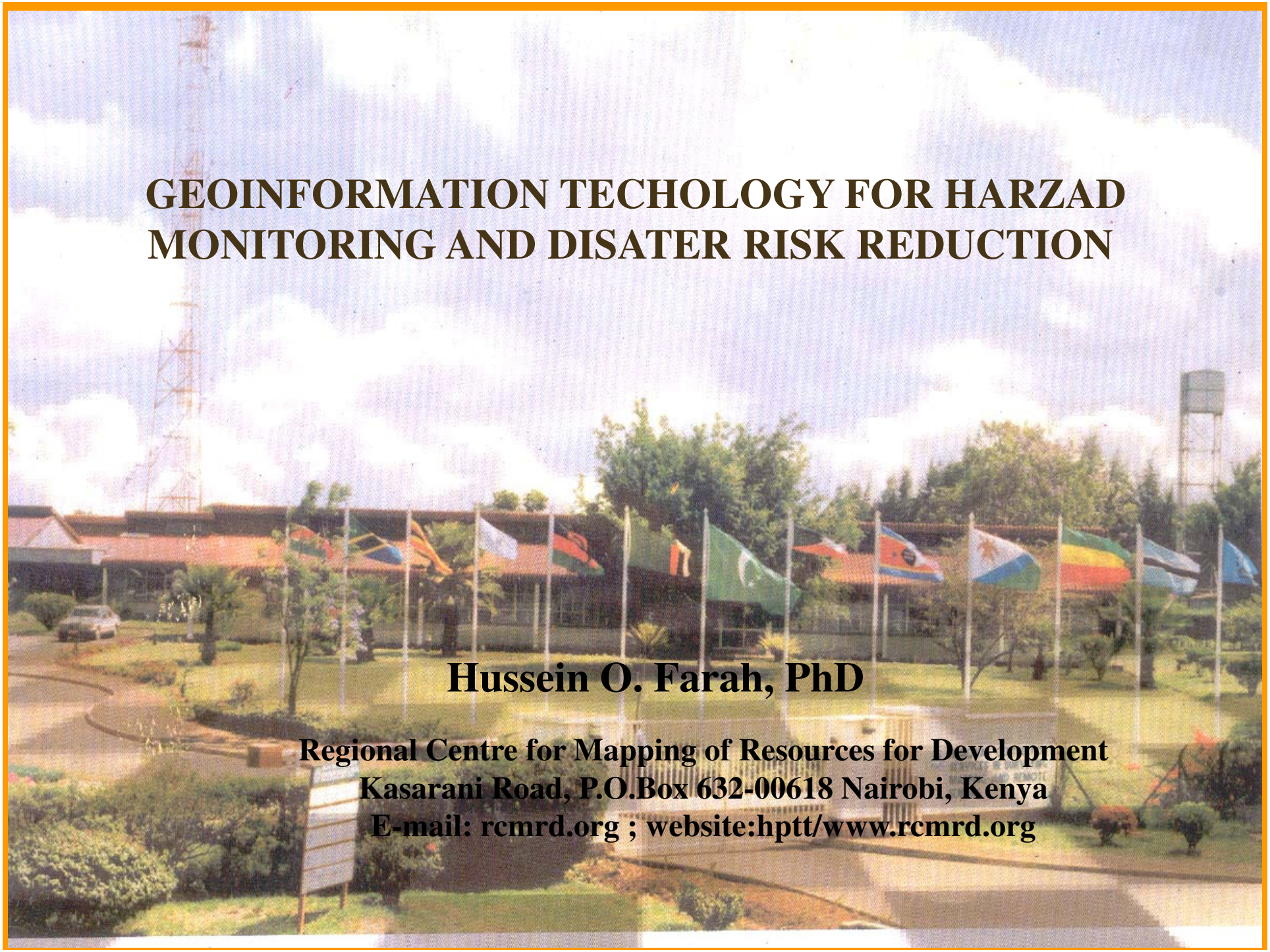
GEOINFORMATION TECHOLOGY FOR HARZAD MONITORING AND DISATER RISK REDUCTION

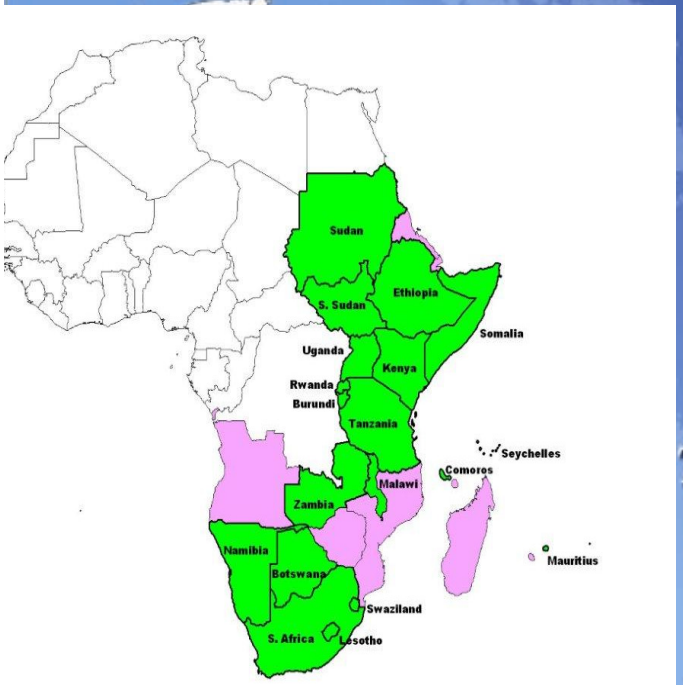


Hussein O. Farah, PhD

Regional Centre for Mapping of Resources for Development
Kasarani Road, P.O.Box 632-00618 Nairobi, Kenya
E-mail: rcmrd.org ; website:hptt/www.rcmrd.org

REGIONAL CENTRE FOR MAPPING OF RESOURCES FOR DEVELOPMENT

RCMRD



Our Vision

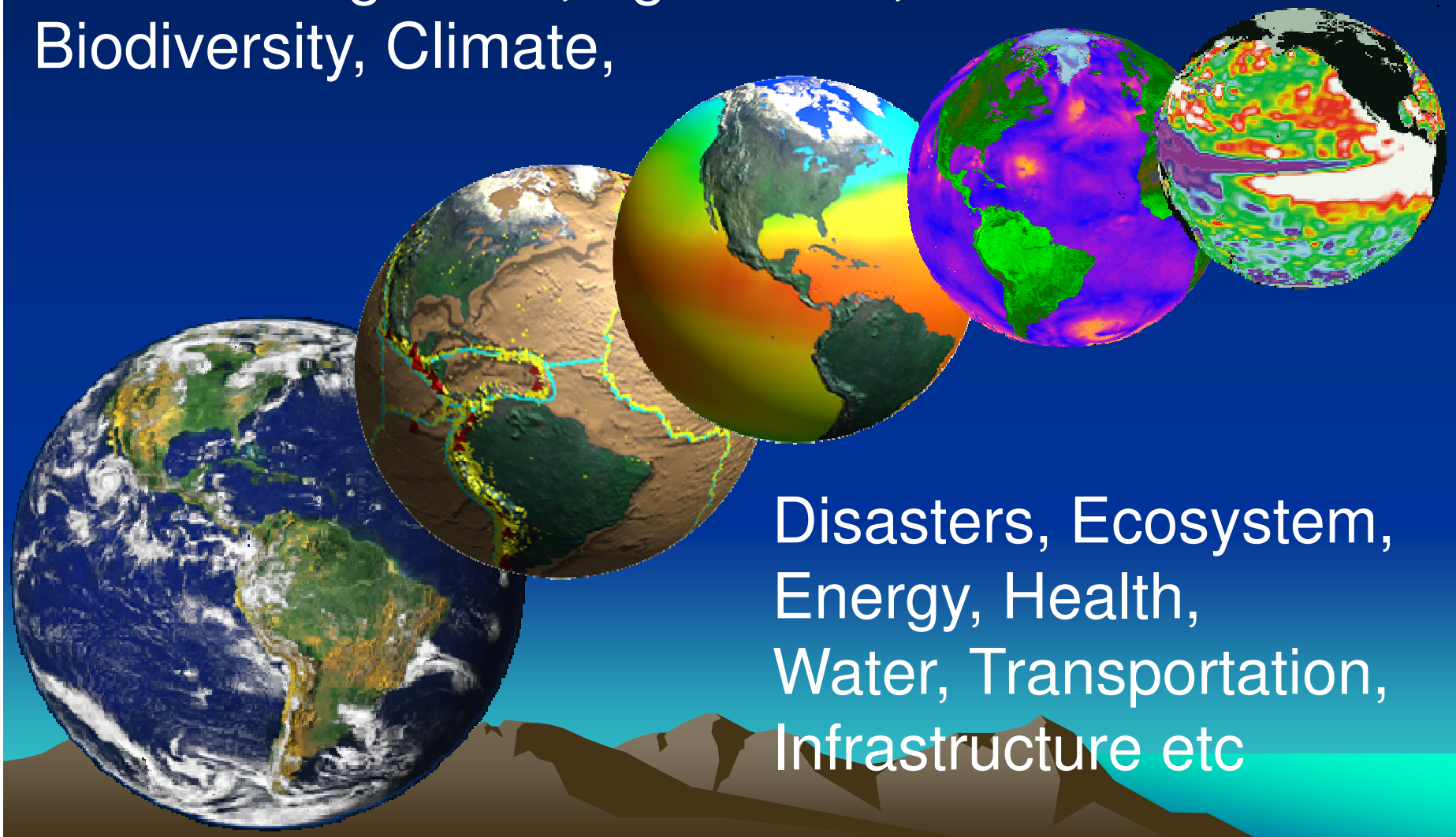
To be a premier Centre of Excellence in provision of Geo-information services.

Our Mission

To promote sustainable development through generation, application and dissemination of geo-information and allied ICT services and products in the Member States and beyond.

Geoinformation for Societal Benefit

Land Management, Agriculture,
Biodiversity, Climate,



Disasters, Ecosystem,
Energy, Health,
Water, Transportation,
Infrastructure etc

Major Activities of RCMRD

A. Advisory services

B. Training

C. Servicing and Calibration of Mapping Equipment

D. Project implementation

E. Data and information Dissemination

F. Research and Development

Introduction

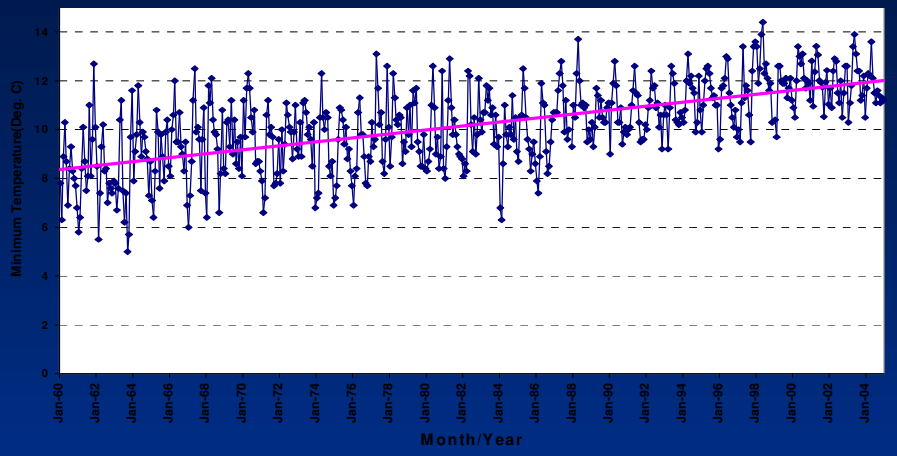
- *People are increasingly vulnerable to hazards from natural and anthropogenic changes in climate and the land surface*
- *Monitoring of hydroclimatic hazards for early warning, is important.*

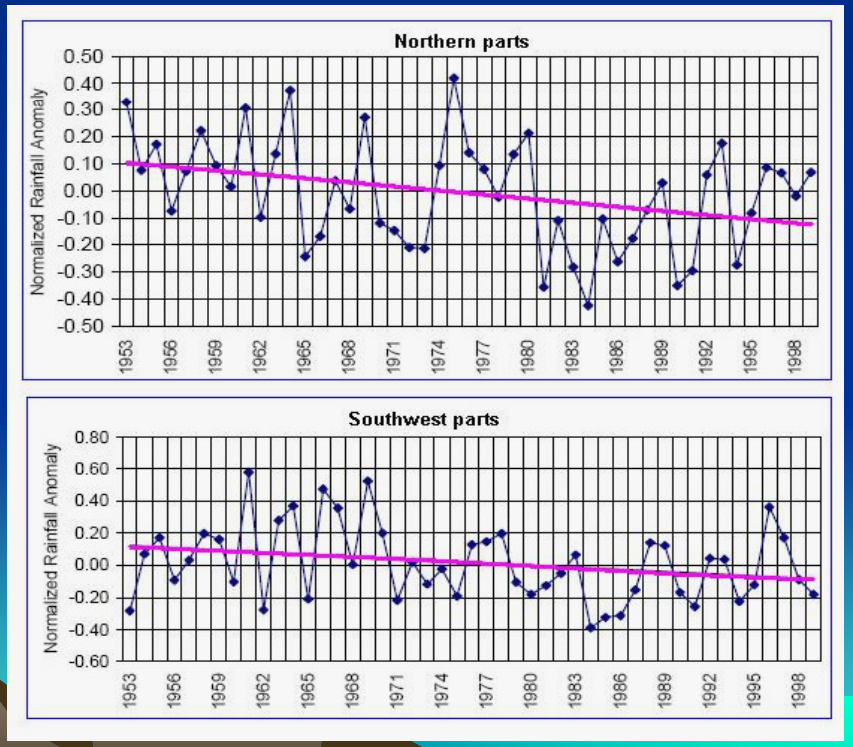
Early Warning

- *Livelihood systems are highly sensitive to climate variability and trends*
- *Conventional climate station networks are sparse*
- *Satellite remote sensing and models fill the gap,*
- *Downscaling climate change scenarios provides information on impact on food security*

Climate Change:

- Rainfall variability, drought, melting glaciers, sedimentation, rising sea levels and flooding, advantage to invasive species, a risk to delicate species unable to adapt to change, health, socio-economic



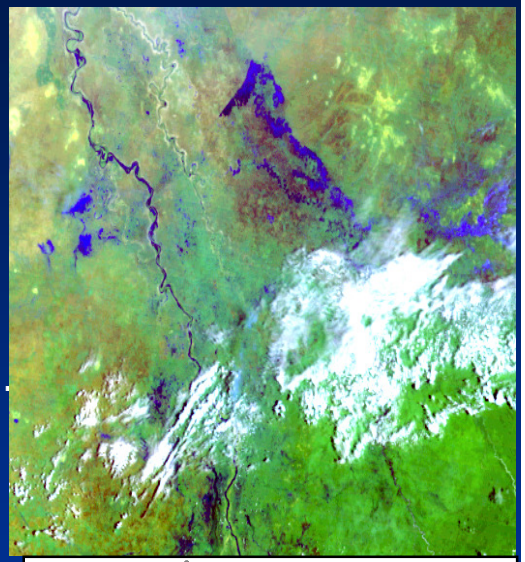


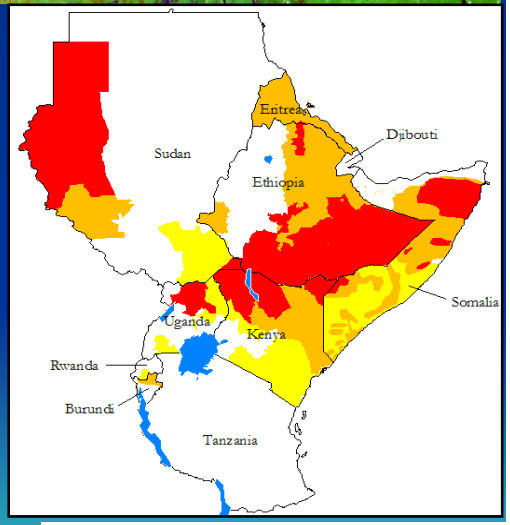
Natural disasters:

- Hydro-meteorological (flooding, storm, drought, etc.),
- Biological (locust, epidemic diseases, etc.) and
- Geological (earthquake, landslide, volcanic eruption, etc.).

- **95%** of natural hazards in the region are caused by droughts and flooding.

- These hazards are responsible for **70%** of loss of life and **75%** of economic loss





Extremely Food Insecur
Highly Food Insecure
Moderately Food Insecu

Climate-related Challenges in the Region

1. **Field data collection (climatic and non-climatic) and exchange** are still both inadequate and inconsistent to support comprehensive and continuous early warning and monitoring.

2. **Early warning and monitoring information packaging and dissemination** is still constrained and ineffective for most vulnerable countries/communities.

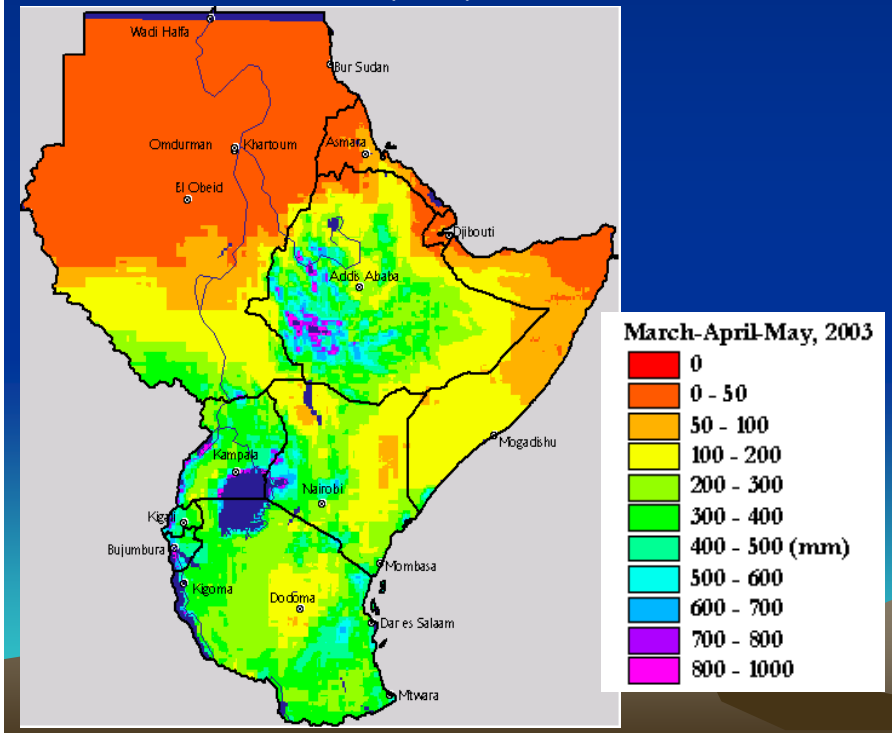
3. **Approaches for Early Warning and Monitoring are not fully integrated and inter-comparable;** seasonal forecasts lack specificity, contextual interpretation and reliability indicators..

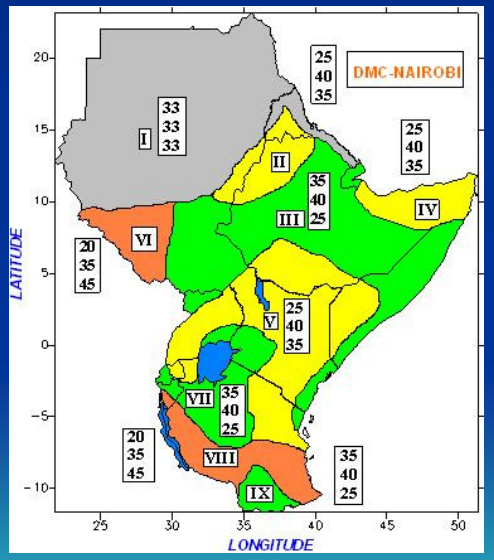
4. **Efficient end-user driven delivery system are lacking** and do not empower vulnerable communities.

Satellite Rainfall Estimation and Monitoring

- Use of NOAA satellite RFE since mid-1990s (Africa)
- A blend of TIR, microwave, and station observations

Rrainfall amounts (mm)

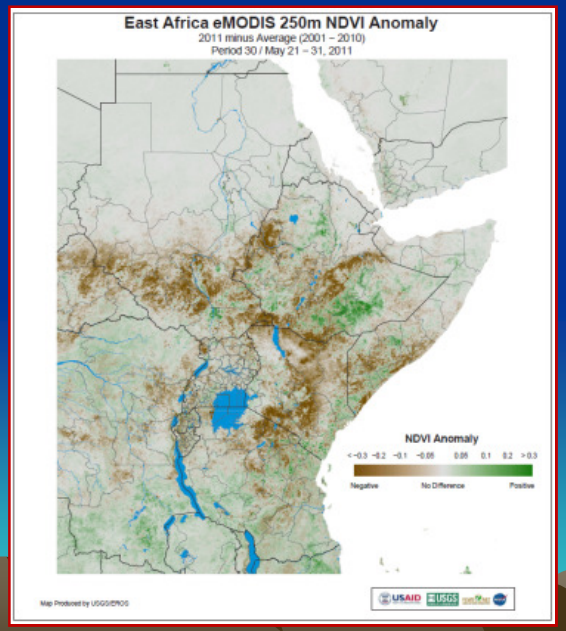


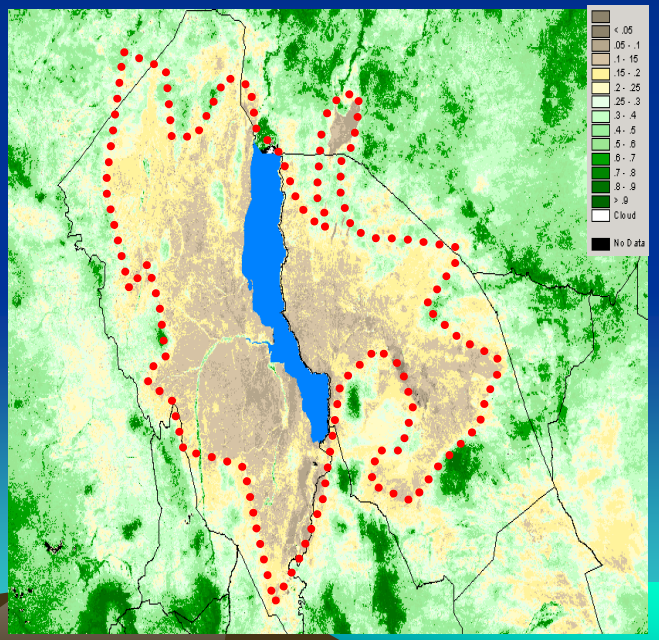


COF Forecast

Monitoring of Crops and Pastures

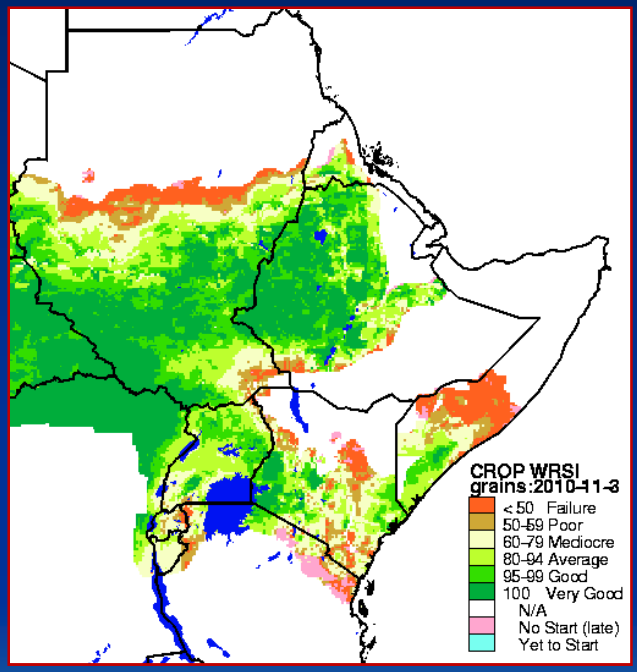
- Normalized Difference Vegetation Index
  - *250-m resolution -MODIS*
  - *10-day composites every 5 days*
  - *Temporal smoothing algorithm applied*
- Used extensively to monitor crop and pasture conditions



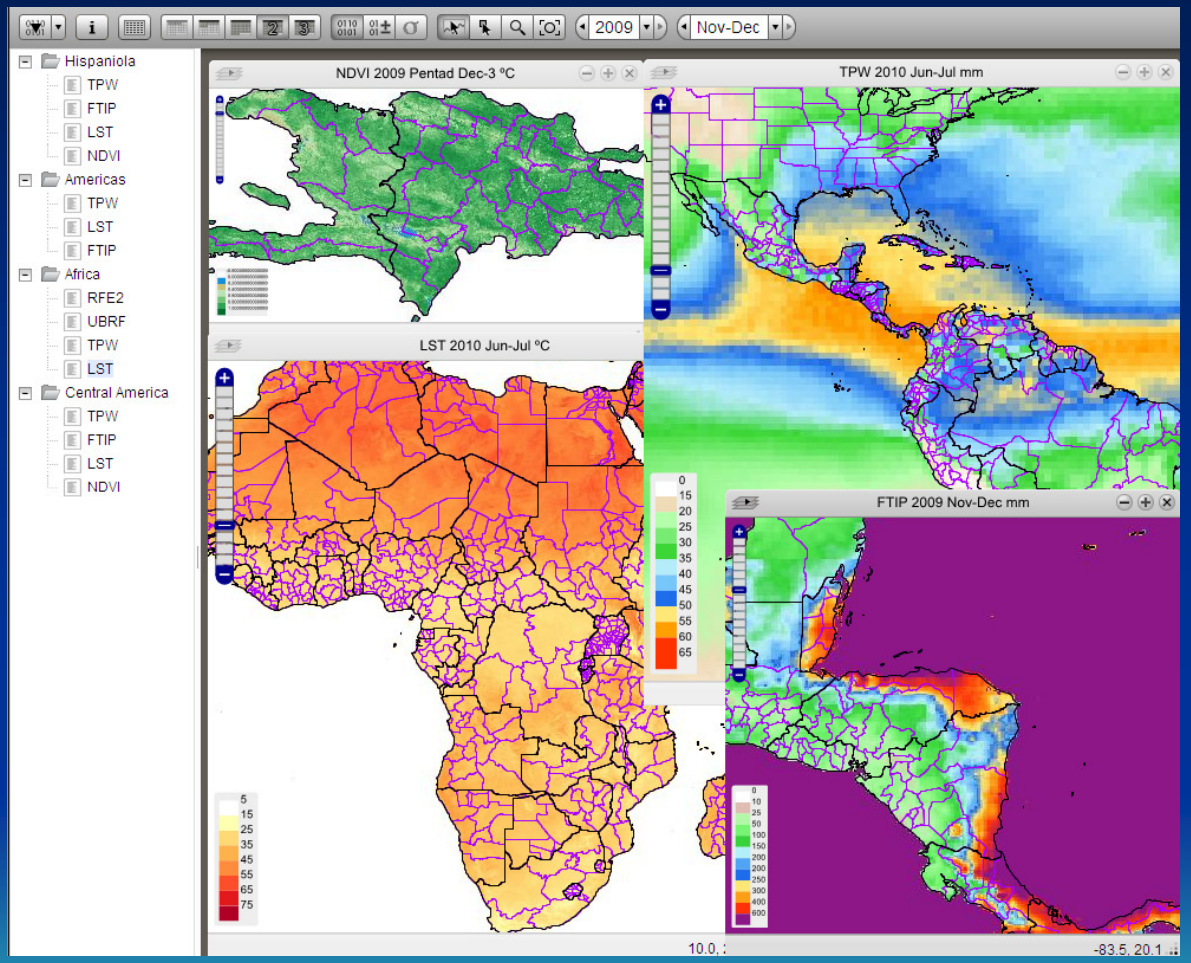


Agricultural Drought Monitoring

- Water Requirement Satisfaction Index (WRSI) model uses rainfall and specific crop water needs to assess crop condition
- Actual ET also estimated
- Showing crop failure during the short rains in Somalia and Kenya 2010

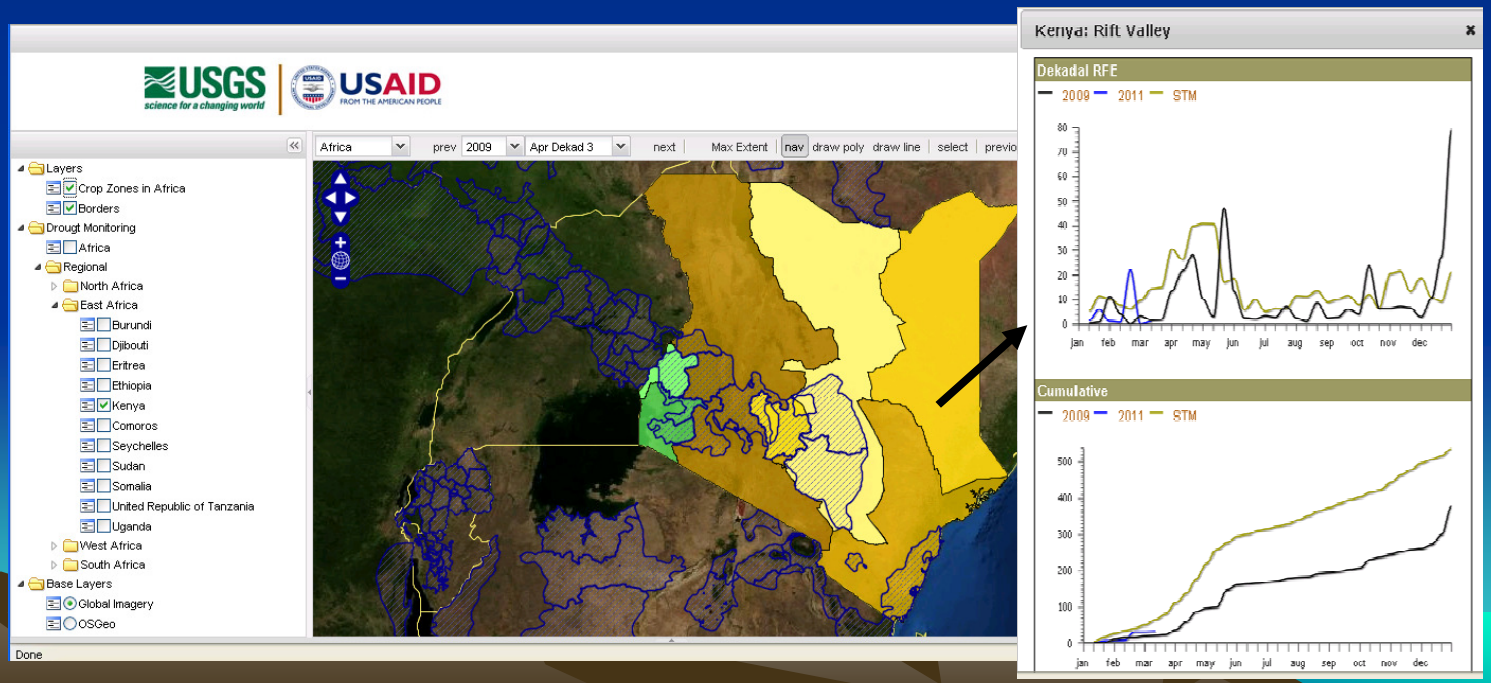


- Satellite monitoring will be increasingly important for early detection of adverse agricultural outcomes in an automated fashion
- Remote sensing information to monitor regions without in-country presence
- Rapid comparison of multiple datasets from multiple sensors
- Standardized anomaly maps and time series



Decision Support Systems

- **Utilizes remote sensing data in an automated fashion to flag areas of drought concern.**
- **Ranks drought severity at crop zone and admin levels**
- **Data are summarized at continental and national scales to identify areas of concern.**



Sharing and Exchange of Data and Information

Discover

- Managed knowledge base
- Catalog services
- Directory services
- Notification services
- Browse & search function

Acquire

- Ground receiving station
- Data acquisition services
- Data processing services
- Data archive
- Geodata services

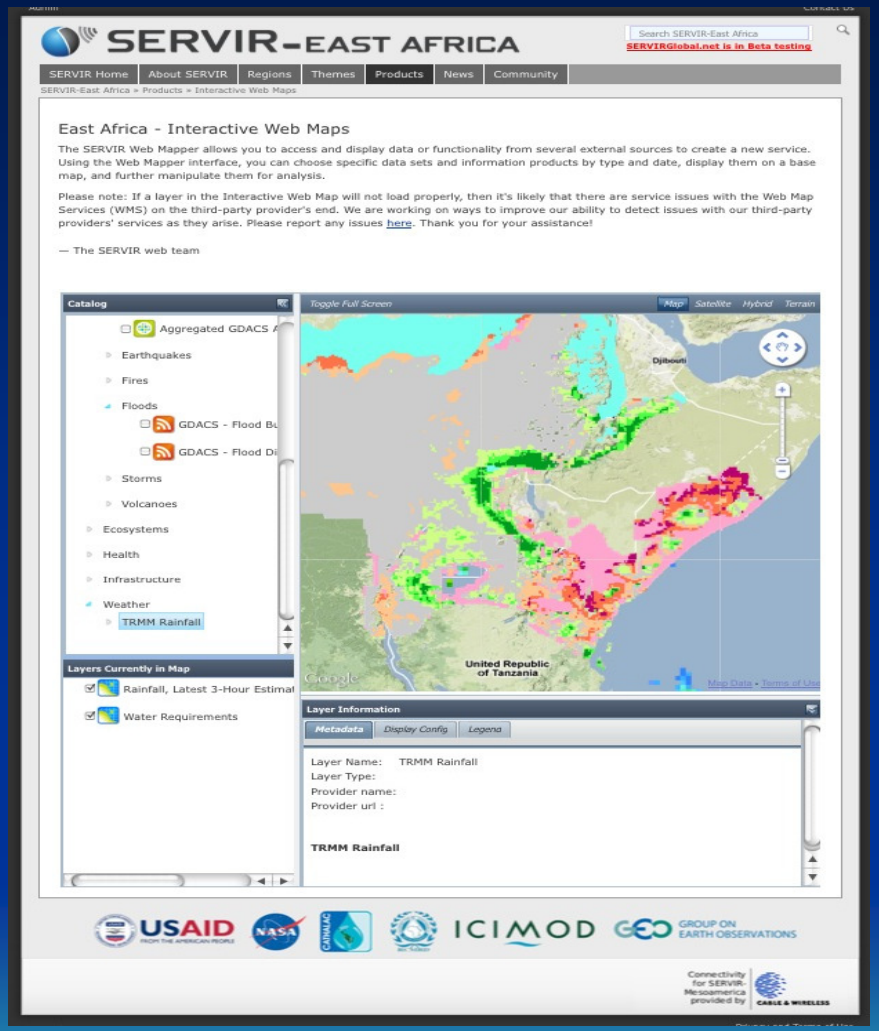
Use / Create

- Visualization tools
- Decision support tools
- Forecasts and models
- Support for interoperability
- Support for product use

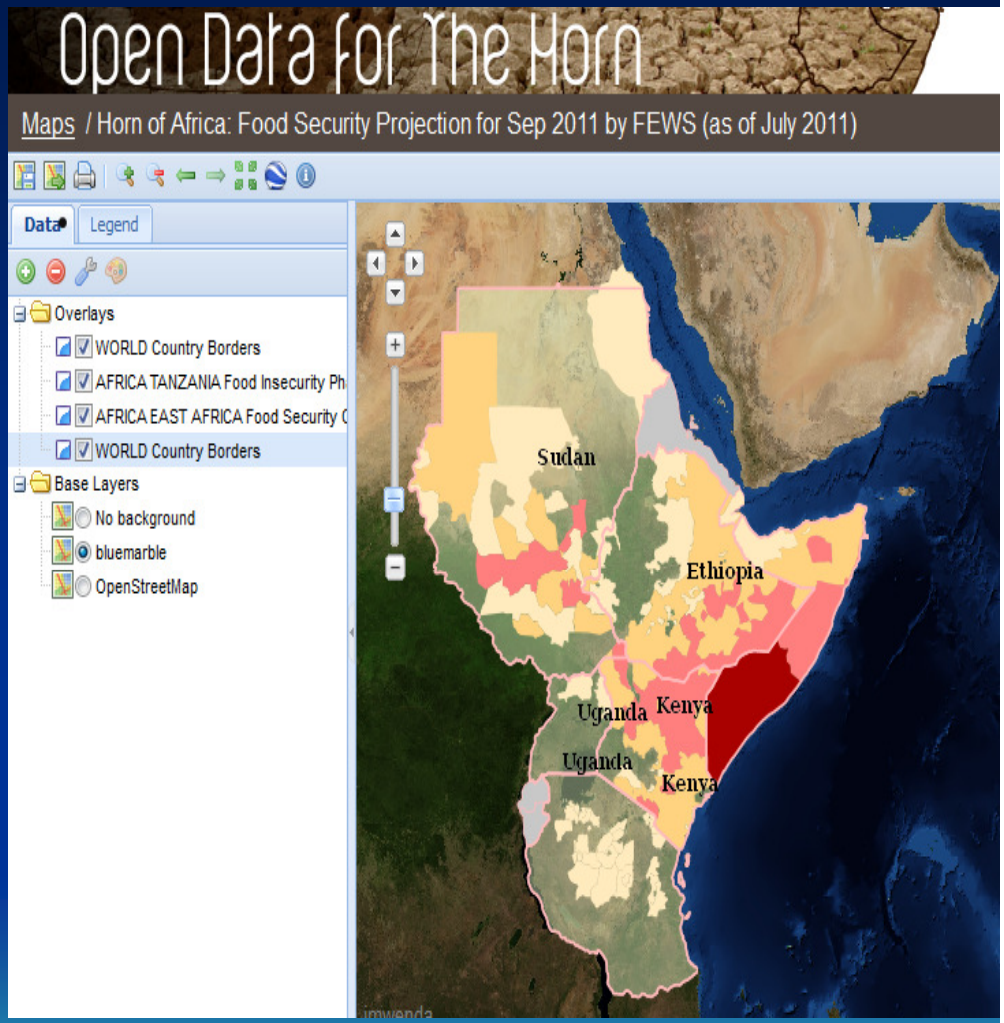
Share

- Metadata authoring tools
- Community building tools
- Feedback mechanisms
- Reducing barriers to sharing

www.servirglobal.net/africa

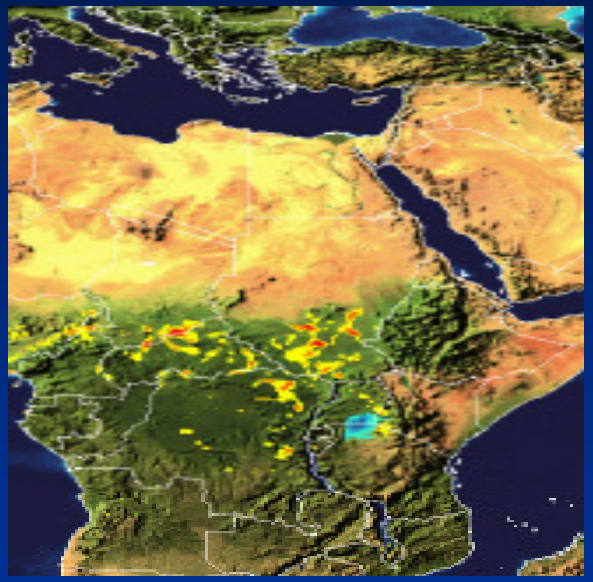


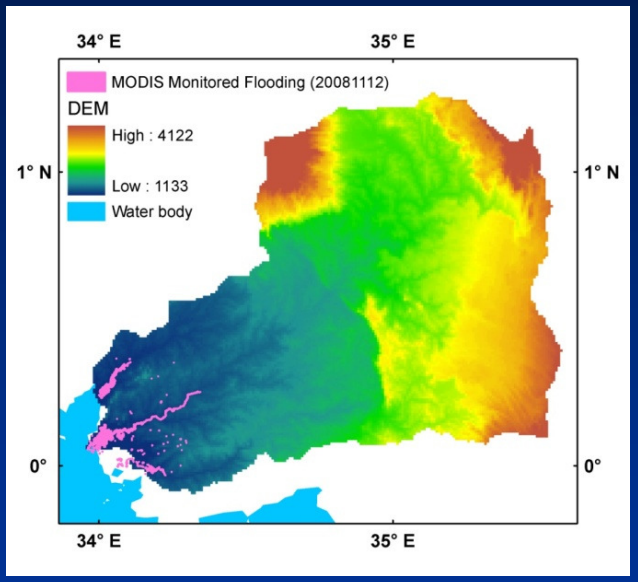
http://horn.rcmrd.org



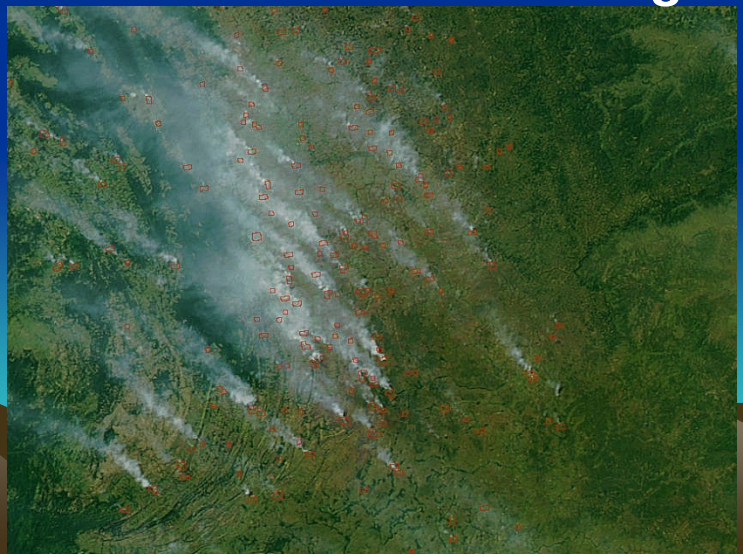
Disaster Management /DRR

Flood Potential/Forcast



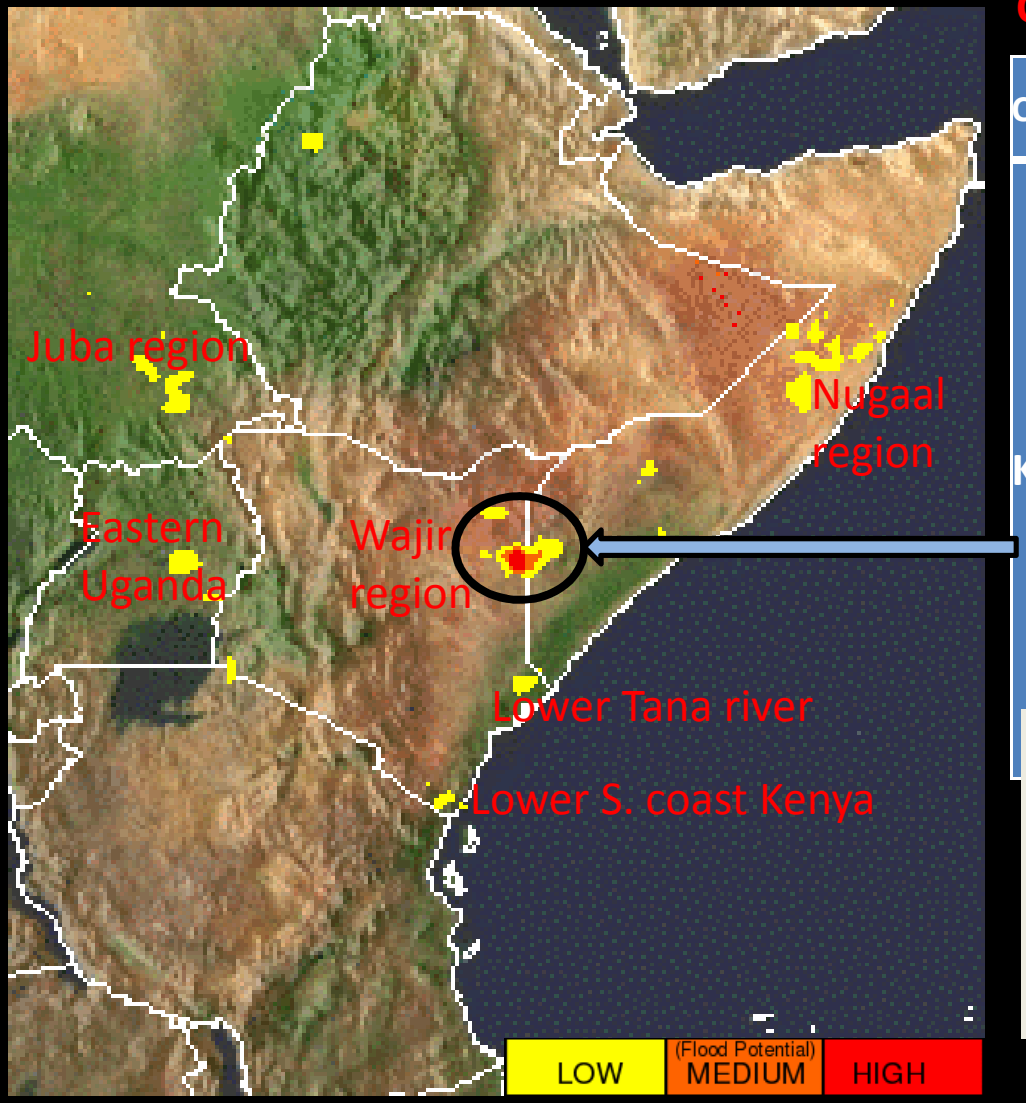


Forest Fires Monitoring



Flood forecast

Day of this alert: 15 May 2012 0000 UTC



Current severe flooding potential areas

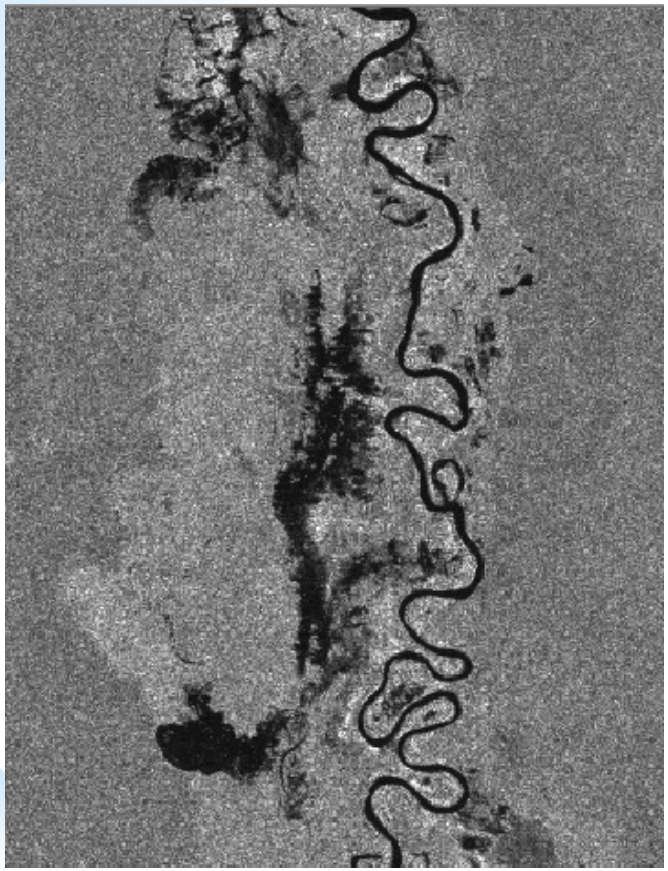
Country		Water level & Latitude/Longitude	
Kenya	Wajir	149mm	1.38 40.88
	Wajir	161mm	2.12 40.62
	Wajir	172mm	1.62 41.12
	Wajir	184mm	1.88 40.38
	Wajir	255mm	1.62 40.88

The current forecast shows **Wajir** in **Kenya** and it's environs as areas with **high** flooding potential.

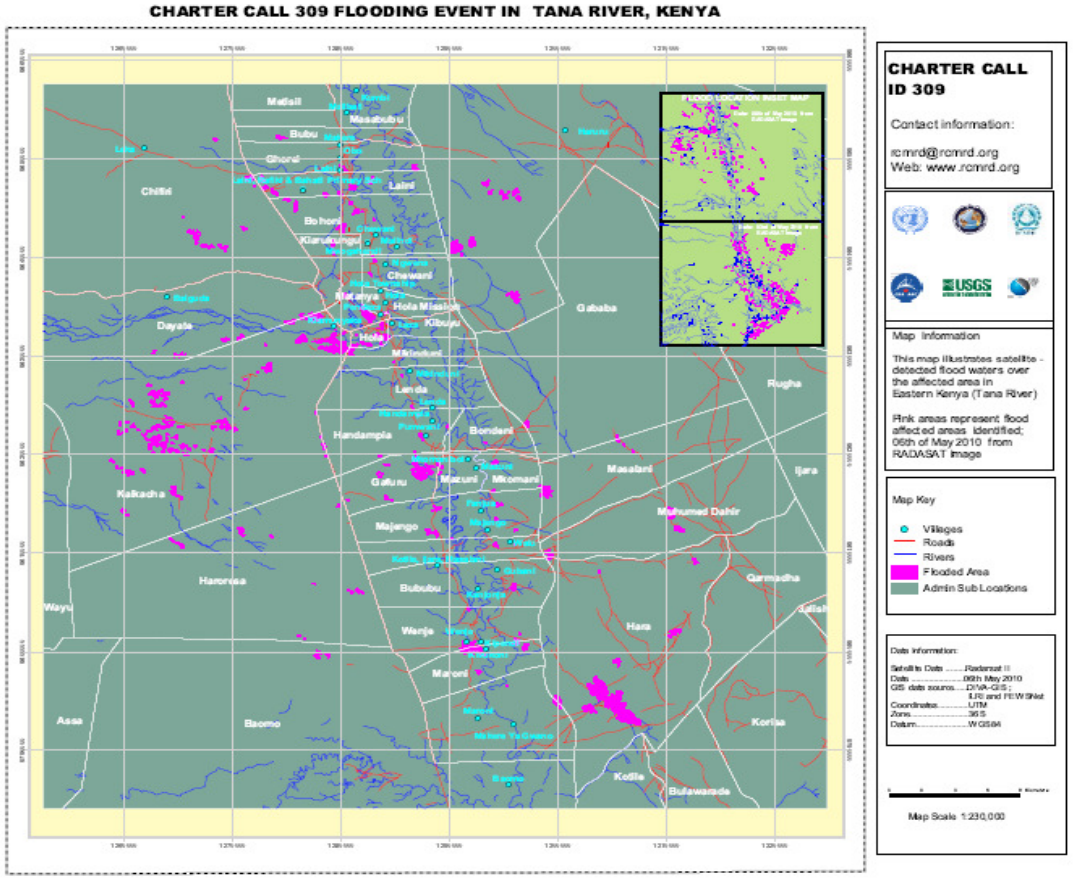
Other areas in the region as indicated on the map have low flood potential .

Response for Flooding in Kenya in June 2010

Charter Activation 309, RADARSAT Image



Flood Disaster Rapid Map

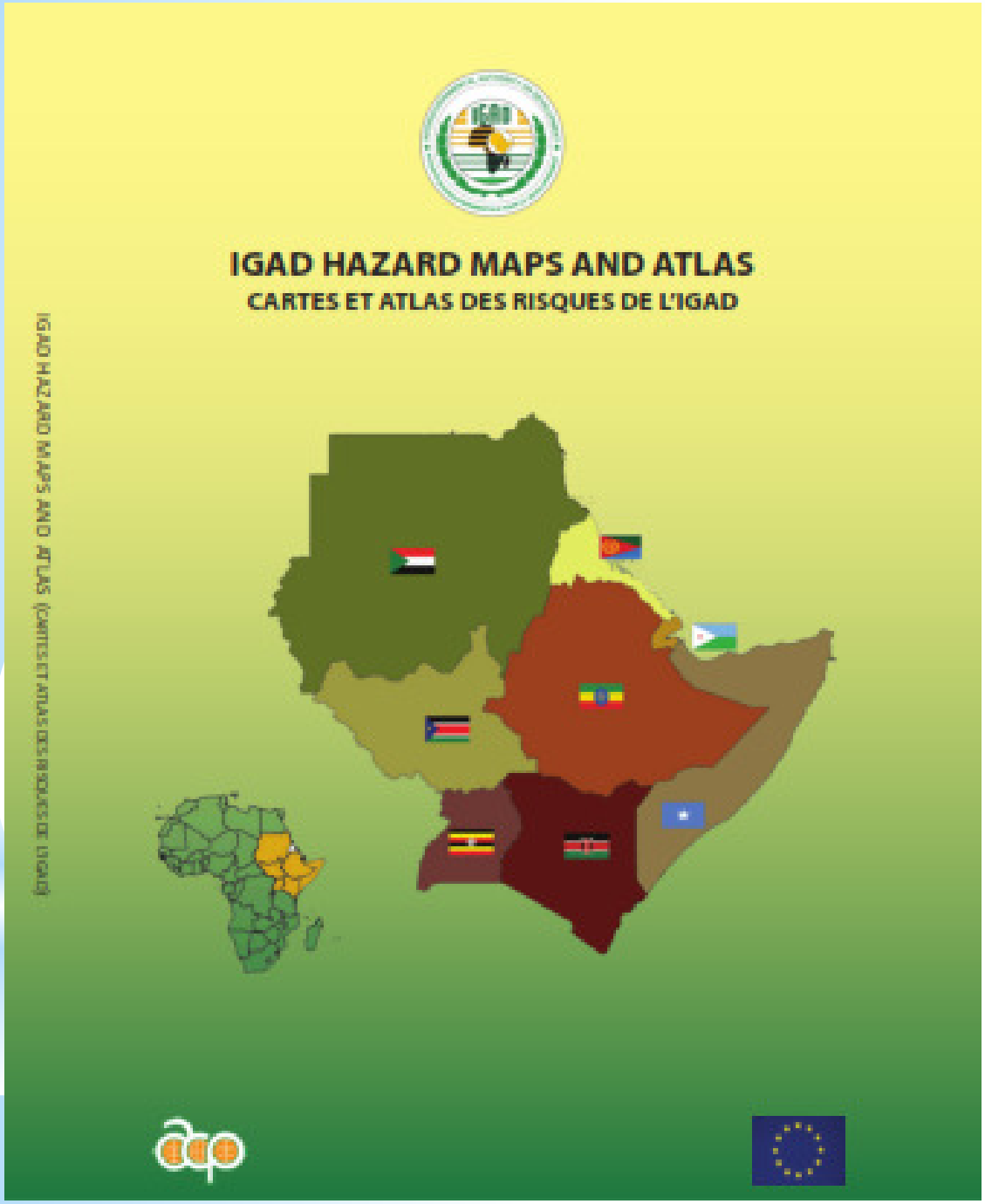


Response: Landslide

On March 2, 2010 a massive landslide occurred in Eastern Uganda's Bududa District. A trading centre in a village was flattened, leaving shops and houses buried under the mud. By morning March 3 2010 the official death toll had raised to 85 people but more than 350 were still unaccounted for.

The Advanced Land Imager (ALI) on NASA's Earth Observing-1 (EO-1) satellite captured this natural-color image on March 11, 2010. Gravity constantly tugs downward on a slope, but only when gravity's force exceeds the strength of the rocks, soils, and sediments composing the slope does land begin to slide down hill. Landslides often occur in conjunction with other events, and rainfall in the Bududa region likely initiated this slide

For more information, visit www.servir.net



Acknowledgement

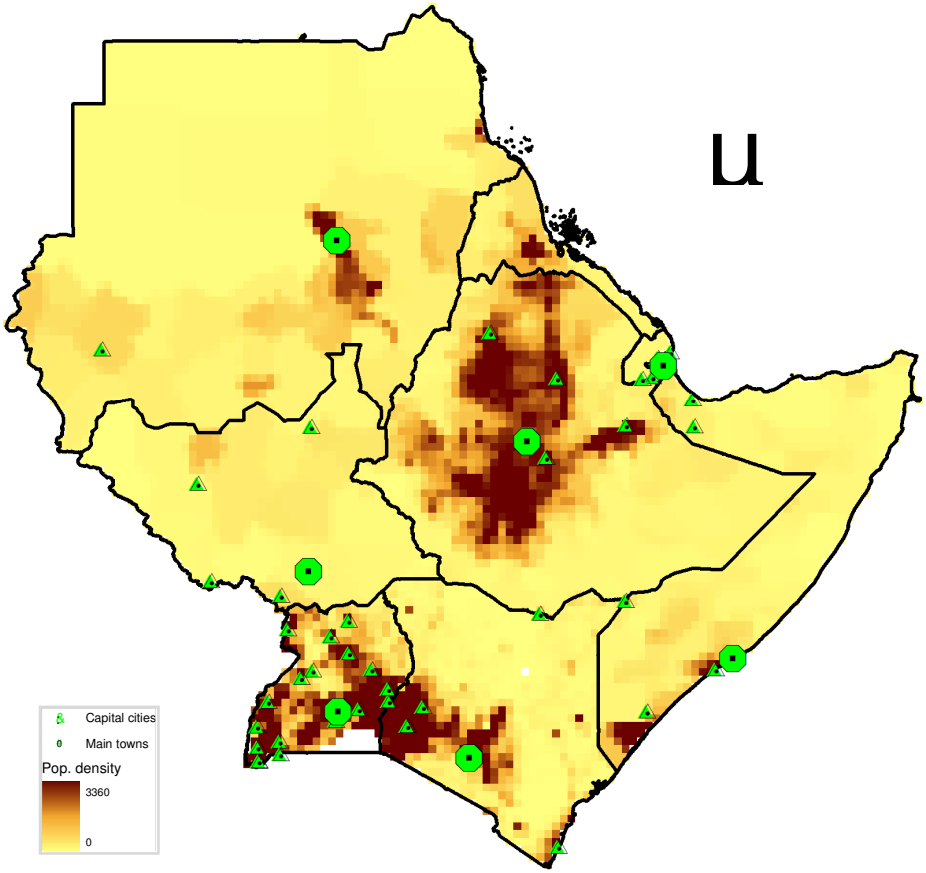
1. IGAD secretariat

2. Member countries DRM institutions

But now that we know where our hazards are, what's next?

We need to know….

1. Where are people living?



2. What's the risk and what/who is at risk?

3. What's the level of exposure, who's vulnerable?