

**IGAD Climate Prediction and Application Center
(ICPAC)**

Nairobi, Kenya

Web: www.icpac.net

Guleid Artan

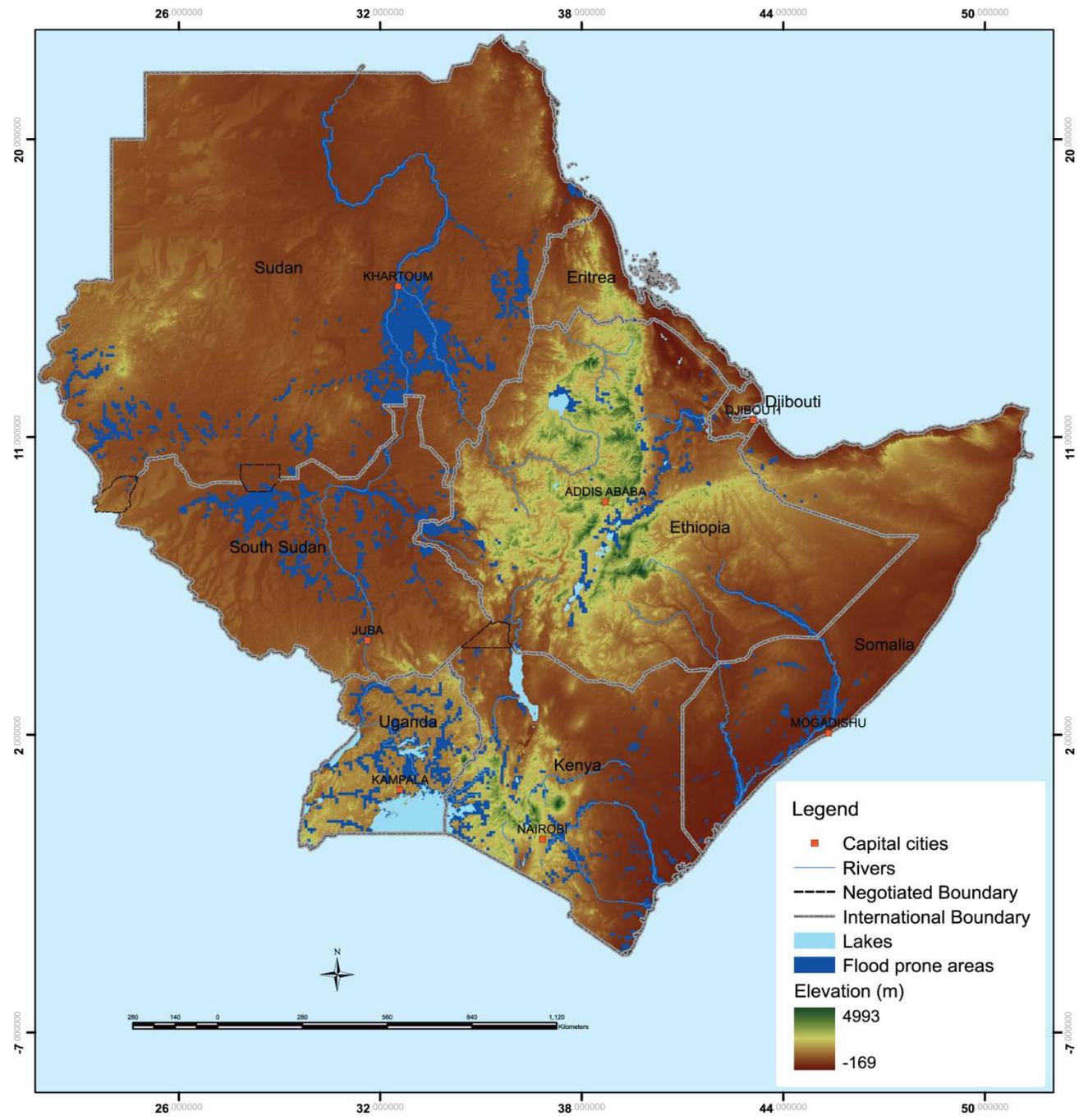
Addis Ababa

11/08/2014

FLOOD PRONE AREA

More than 30% of the region is directly affected by floods

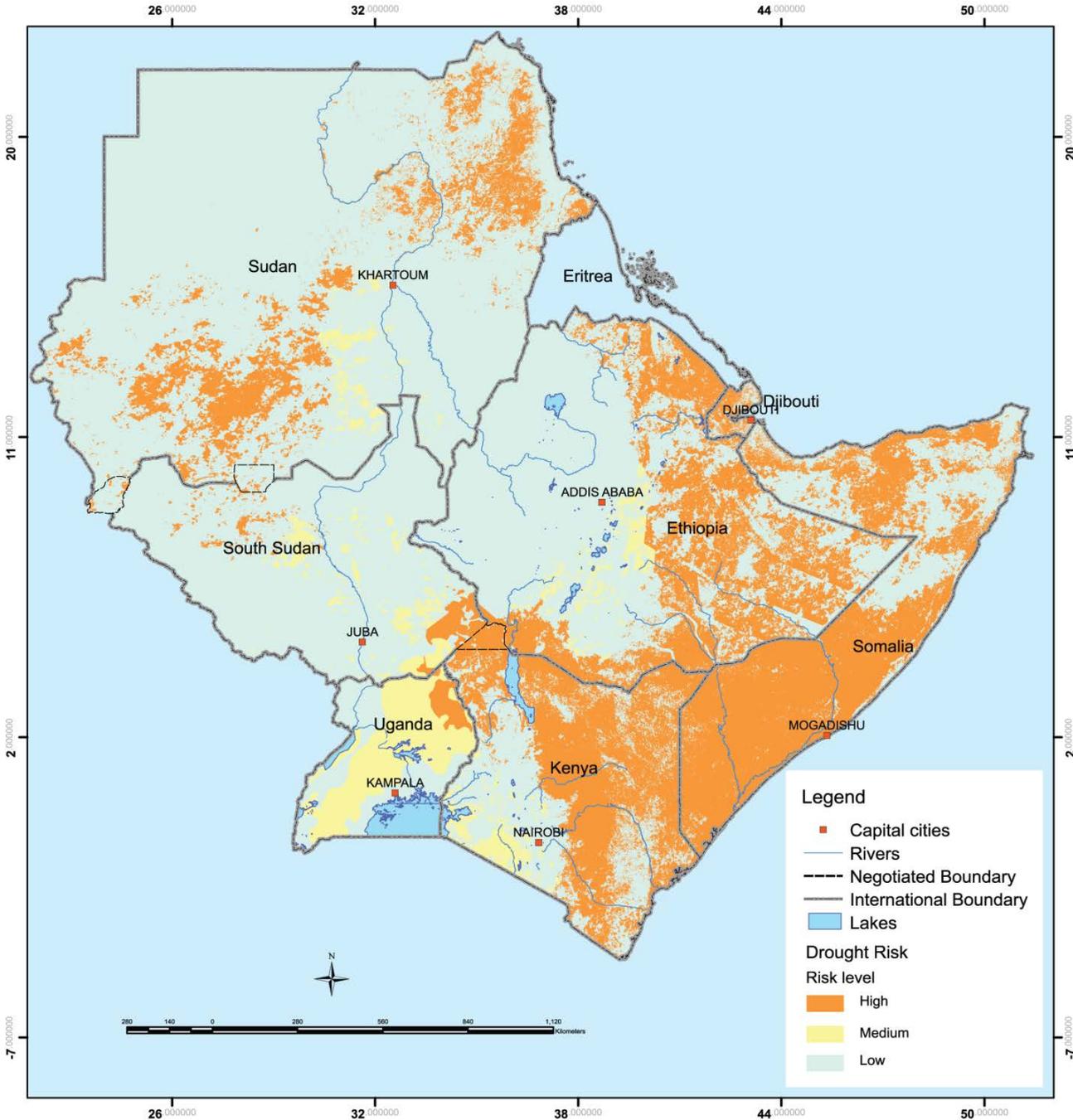
Data sources:
Satellite data,
flood models
and Member
States DRM
institutions



DROUGHT PRONE AREA

More than 75% of the region is directly affected by droughts

Data sources:
SPOT VGT NDVI
and Member States DRM
institutions



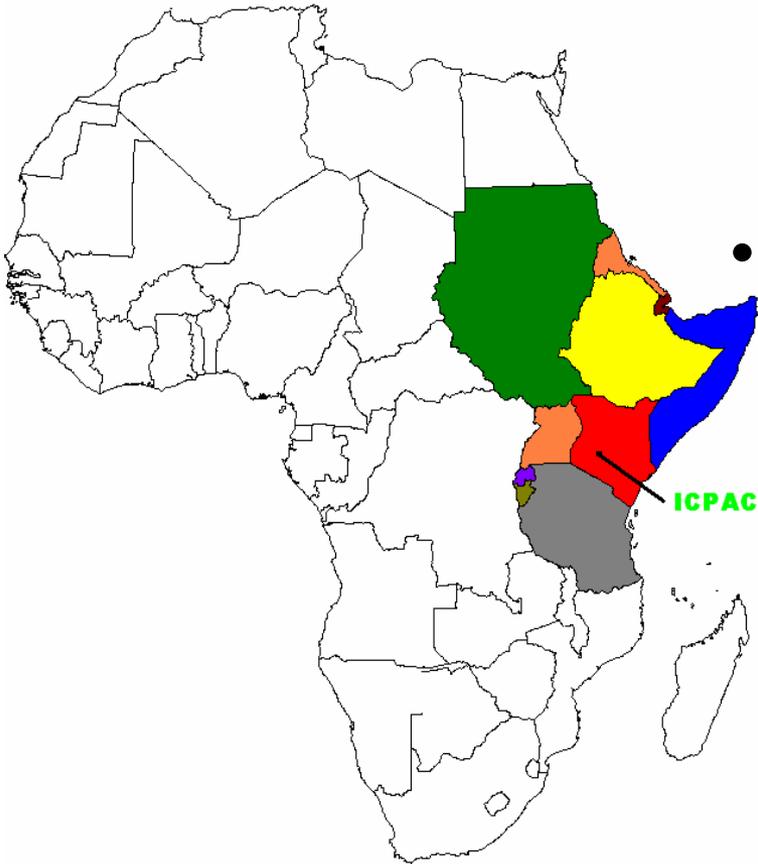
Challenges at the Countries Level

- Sparseness of the hydro-meteorological networks observation.
- Weak modeling, prediction and early warning systems.
- Difficulty in tailoring the climate products for sector specific needs.

Background

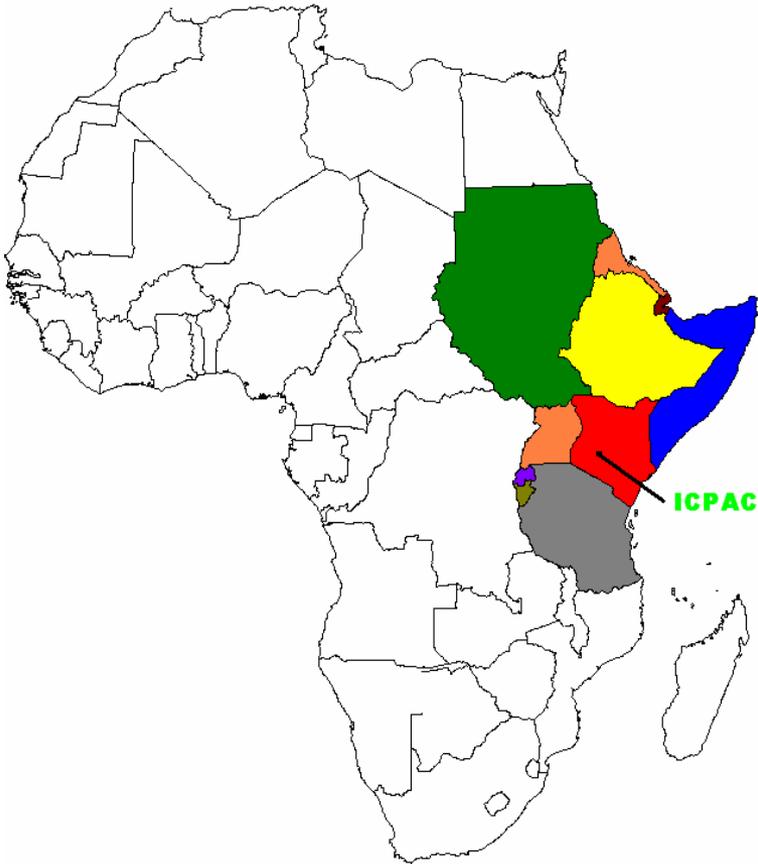
- The Greater Horn of Africa (GHA) region is prone to extreme climate events such as droughts and floods with severe negative impacts on key socio-economic sectors;
- The droughts of 1970's and 1980s were devastating in the region;
- After those droughts, representatives of Governments in eastern and southern Africa came together to find a solution;

Background: ICPAC



- DRM (**Drought Monitoring Centre**) was established in 1989 under the initiative of WMO and UNDP for 24 countries in the eastern and southern Africa sub-region for regional drought monitoring with a head office in Nairobi and a sub-center in Harare.
- Due to increased demand for climate information and prediction services, the Nairobi and Harare components started to operate independently in 1998 with:
 - The Drought Monitoring Centre, Nairobi (DMCN) covering GHA region;
 - The Drought Monitoring Centre, Harare (DMCH) covering Southern Africa region;

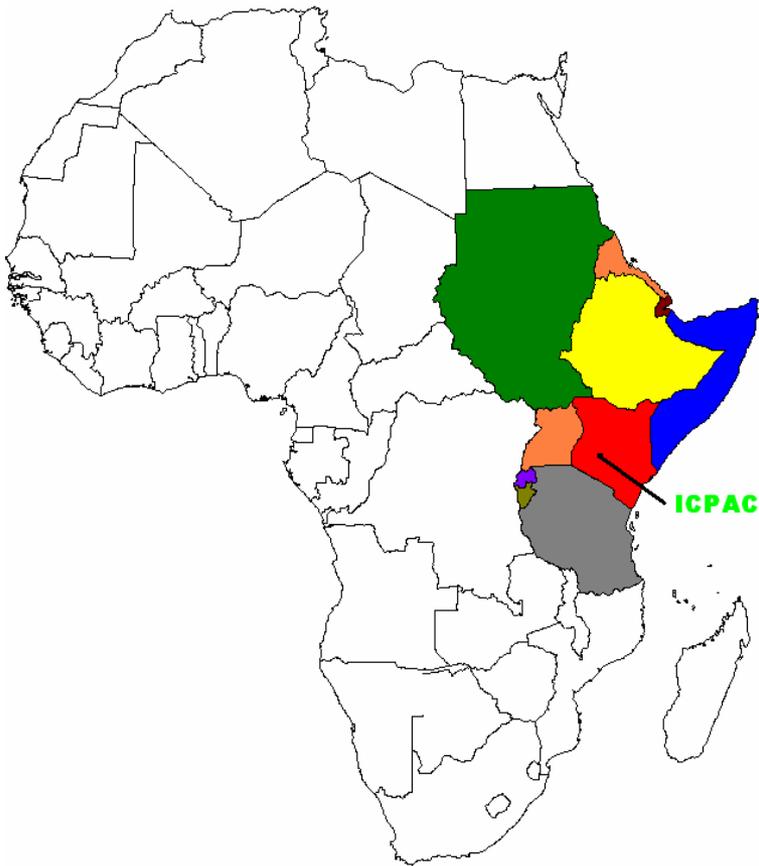
Background: ICPAC



- In 2000 DMCN was adapted as a project of IGAD;
- At the 10th Summit of the IGAD Heads of State and Government that was held in Kampala, Uganda in October 2003 the decision to absorb DMCN as an autonomous **specialized Institution of IGAD** was ratified .
- In order to reflect better all its new mandates, mission and objectives within the IGAD system, the name of DMCN was changed to ***IGAD CLIMATE PREDICTION AND APPLICATIONS CENTRE (ICPAC)***.
- ICPAC has 8 members states plus 3 beneficiary states : Burundi, Rwanda and Tanzania (11 countries benefit from ICPAC's services).

Background: ICPAC

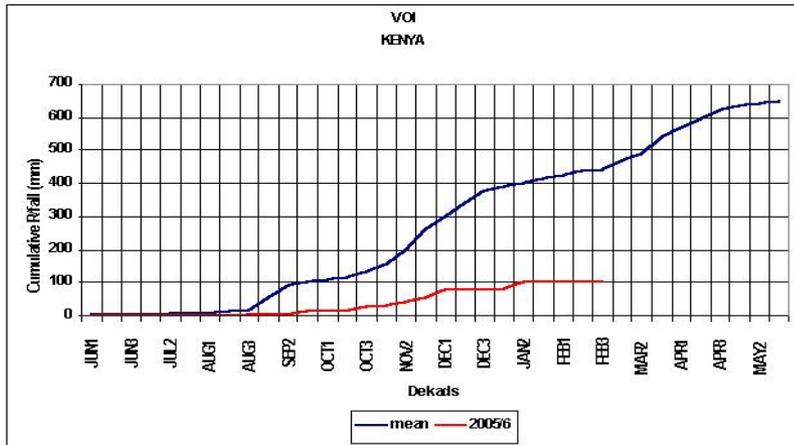
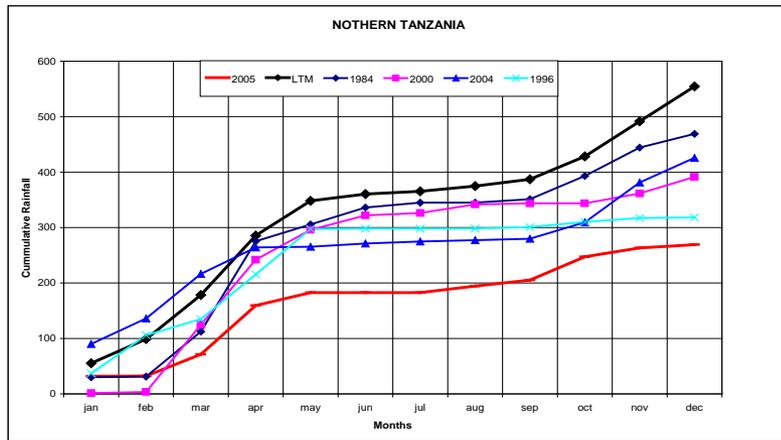
- The Mission of ICPAC is to provide climate information and early warning for applications in support of sustainable development in the Greater Horn of Africa region.



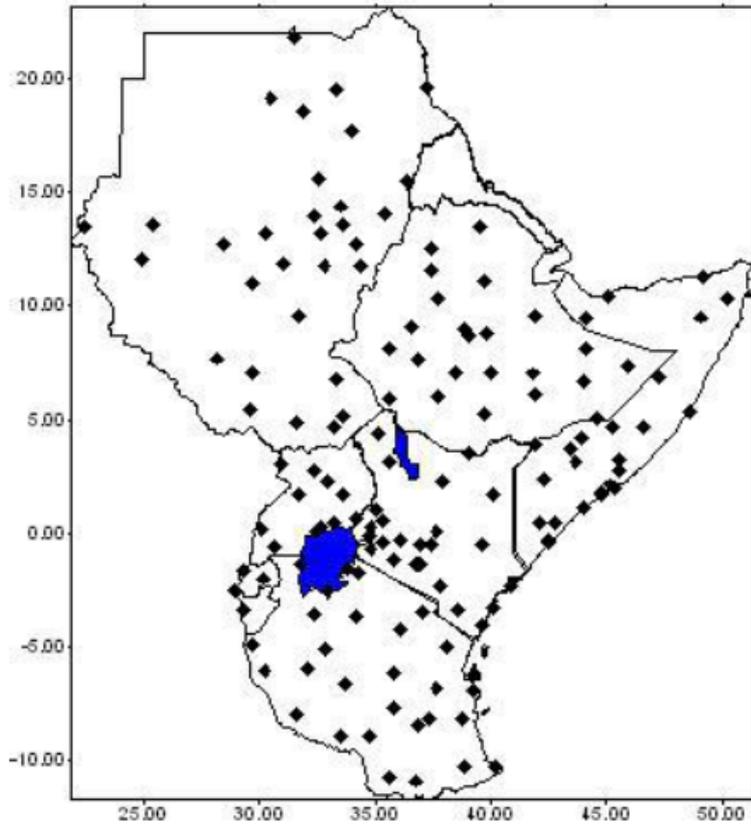
ICPAC Activities

- Monitoring of climate stress on 10 day, monthly, seasonal and annual time scales;
- Prediction on 10 day, monthly & seasonal time scales;
- Generation of consensus regional seasonal outlooks;
- Climate diagnostics including analysis of climate variability/extremes;
- Downscaling of global climate forecasts to regional and national levels;
- Implementation of a Regional Climate Watch;
- Generation of climate change scenarios;
- Maintaining regional database and generating indices of climate extremes;
- Capacity building;
- Assessing climate change related socio-economic impacts.

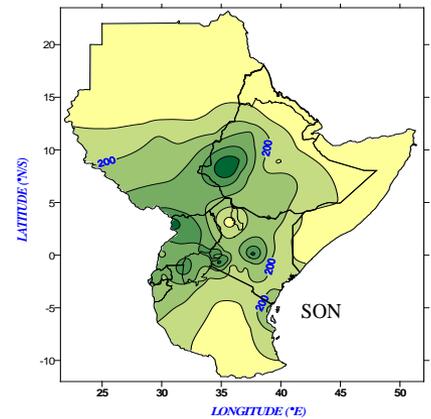
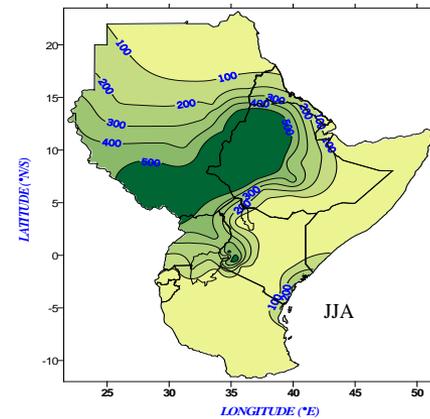
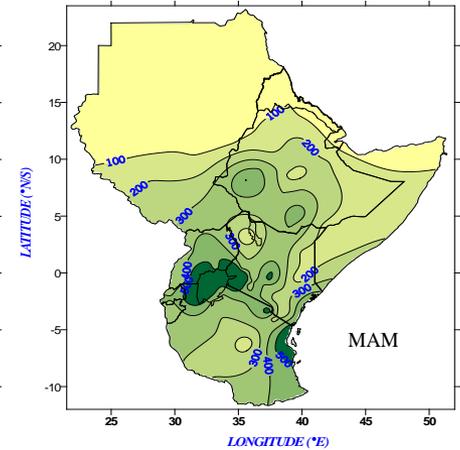
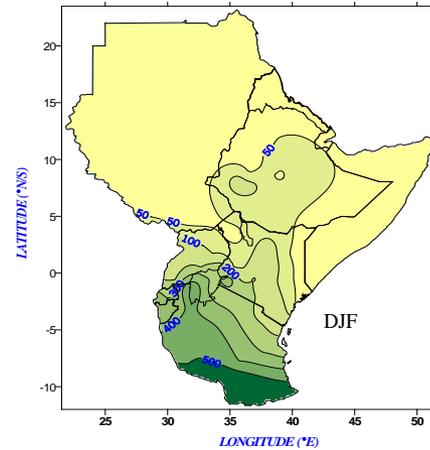
ICPAC Activities: Regional Stress Monitoring and Risk/ Vulnerability



ICPAC Activities: Climate Anomalies Monitoring

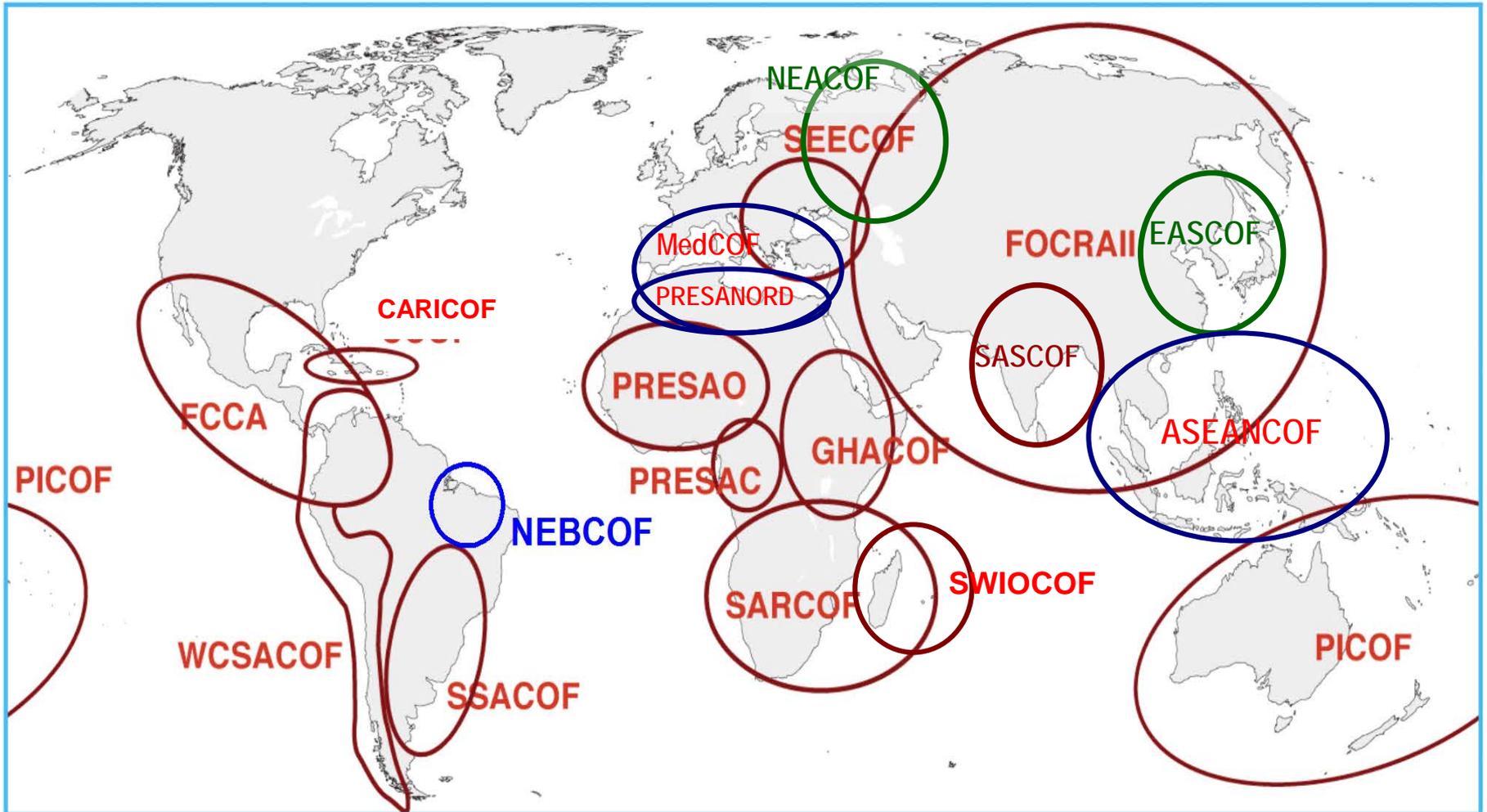


Distribution of GHA
Climatological stations

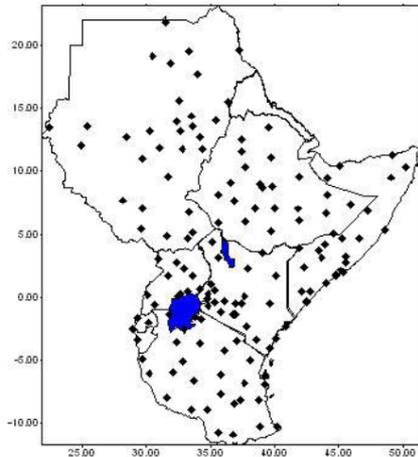


Climate Atlases

Global distribution of regional Climate Outlook Forums (RCOFs)



Seasonal Climate Outlook Forecast (GHACOF)



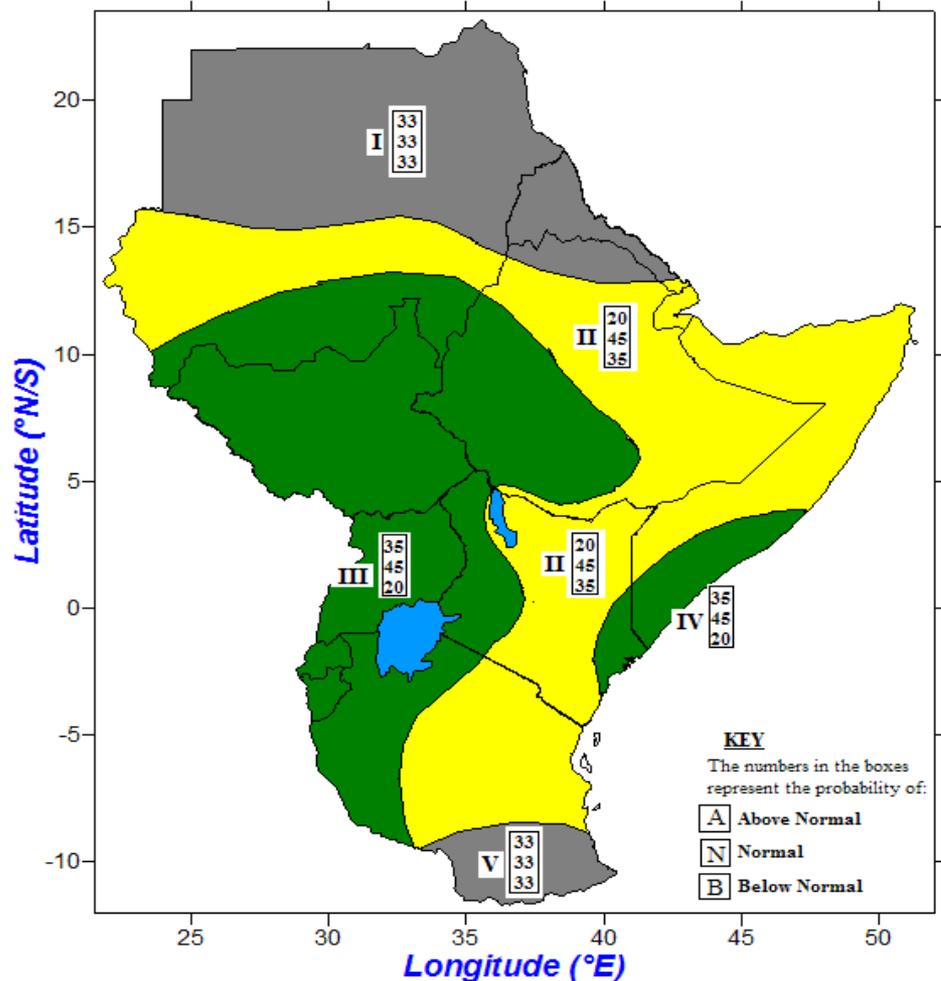
Distribution of GHA Climatological stations (176)

Greater Horn of Africa Consensus Climate Outlook for the September to December 2013 rainfall season

Zone I & V: The area is usually dry during September to December 2013 season

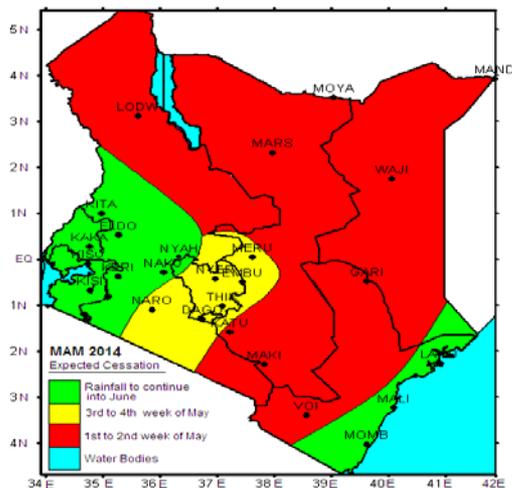
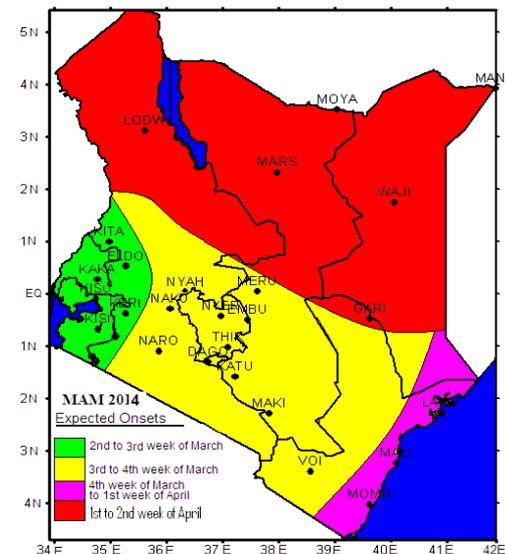
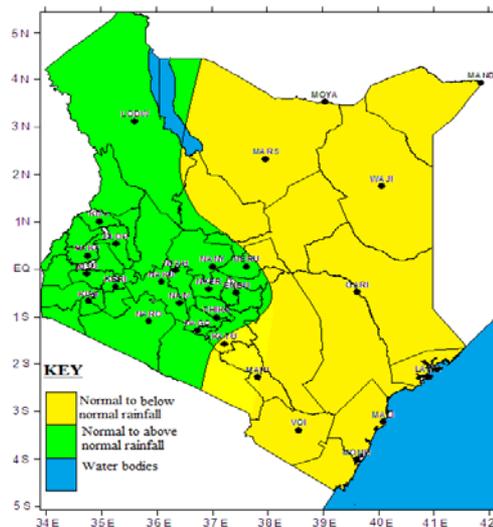
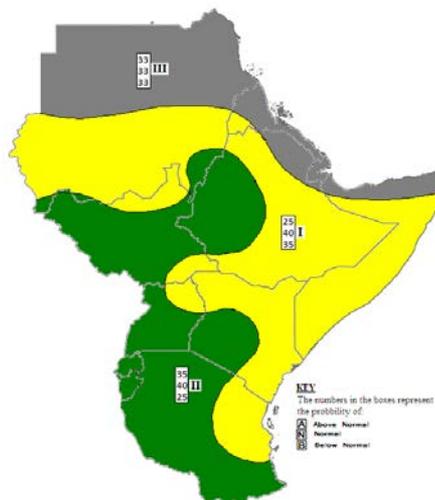
Zone II: Likelihood near normal to below normal rainfall

Zone III & IV: Increased likelihood of near normal to above normal rainfall



Consensus Rainfall Outlook for September to December 2013

Downscaling GHACOF to National & Sub-national levels



Onset

Onset: Rainfall on expected on 3rd to 4th week of March 2014

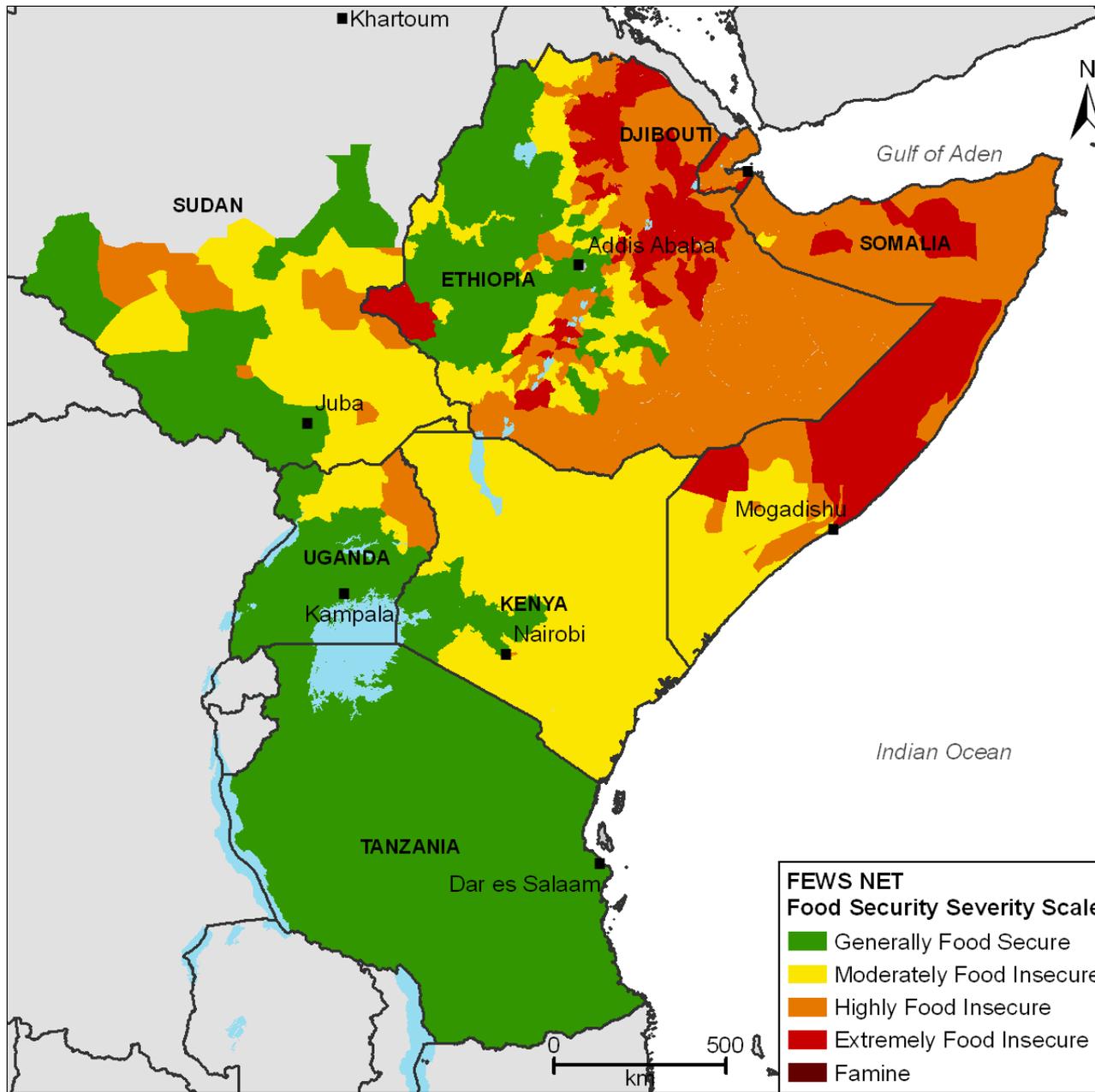
Cessation: Rainfall will continue into 1st to 2nd week of May 2014

Length of season: At least 7 weeks

Expected Performance: The distribution, both in time and space, is expected to be poor characterized by episodic events with long dry spells.

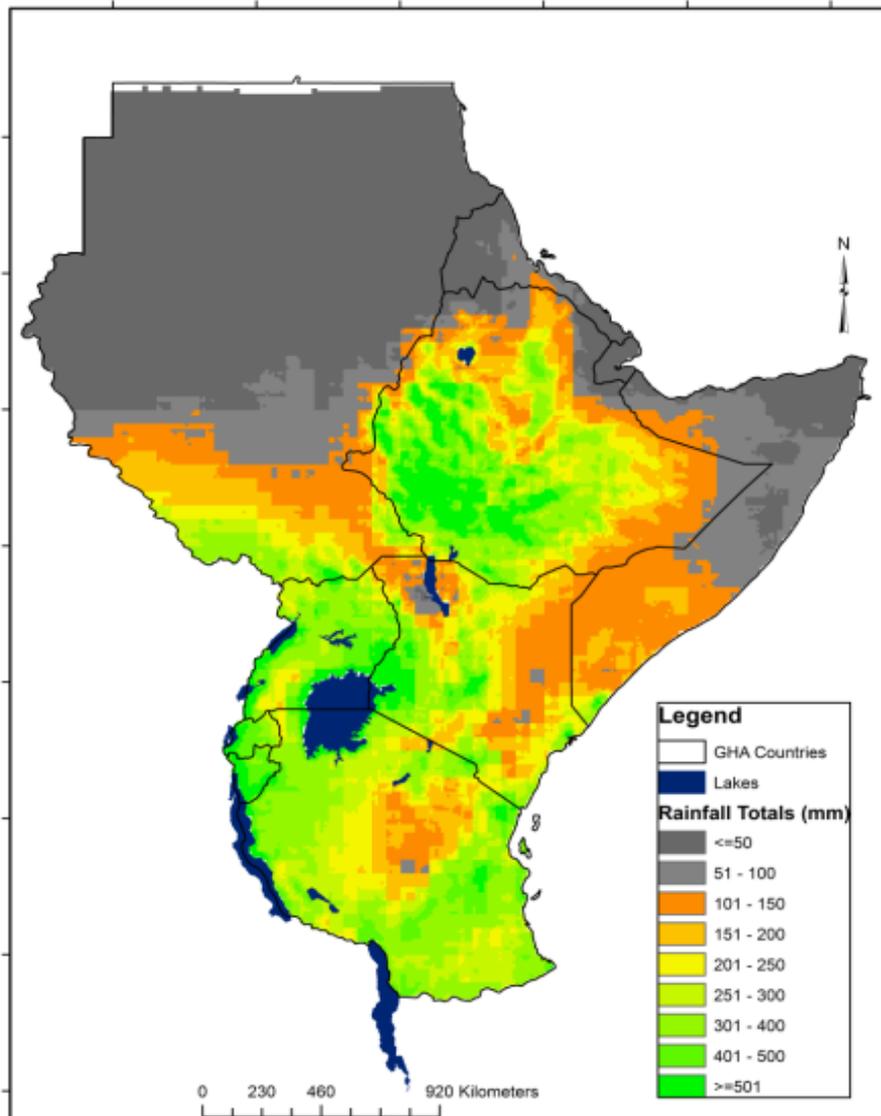
Expected Cessation

Food Security Outlook: Jun/Sep. 2010

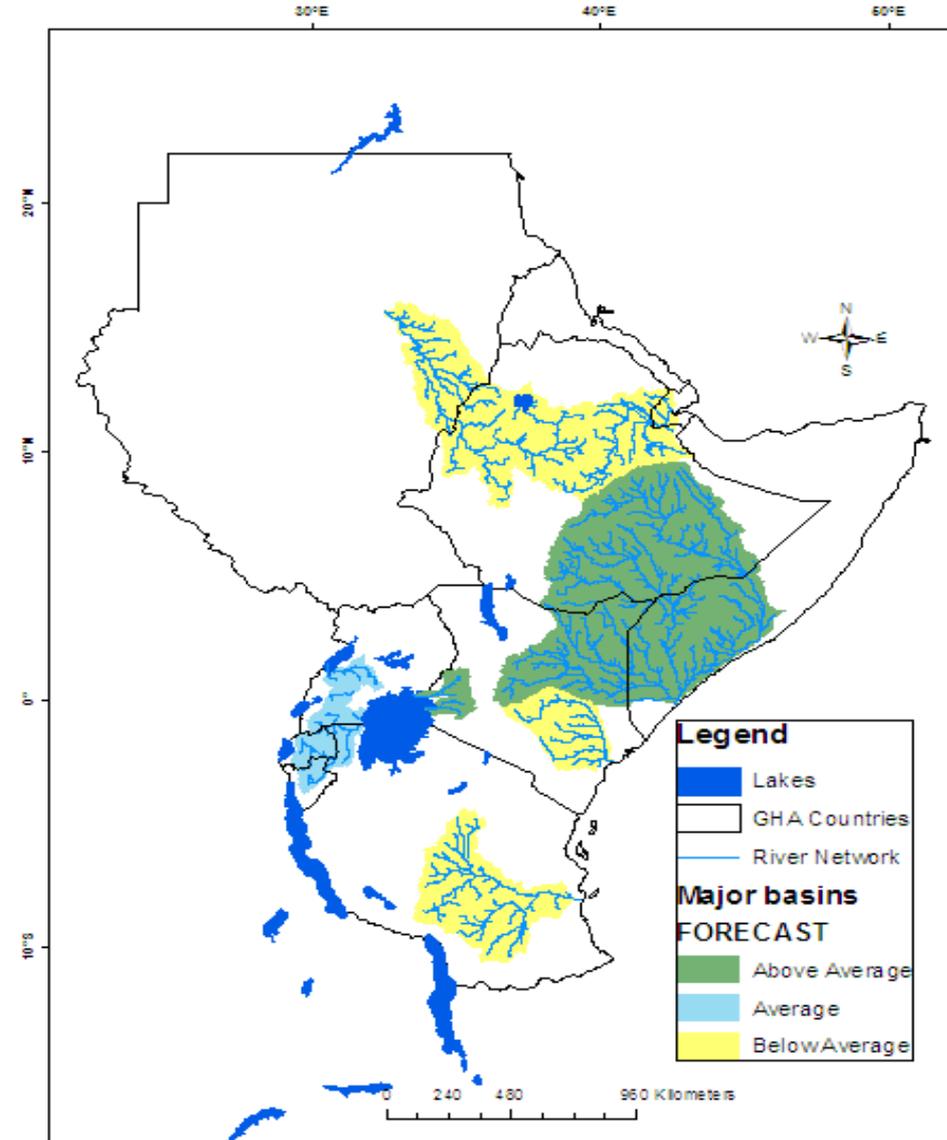


MAM 2010 Stream flow forecast based on GHACOF 25 outlook

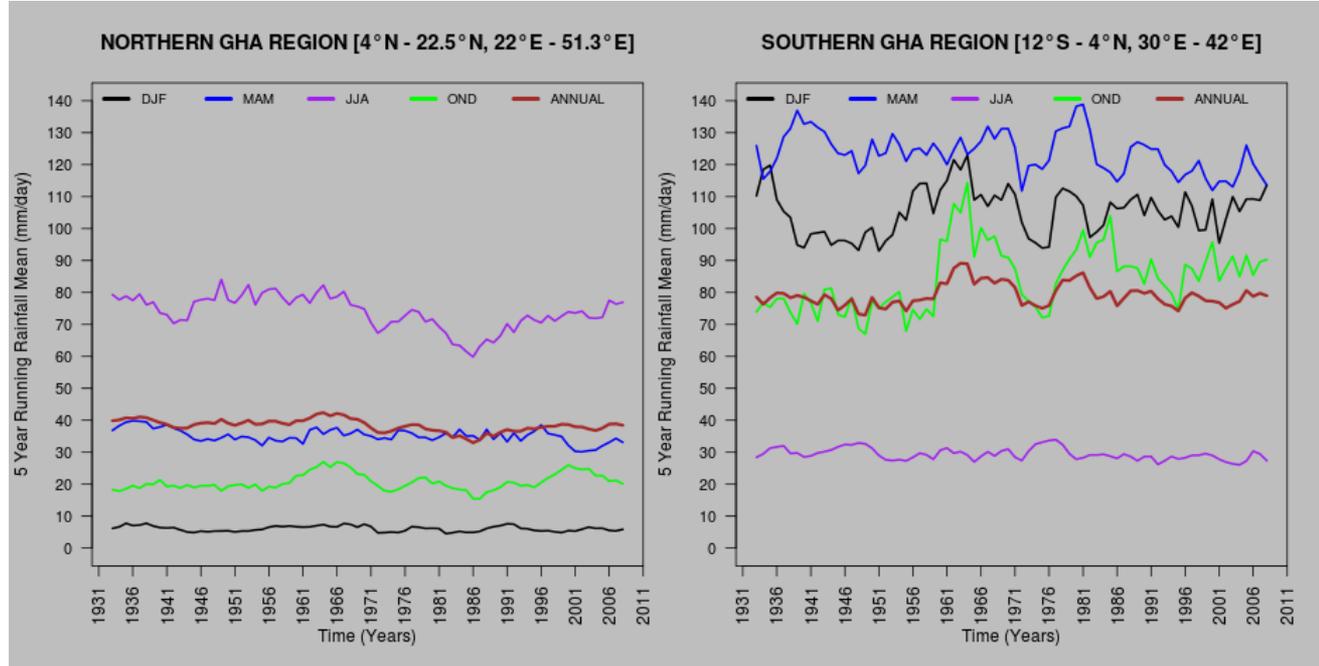
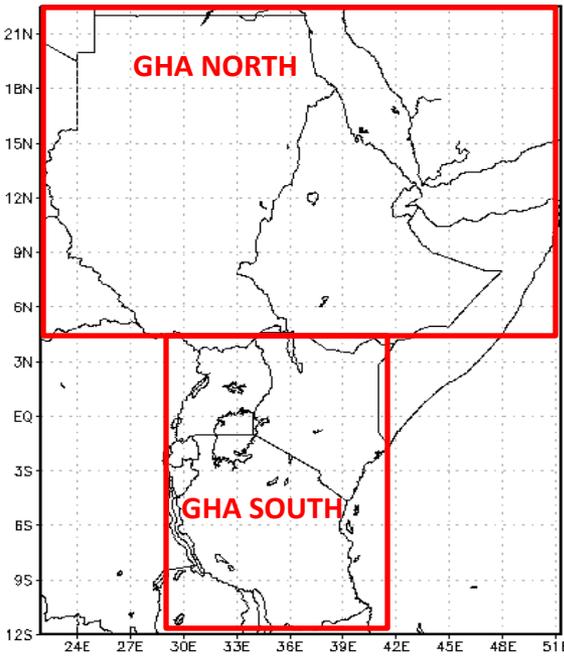
GHA MAM 2010 Potential Rainfall Quantity Map



GHA MAM 2009 HYDROLOGICAL OUTLOOK



GHA climate historical observations



GHA north:

Pm: 40mm ; Tm: 24C

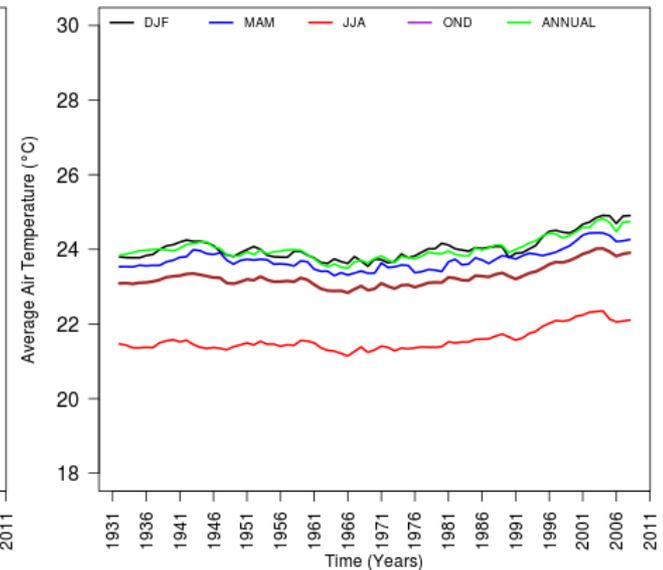
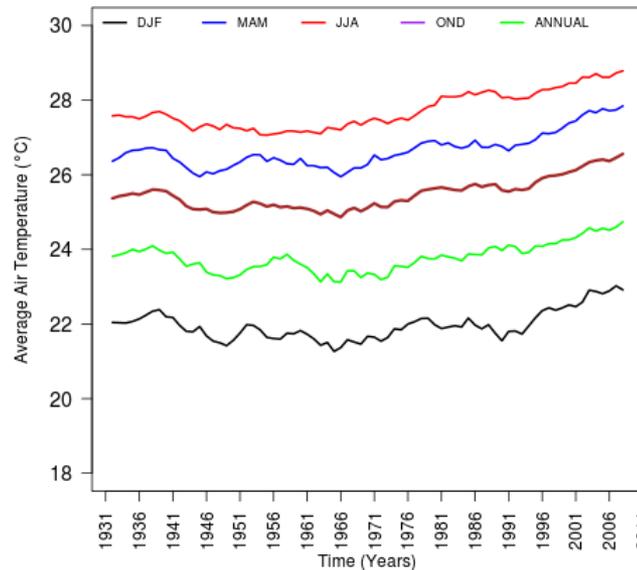
GHA south:

Pm: 80mm ; Tm: 24C

Over 80 years

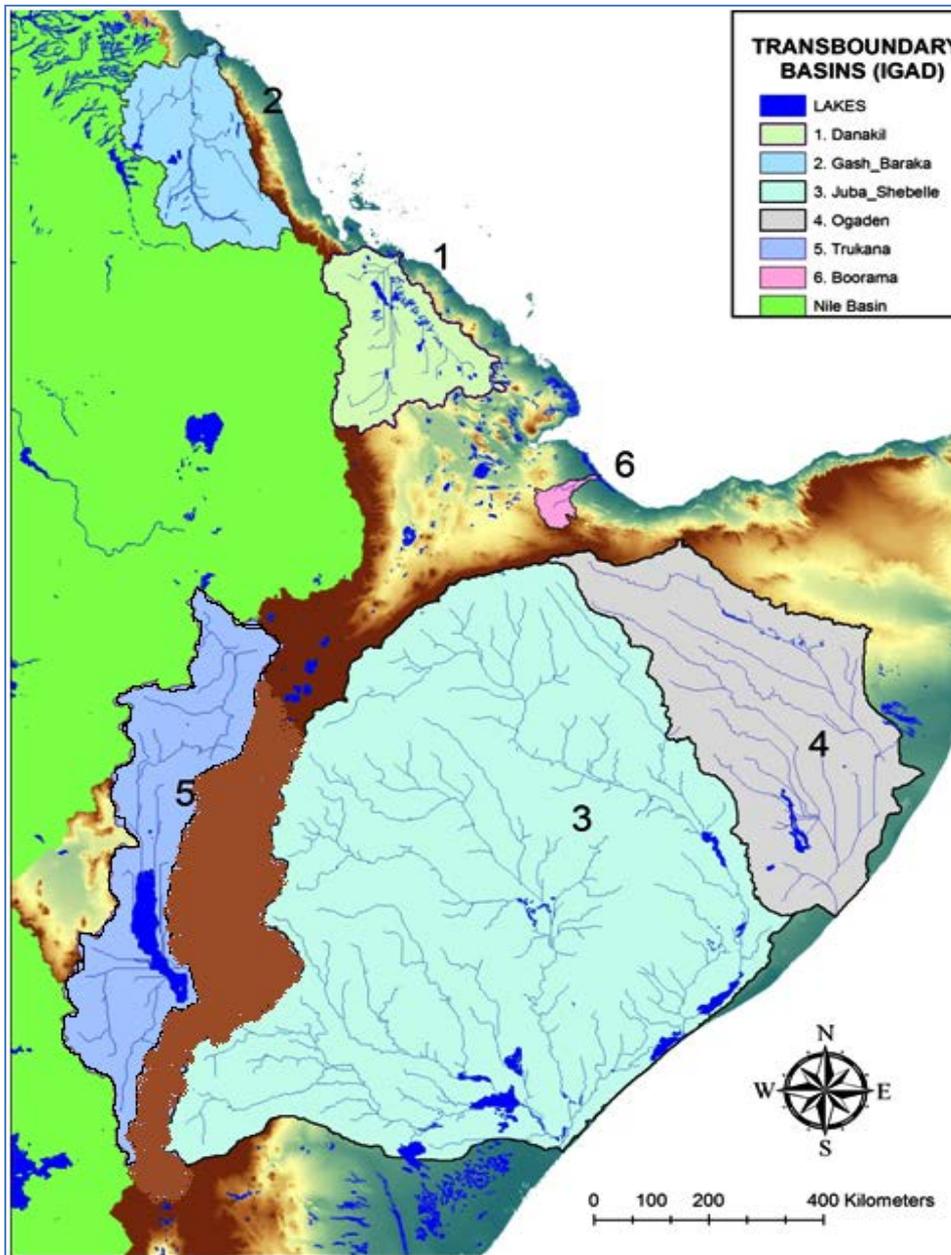
- P decrease -2 to -8 mm

- T increase +0.5°C to +1°C



IGAD transboundary basins

Basin delimitation using
Digital Elevation Model



Basin Name (Figure 9)	Basin Number	Catchment Area (km ²)	Sharing Countries
DANAKIL	TB-1 (1)	61,549	Ethiopia, Eritrea
GASH BARAKA	TB-2 (2)	66,549	Eritrea, Sudan
JUBA SHEBELLE	TB-3 (3)	753,202	Ethiopia, Kenya, Somalia
OGADEN	TB-4 (4)	207,363	Ethiopia, Somalia
TURKANA OMO	TB-5 (5)	256,267	Ethiopia, Kenya, Sudan, Uganda
AYESHA	TB-6 (6)	4,963	Ethiopia, Somalia

IGAD HYCOS NETWORK

Legend

- HYCOS Stations
- Main Rivers
- Water Bodies

Topography

- < 250m
- 250 - 500m
- 500 - 750m
- 750 - 1,000m
- 1,000 - 1,250m
- 1,250 - 1,500m
- 1,500 - 2,000m
- 2,000 - 2,500m
- 2,500 - 3,000m
- > 3,000m

100 automated hydrological stations to be installed by March 2015

Scale 1:4,000,000

IGAD HyCOS Project

Map prepared by
J.M.

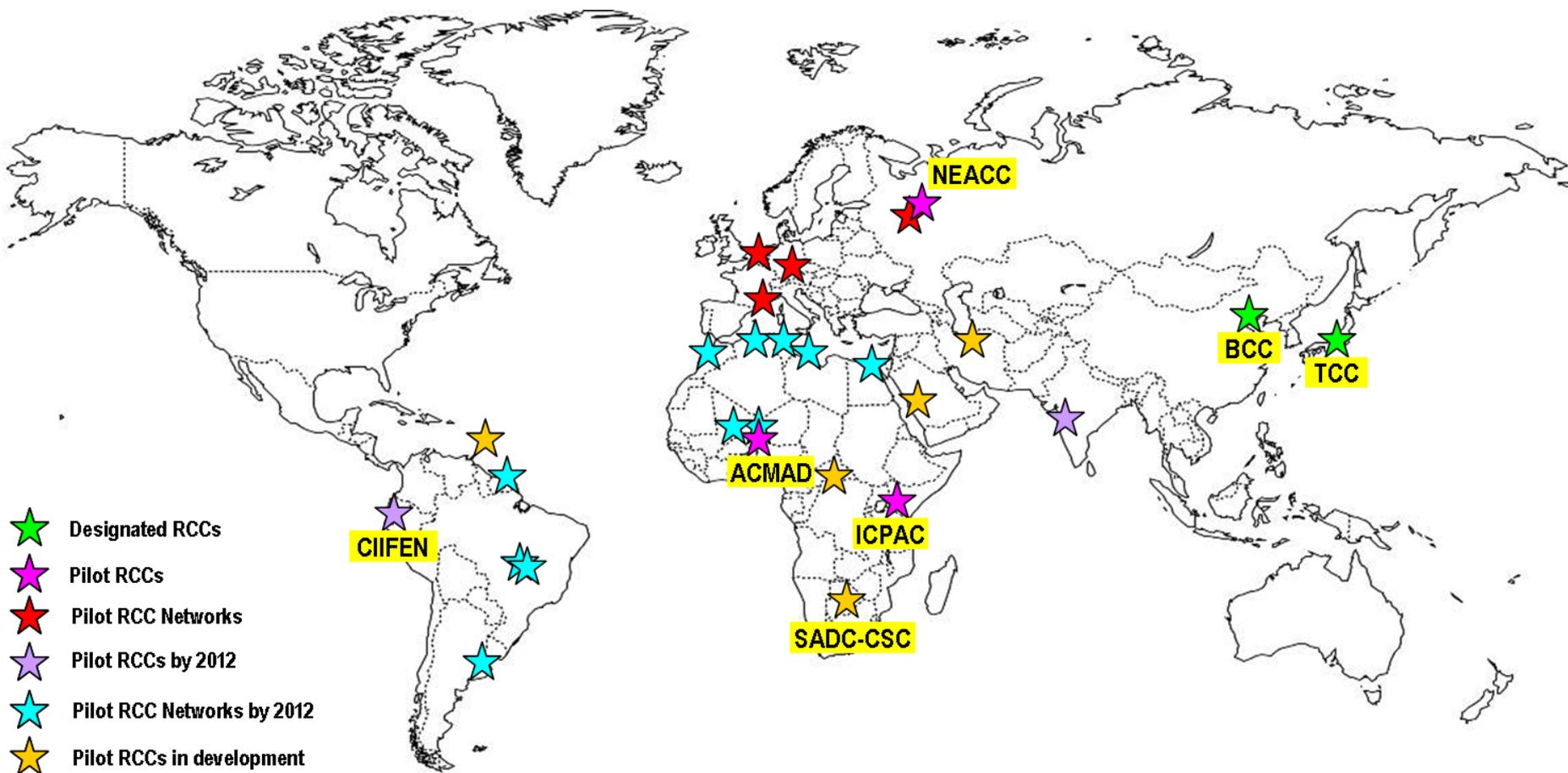
16 December 2012



ICPAC as WMO Regional Climate Center (RCCs)

- **“WMO RCCs are centers of excellence that create regional products including long-range forecasts that support regional and national climate activities and thereby strengthen capacity of WMO Members in a given region to deliver better climate services to national users.”**

Current status of RCC establishment around the world



Conclusions and recommendations

- Early warning technologies have greatly benefited from recent advances in Information Communication Technology (ICT) and improved knowledge on natural hazards and the underlying science;
- Nevertheless many gaps still exist in early warning technologies and capacities- especially in the GHA countries.

Recommendations

- **ICPAC plans fill existing gaps as well as bridge the gaps between science and decision making and strengthen coordination and communication links.**