



Regional Climate Prediction and Hydrological monitoring in GHA

IGAD Climate Prediction and Application Centre

Roundtable Event on strengthening development of weather, climate and hydrology related early warning systems in Africa

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Context of the IGAD Region

Climate predicament → desertification, severe droughts, famine, destructive floods

- 4/5 of the region is dry lowlands comprising of arid , semi arid & dry sub-humid.
- The region is facing climate extreme events that lead to recurrent severe droughts and floods.

Limited knowledge on water resources → lack of management and planning

- Limited monitoring systems .
- Highly complex geological media, (heterogeneous, fractured, coastal, etc...).
- Importance of groundwater and weak commitment to the gw investigation at regional level.
- 6 transboundary basins in addition to Nile basin.
- Inexistence of permanent regional water cooperation entity.

Human related threats → Water scarcity

- IGAD region is 5.2 million km² .
- Population is about 206 million in 2010, projected to reach 462 million in 2050.
- Djibouti, Eritrea, Kenya, and Somalia with 1000 m³ /person /yr or less, are experiencing water scarcity.
- By 2025 even Ethiopia and Uganda which are presently with adequate water will be water stressed (1000-2000m³/person /yr)
- By 2025 Djibouti, Eritrea, Kenya, Somalia and Sudan will be in water barrier situation (500 m³/person/yr).

Overview of IGAD Organization



The Intergovernmental Authority on Development (IGAD) was created in **1996** to supersede the Intergovernmental Authority on Drought and Development (**IGADD**) which was founded in **1986**.

Eight states are members of IGAD :

Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan, Uganda.

IGAD mission is to assist Member states

- Promotion and maintenance of peace and security and humanitarian affairs,
- Food Security and environmental protection
- Economic cooperation and integration.

DMC (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.

In 2003 IGAD ratified the decision to absorb DMC as an autonomous specialized Institution of IGAD with the change of name of DMC to **ICPAC (IGAD climate prediction and applications centre**

ICPAC has 8 members states plus 3 beneficiary states : **Burundi, Rwanda and Tanzania**

Main Activities of ICPAC

Climate outlook

- Monitoring of climate stress on 10 day, monthly and seasonal time scales;
- Climate prediction on 10 day, monthly and seasonal time scales;
- Modeling of climate variability and change;
- Organization of regional climate outlook forums;
- Generating products tailored for sector specific applications;

Climate application

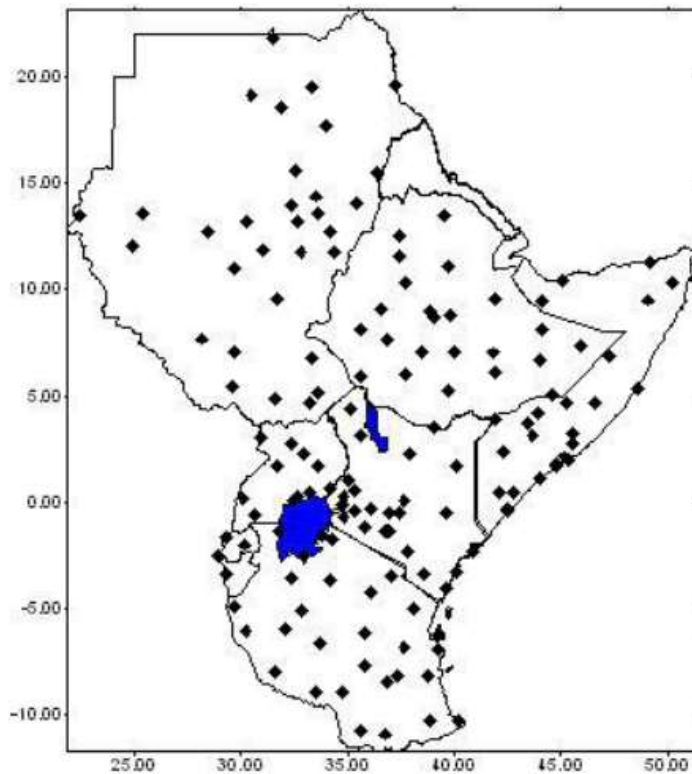
- Pilot application projects to demonstration benefits of climate early warning advisories and community adaptation to climate variability/change.
- Assessing climate related socio-economic impacts;

Capacity building

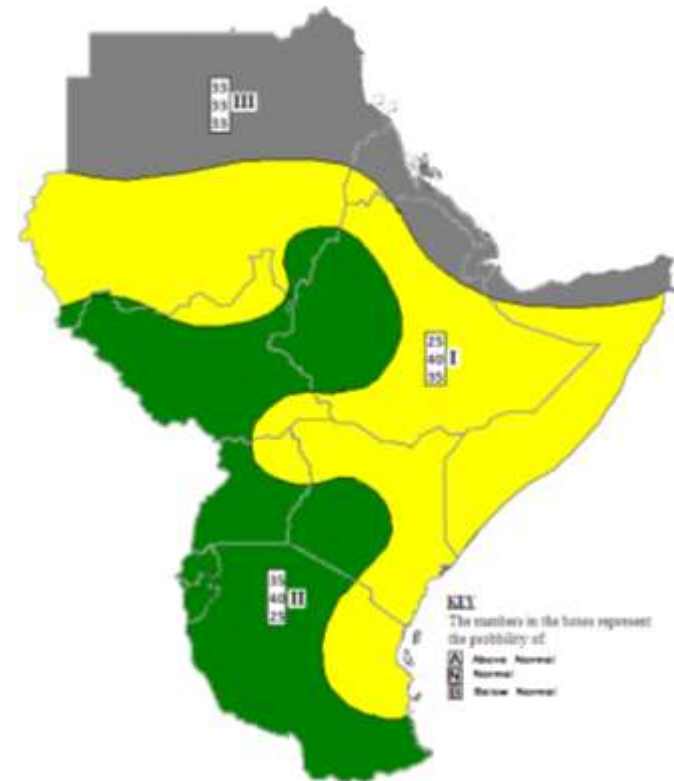
- Training of regional climate scientists in monitoring, diagnostics and prediction;
- Training of users in interpretation and use of climate products.

Climate monitoring network and forecast

Distribution of GHA
Climatological stations (133)



Consensus Rainfall Outlook
for March to May 2014

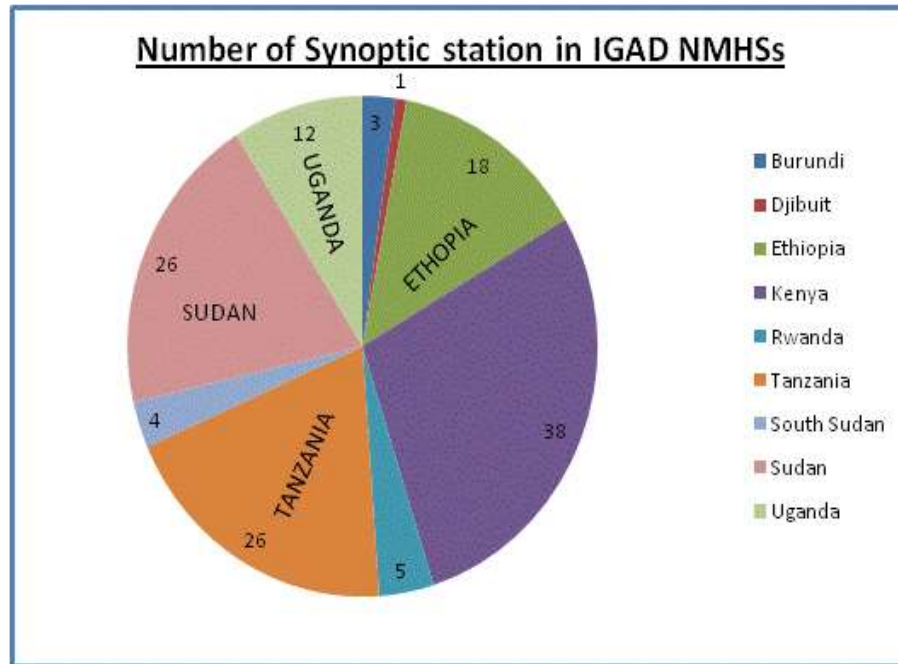


Greater Horn of Africa Consensus Climate Outlook for the March to May 2014 rainfall season.

- Data come from NMHSs
 - Rainfall, Tmax, Tmin, Pressure
- Data sent by email
 - 10 days

- Zone I** : Increased likelihood of near normal to below normal rainfall
- Zone II**: Increased likelihood of near normal to above normal rainfall
- Zone III** : This zone is usually dry during March to May season

Availability of data points in the region



Country	SYNOPTIC	Agromet	Hydromet St	Rainfall St	AWS	Country Total	Digitised status
Burundi	3	0	14	19	3	39	10%
Djibouti	1	0	0	1	5	7	30%
Ethiopia	18	173	571	403	50	1215	60%
Kenya	38	13	22	1500	72	1645	50%
Rwanda	5	9	72	80	42	208	80%
Tanzania	26	15	0	2056	23	2120	25%
South Sudan							
Sudan	4	1	0	0	9	14	20%
Sudan	26	7	0	420	1	454	100%
Uganda	12	16	28	200	110	366	45%
TOTALS	133	234	707	4679	315	6063	

Climate outlook process flowchart

11 countries provide historical observed monthly data of rainfall and temperature

Global Meteo Centers provide predictors dataset SST, IOD, ENSO etc...

Communication/ dissemination department

Process change team

Preprocessing, data quality verification

Quality and quantity of data are ok

delete false data and complete the dataset statistically

Statistical models are lunched

correlation between observed and simulated rainfall is ok

Dynamical models are lunched

Verification and cross-validation

Repetition for 62 climatic zones of the region

Regional outlook is developed and discussed for consensus

Consensus ok

Result is compared to global center forecast

the product is coherent with more than 6 global center's results

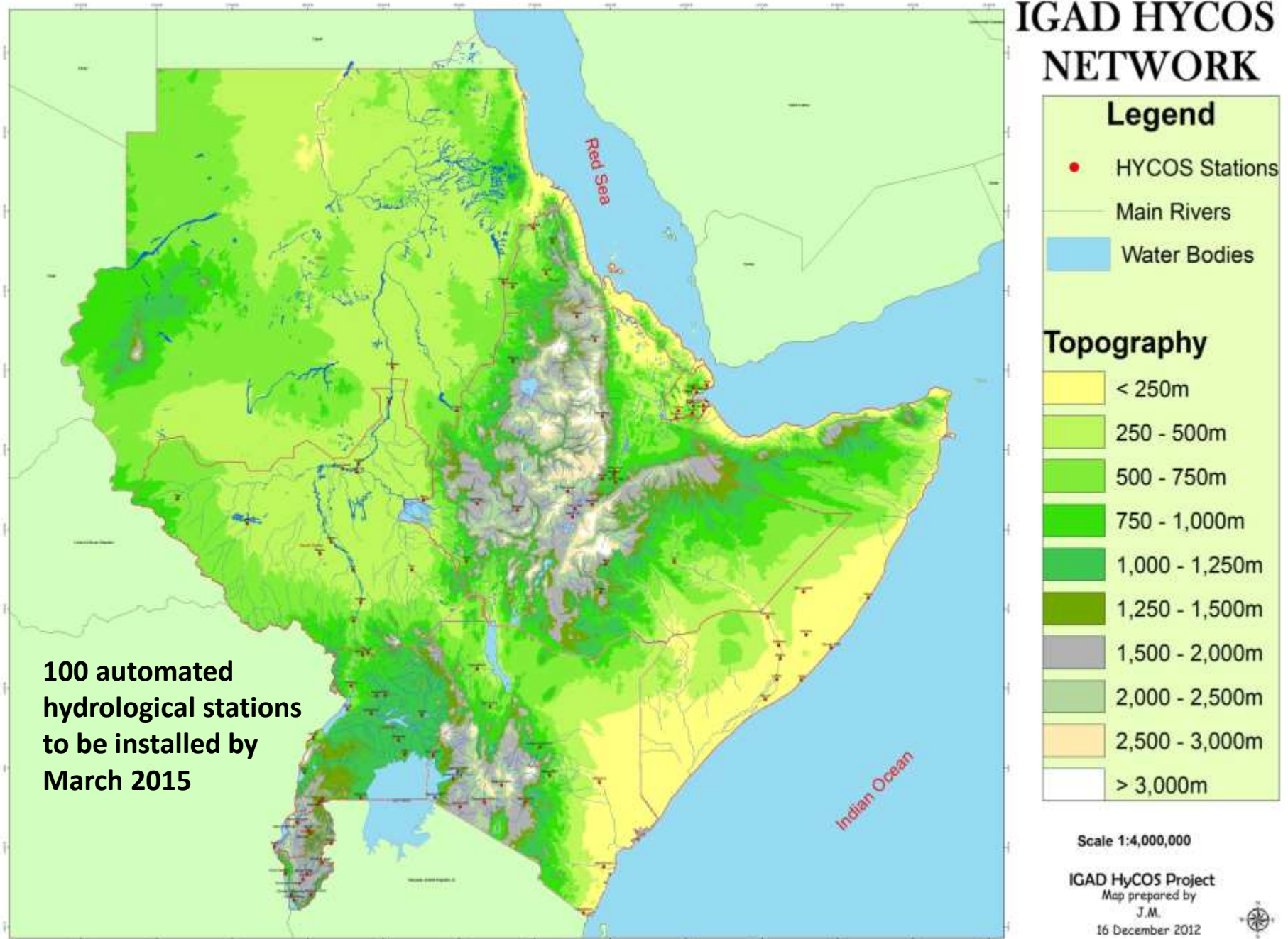
Regional climate outlook is released

2 days

6 days

Future hydrological network in the region

IGAD HYCOS NETWORK



Specifications of IGAD-HYCOS network

Item Description	B	D	E	K	R	Som	SS	S	U	Total
Lot 1: Metric Staff Gauges	40	30	25	565	40	30	20		45	795
Lot 2: Mechanical Current Meters	1	1	1	1	1	1	1		1	8
Lot 3: Boats and outboard motors for M Cur M	1		2		1	1	1		1	7
Lot 4: ADCP (Acoustic Doppler Current profiler)	1					1	1	2	1	6
Lot 5: Levelling instrument	2	2	2	1	2	1	1		2	13
Lot 6: Portable Multiparameter water quality sensor	2	3	2	1	10	2	1	2	2	25
Lot 7: Tipping Bucket Rain Gauge	7	10		5	8	10	5	1		46
Standard Rain Gauge	5	10		5	5	10	5	12		52
Lot 8: Water level sensors: Shaft Encoder - Pressure Transducer	7		9	5	8	5	5		8	47
Lot 9: GSM/GPRS DCP	7		11	15		10	9		12	64
Lot 6,7 & 8: Sensors for GSM DCP										
Lot 10: Meteosat DCP		9	7		8		5	3		32
Lot 6,7 & 8: Sensors for Meteosat DCP										

Countries	B	D	E	K	R	Som	SS	S	U	Total
Number of stations	7	9	18	15	8	10	14	3	12	96

Recommendations and way forwards

- Supporting the development of pilot application of Climate prediction.
- Capacity development and awareness raising on the use of climate prediction for planning.
- Reinforcing Hydrological network with additional stations in the GHA.
- Upgrading and Integrating , existing stations within EWS network.
- Encourage the creation of Regional water resource management Entity within IGAD



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Thank you for your kind attention