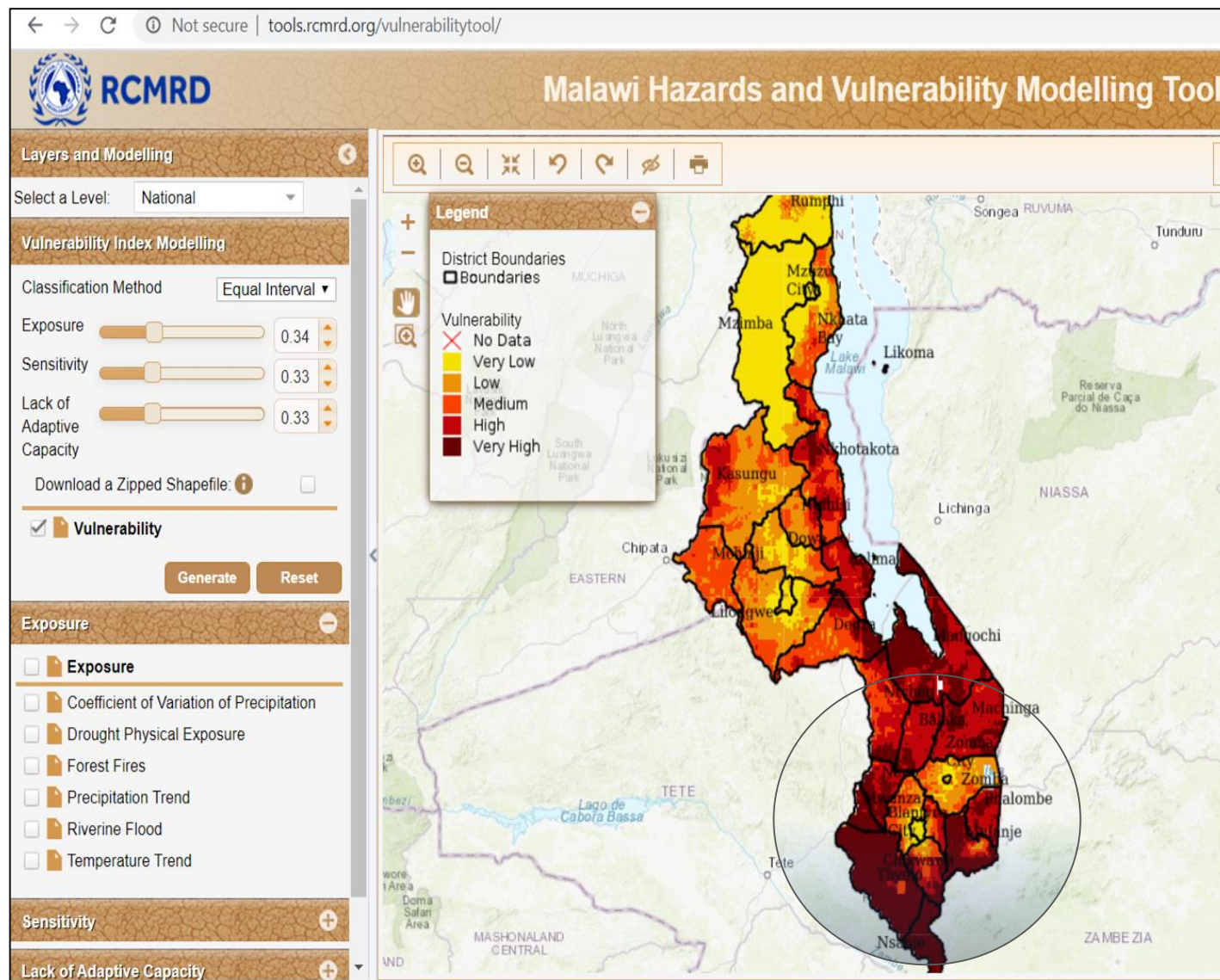
- **Agriculture-based economy** (over 85% of the population)
- Higher impact of climate change and variability in the South
- **Over-reliance on in-situ measurements for flood forecasting**
- Extensive deforestation and watershed degradation

## Hazards:

- **Floods**
- Heavy storms
- **Drought**
- Landslides
- Pest Infestations
- **Disease epidemics / Waterborne diseases**

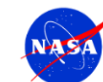


# Malawi's Hazards and Vulnerability





# The Integrated Community-Based Flood Early Warning System (CBFEWS)



## Water level Sensor



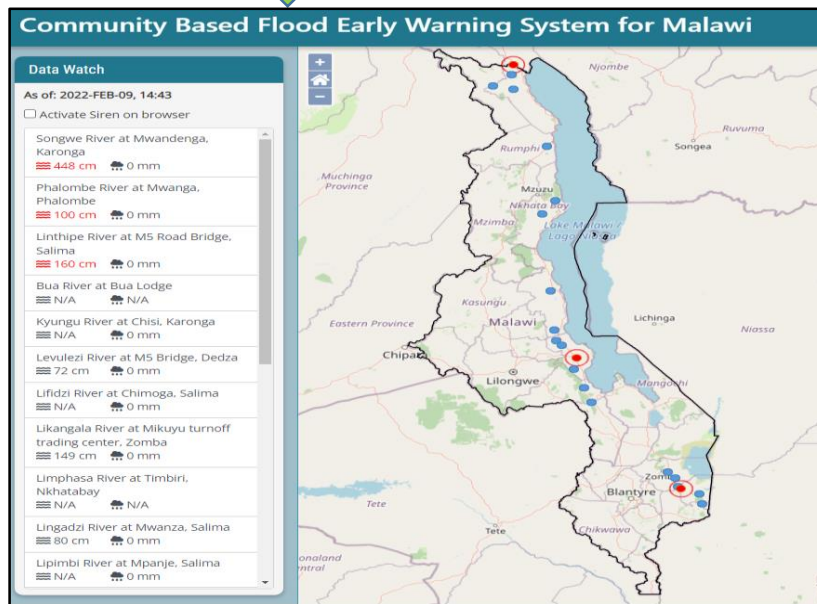
## Data Server Upload



Data Transmission

Manual Trigger  
Remote Trigger

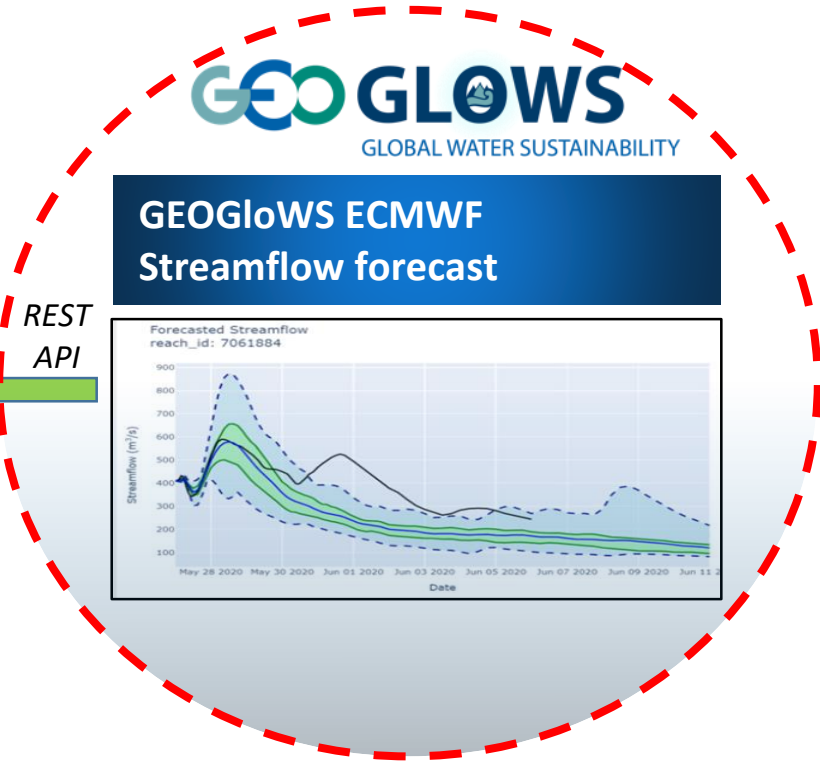
## Alarm Unit



Upload

Alarm track

Trigger



# The GEOGLoWS-ECMWF Streamflow Forecasting Service

<https://geoglows.apps.aquaveo.com/apps/geoglows-hydroviewer/>

<https://tethys.byu.edu/apps/geoglows-hydroviewer/>



# Malawi's annual flood impact

| Rain Season<br>November/April               |                | Financial Impact<br>(Million USD) |          | Population                |           |      |
|---|----------------|-----------------------------------|----------|---------------------------|-----------|------|
| Period                                      | Event          | Losses and Damages                | Recovery | Affected by economic loss | Displaced | Dead |
| 2011/2012                                   | Heavy rainfall | 12                                | 22       | 18,000                    | 6,800     | 18   |
| 2014/2015                                   | 2 Cyclones     | 215                               | 494      | 1,101,364                 | 230,000   | 106  |
| 2018/2019                                   | 2 Cyclones     | 220                               | 368      | 975,600<br>(277,089) ★    | N/A       | 60   |
| CBFEWS/GEOGloWS<br>Implemented<br>2021/2022 | 2 Cyclones     | 156                               | 185      | 994,967<br>(156,197) ★    | 221,127   | 46   |

2015/2016 Drought

★ Districts in which CBFEWS was implemented in 2021

# Next Steps

- *World Bank* to support the Government to scale-up to 10 flood prone districts in the Southern part of Malawi, targeting additional 40 river systems.
- *RCMRD and GEOGloWS partners* through the *USAID SERVIR Program* to replicate the integrated project and increase the institutional capacity in other countries.
- *GEOGloWS* to develop supplementary guidance to the UNFCCC NAP Technical Guidelines to include the GEOGloWS-ECMWF service in other countries.