# IOC PARTICIPATION IN THE CLIMATE OUTLOOK FORUM FOR THE GREATER HORN OF AFRICA REGION

### 1) Background:

The IGAD Climate Prediction and Application Centre (ICPAC) in collaboration with the World Meteorological Organization (WMO) and National Meteorological and Hydrological Services (NMHSs) have organized 35 regional climate outlook fora-(RCOFs) aimed at providing consensus early warning seasonal climate information to support the regional disaster resilience and sustainability strategy framework in the Greater Horn of Africa region.

UNESCO/IOC and the Western Indian Ocean Marine Sciences Association (WIOMSA) have worked together to enhance the collaboration between oceanographers and climate experts in the Western Indian Ocean region, to facilitate the generation of better climate forecasts through the Climate Outlook Forums organized in partnership with the IGAD Climate Prediction and Application Centre (ICPAC).

#### The Indian Ocean and Greater Horn of Africa Climate.

The ocean is a major driver of the global climate through Ocean-atmosphere interaction. The most prominent example is the El Nino phenomenon in the Pacific, a well-documented interannual climate signal. Climate predictions are of substantial benefit to many parts of the world in risk management and adaptation to cope with the impacts of climate variability and change. Recognizing this, regional climate outlook forums (RCOFs) were conceived with an overarching responsibility to produce and disseminate a regional assessment of the state of the regional climate for the upcoming season. Built into the RCOF process is a regional networking of the climate service providers and representatives of sector-specific users. ICPAC has been coordinating the regional Climate Outlook Forum (COF) covering the Greater Horn of Africa.

Indian Ocean systems play key role in the modulation of African climate systems. A review of the 2012 October/November/December (OND) short rains performance for example show that the predicted above normal rainfall were largely achieved. The major systems that controlled this rainfall were driven mainly from the Indian Ocean. The Indian Ocean Dipole, the warm SST's in the northern part of the Indian Ocean close to the Arabian sea, the warm SST's to the east of Madagascar, the cold SST's over the Mozambique channel all played key roles in the OND rainfall patterns. However the details of the interaction between the ocean and the atmosphere in the GHA are not fully understood at this time. For example whereas the SSTs in the Indian Ocean basin play a key role in the climate of the region as indicated above, the processes controlling their evolution are not well understood. A consensus outlook for the short and long rainfall seasons over the Greater Horn of Africa region can only be improved through the expert assessment of both prevailing global, regional and local oceanic and climate indicators. The outlook should be prepared based on the various prevailing global climate conditions and forecasts from different empirical and dynamical ocean and atmospheric coupled models.

#### Participation of UNESCO/IOC and WIOMSA in COF

IOC and WIOMSA have co-sponsored participants in: COF-15 (March 2005, Mombasa, Kenya), COF-32 (August 2012, Zanzibar, Tanzania), COF-33 (February 2013, Bujumbura, Burundi), and COF-35 (August 2013, Eldoret, Kenya). The goal has been to enhance the collaboration between climate experts and marine scientists in order to improve climate forecasts, as well as mitigating the impacts of climate in the coastal and marine zones.

Highlights of the previous COFs include:

COF-15: Focused on Application of Climate Information in Planning and Management of Coastal Zone, Marine and Inland Aquatic Resources for Sustainable Development. Recommendations included: (i) develop policies and strong laws that will enforce and ensure climate information is factored in coastal zones and inland waters planning and management for sustainable development, (ii) establish an early warning system for maritime disasters, (iii) enhancement of inland maritime and coastal weather/climate observation networks, (iv) sensitization of potential users on the importance of climate information in their various sectors and activities, and (v) encourage networking and collaboration with other programmes and institutions on maritime science training and research.

- COF-32: focused on Enhancing the use of information of the Indian Ocean systems for improved climate prediction and early warning of climate extremes over the Greater Horn of Africa. Marine related topics covered included: (i) Reviewing Indian Ocean systems, associated data and products that are required to improve climate prediction in GHA, (ii) Addressing sustainability in availability and accessibility of relevant Indian Ocean data and products, (iii) Strengthening collaboration between climate and ocean scientists in the region, (iv) Review of the current state of the global climate including the prospects of the development of El Niño, and (iv) Reviewing regional climate change science, impacts, mitigation and adaptation.
- COF-33: focused on Building Climate Resilience for Disaster Risk Reduction, Climate Change and Adaptation for Sustainable Development in the GHA. An Ocean Experts group was established with the following objectives: (i) identify key drivers of ocean circulation in the region, use of ocean data to improve climate forecasting, and provide the information to climate scientists, (ii) Develop a system that will be used to produce marine forecasts that will feed into climate outlooks, and (iii) Ultimately, enhanced regional collaboration between the oceans and climate communities to facilitate the generation of more accurate seasonal climate forecasts for the GHA region, and provide ocean data products to other stakeholders.

#### Establishment of the Oceans Experts team and its meetings.

The Ocean Experts team which was established during the 33<sup>rd</sup> Session of the Climate Outlook Forum (February 2013, Bujumbura, Burundi) with the following objectives:

- To identify key drivers of ocean circulation in the region, use of ocean data to improve climate forecasting, and provide the information to climate scientists.
- Develop a system that will be used to produce marine forecasts that will feed into climate outlooks
- Ultimately, enhanced regional collaboration between the oceans and climate communities to facilitate the generation of more accurate seasonal climate forecasts for the GHA region, and provide ocean data products to other stakeholders.

The team held its meeting at the IGAD Climate Prediction and Application Centre in Nairobi, Kenya from 13-19 August 2013 and identified the following major systems and processes in the Ocean that are believed to influence the Climate of the GHAF region: The Indian Ocean Monsoon (the East Africa Low Level Jet), The currents (Somali, Indonesia Through Flow etc.), The Indian Ocean Zonal Mode (IOZM), The upwelling systems, and Oceanic Kelvin and Rossby waves.

The session focused on the following topics:

- How has the sea state evolved over the Jan Aug period
- ODV as a tool for visualization and analysis of oceanographic and meteorological data
- How will the sea state evolve over the Sep-Dec period
- What will be the impact of climate predictions on the coastal and marine sector?
- Developing an ocean observing system for the WIO region
- Planned course on application of ocean forecast and model products
- Linkages to the African Marine Atlas work

The following tasks were agreed on, to be implemented before the end of February 2014.

- (i) Define categories of users that the ocean predictions will be directed to.
- (ii) Define products that will be prepared (including those listed below)
- (iii) Sea Surface Temperatures, Salinity, Ocean currents, Tides/sea levels, Isotherm variability, IOD, 30meteres depth variations, and thermocline
- (iv) Identify models/data sources?? Taking into account discussions at previous COFs, and the performance of the available models
- (v) Working meeting for the experts group (December 2013)
- (vi) Prepare the products and circulate to Ocean Group January/February 2014??
- (vii) Disseminate the products to users after validation??

The team was divided as follows to follow-up on the tasks:

- modelers: Sinibaldo, Clousa, Sagero, Mahongo, Mavume, Candida
- experts who can process satellite and insitu data: Veronica, Majambo, Harrison, Njuguna, Shagude, Bemiasa, Candida, Sagero
- interpreting the outputs experts on the ocean science of the region: Mavume, Shagude, Bemiasa, Amollo, Oloo, Veronica,
- Assigning specific tasks to countries/institutions?? individual experts

The team would also be actively involved in the African Summer School on Application of ocean and coastal model/forecast products planned by UNESCO/IOC in 2014.

#### 35<sup>th</sup> Session of Climate Outlook Forum.

The Thirty Fifth Greater Horn of Africa Climate Outlook Forum (GHACOF35) was convened from 21 - 23 August 2013 at Boma Inn, Eldoret, Kenya by the IGAD Climate Prediction and Applications Centre (ICPAC) in collaboration with the World Meteorological Organization (WMO), and partners to formulate a consensus regional climate outlook for the September to December 2013 rainfall season over the GHA region. The GHA region comprises Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Tanzania and Uganda.

The forum reviewed the implications of the current and evolving global and regional climate driving global mechanisms including the current and projected Sea Surface Temperatures (SSTs) over all Global Oceans; anticipated neutral ENSO conditions over eastern equatorial Pacific Ocean region, evolution of weak negative Indian Ocean dipole (IOD) mode; among many other global processes that influence on GHA climate . The influence of global processes is modulated by regional and local scale features including large inland lakes and the complex topographical patterns. Guidance and valuable forecast inputs were drawn from a wide range of sources including the World Meteorological Organisation's Global Producing Centres(WMO-GPCs), APEC Climate Centre and Korea Meteorological Administration, Met Office Hadley Centre (MOHC) and the National Oceanic and Atmospheric Administration (NOAA) Africa desk as well as the National Meteorological and Hydrological Services (NMHSs) of the Greater Horn of Africa.

The rainfall outlook for the September to December 2013 rainfall season is given in the figure.

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

Users of climate information who participated in the forur gender, civil society, agriculture and food security, wate media sectors as well as non-governmental organizations specific assessment of the skill and usefulness of the pr formulated mitigation strategies for specific sectors base the September to December 2013 rainfall season.

In the discussions following presentation of the repor participants noted that:



- The provision of adequate meteorological services in all the countries is crucial
- The observations network needs to be enhanced.
- Downscaled products should be prepared to cater for local needs
- The forecasts should be updated regularly, and the forecasts should be compared to actual observations
- Proper extension services are required to ensure food security by encouraging farmers to grow the correct crops at the correct time.
- Contingency Plans should be prepared in order to assure 24hours readiness to deal with potential disasters
- Media can play an important role by highlighting the need for observations, campaigning for increased budgets, and also comparing the forecasts and actual observations.
- Women, especially those from marginalized communities should be encouraged and supported to go into science, including through provision of scholarships.

#### Session on Oceans and Coastal Zones at COF -35

The main weakness of the marine and coastal zones group was that it comprised mainly researchers and academics and did not include other potential users of COF products from the sector. Efforts should be made to include other categories such as artisanal fishers, coastal tourism, aquaculture, coastal developers, ports authorities, oil refineries, oil explorers, resource managers and disaster response groups.

The COFs only provides information on rainfall while coastal communities require much more information than only rainfall. The ocean experts group should work with the climate group during the forecasts so as to develop the products required by the marine sector. Additional climate services/products required include: rainfall, wind speed/direction, waves/swells heights, currents, SSTs and chlorophyll information to identify fishing zones/grounds, tides and phases of the moon (spring and neap tides). The COF forecasts/products should be communicated to need to a wider user community at the coast, who will then be able to use them and provide feedback.

The following tasks were proposed for the ocean experts group, to be implemented before the end February 2014:

- Define categories of users that the ocean predictions will be directed to.
- Define products that will be prepared (including Sea Surface Temperatures, Salinity, Ocean currents, Tides/sea levels, Isotherm variability, IOD, 30meteres depth variations, and thermocline)
- Identify appropriate ocean models and data sources, taking into account discussions at previous COFs, and the performance of the available models

A workshop for selected ocean experts should be organized in December 2013 in order to review the ocean state forecasts from COF-35 and prepare forecasts for the first half of 2014. The products prepared should be circulated to the Ocean Experts group for review in January/February 2014 before they are shared with the climate group. The products will then be disseminated to users during the next COF, after validation.

# ANNEX I

# **OCEAN EXPERTS WORKSHOP**

# **List of Participants**

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# ANNEX II

# **PROGRAMME - OCEAN EXPERTS MEETING**

13-19 August 2013, ICPAC, Nairobi, Kenya.

Tuesday 13 August 2013.			
08:30	Registration of participants		
Setting the Stag	ge		
09:00 - 09:30	OPENING SESSION – JOINT WITH CLIMATE GROUP		
09:30-10:30	Results of previous Ocean Experts sessions at the COF and pre-COF and Exceptions of IOC/WIOMSA (Mika Odido). Evolution of the Ocean State in the Western Indian Ocean during the January – August 2013 period (Paul Oloo and KMD team).		
10:30 -11:00	TEA/COFFEE BREAK		
Presentations o	n Climate and Ocean forecast related activities of the participating organizations.		
11:00-12:30	Kenya Meteorological Department, Kenya Kenya Marine and Fisheries Research Institute, Kenya. Institut Halieutique et des Sciences Marines, Madagascar Mauritius Meteorological Services, Mauritius		
12:30 - 14:00	LUNCH BREAK		
Presentations o	on Climate and Ocean forecast related activities of the participating organizations.		
14:00-15:30	Universidade Eduardo Mondlane, Mozambique Instituto Nacional de Hidrografia e Navegaçao, Mozambique National Meteorological Services, Seychelles Institute of Marine Sciences, Tanzania Questions/Discussions		
15:30 -16:00	TEA/COFFEE BREAK		
16:00 -17:00	SERVIR-Africa Coastal and Ocean Research and Development in the Indian Ocean – CORDIO. Questions/Discussions		
17:00	END OF SESSION		
Wednesday, 1	4 August 2013.		
Ocean Data Vi	ew as a tool for analysis and visualization of oceanographic and meteorological data.		
09:00-10:30	Presentations and exercises		
10:30 -11:00	TEA/COFFEE BREAK		
Ocean Data Vie	ew as a tool for analysis and visualization of oceanographic and meteorological data.		
11:00 - 12:30	Presentations and exercises		
12:30-14:00	LUNCH BREAK		
WIO Sea State	for the period September – December 2013		
14:00 – 15:30	How is the WIO sea state likely to evolve over the September – December 2013 period, and what is the implication for the climate/weather?? ( <i>Paul Oloo and KMD team</i> )		
15:30-16:00	TEA/COFFEE BREAK		
16:00-17:00	The African Marine Atlas and potential for involvement of ocean-climate scientists Discussions.		

## Thursday, 15 August 2013

Presentations on Climate and Ocean forecast related activities of the participating organizations.			
09:00-10:00	Institut Halieutique et des Sciences Marines, Madagascar		
	Mauritius Meteorological Services, Mauritius		
	Universidade Eduardo Mondlane, Mozambique		
	African Summer School on Application of Ocean forecasting and modeling products (Mika Odido)		
10:30-11:00	TEA/COFFEE BREAK		
Ocean Data View as a tool for analysis and visualization of oceanographic and meteorological data.			
11:00–12:30	Presentations and exercises		
12:30-14:00	LUNCH BREAK		
Ocean Data Vie	ew as a tool for analysis and visualization of oceanographic and meteorological data.		
14:00-15:30	Presentations and exercises		
15:30-16:00	TEA/COFFEE BREAK		
16:00–17:00	The African Marine Atlas and potential for involvement of ocean-climate scientists		

# Friday, 16 August 2013

14:00 - 15:30

# Ocean Observations in WIO region.

09:00-10:30 Development of an Ocean Observing System for WIO, responding to requirements for human and economic security as well as climate/ocean forecasting TEA/COFFEE BREAK 10h30-11:00 11:00-12:30 Review of recommendations from Ocean Experts meetings at COF32 and 33 and development of implementation strategy. LUNCH BREAK 12:30-14:00 14:00-15:30 Tidal predictions using various tools 15:30-16:00 TEA/COFFEE BREAK 16:00 - 17:00Exercises: Tidal predictions and Ocean Data View Monday, 19 August 2013 Planning for the Future 09:00-10:30 Review of the Ocean Experts pre-COF 35 session TEA/COFFEE BREAK 10h30-11h00 11:00-12:30 JOINT SESSION WITH CLIMATE GROUP 12:30-14:00 LUNCH BREAK

> Outcomes and way forward Agenda for COF-35 parallel session Coastal and Marine Areas

# ANNEX III



# THIRTY FIFTH GREATER HORN OF AFRICA CLIMATE OUTLOOK FORUM (GHACOF 35):

# 21-23 AUGUST 2013, BOMA INN, ELDORET, KENYA

# **THEME:** Building Resilience to Climate Related risks through Regional Climate Outlook Forums (RCOFs) in the Greater Horn of Africa

## PROGRAMME

#### **TUESDAY 20 AUGUST 2013**

Time	Activity	Facilitator	
15.00-18.00	Arrival & Registration	ICPAC	
WEDNESD	WEDNESDAY 21 AUGUST 2013		
8.00-08.30	Registration	ICPAC	
8.30-9.30	<ul> <li>SESSION I: Setting the scene for the Forum</li> <li>Perspectives of the Forum: <i>Prof. Laban Ogallo, ICPAC</i></li> <li>ICPAC Activities and achievements: <i>Mr Zachary Atheru, ICPAC</i></li> <li>Progress in seasonal climate prediction and opportunities and Gaps at ICPAC: Key note presentation: <i>Prof Richard Anyah, University of Connecticut</i></li> <li>New method based on supervised machine learning algorithms for generation of improved regional seasonal prediction products: <i>Prof F. Semezzi, North Carolina State University and Dr. Waniha, TMA</i></li> <li>Discussions</li> </ul>	Chair: Rappoteur:	
10.00-11.00	<ul> <li>OPENING CEREMONY</li> <li>Key note address: Mr Abbas Gullet (Kenya Red Cross)</li> <li>Opening</li> <li>PHOTO SESSION AND HEALTH BREAK (Separate programme available)</li> </ul>	Chair: Rappoteur:	
11.00-13.00	<ul> <li>SESSION II: Specific Sector applications in building resilience</li> <li>IGAD Drought Disaster Resilience and Sustainability Initiative (IDDRSI): Dr Samuel Zziwa, IGAD</li> <li>UNISDR initiatives in Africa and regional needs and priorities for post-2015 (HFA) for Disaster Risk Reduction: Ms. Sharon Rusu, UNISDR</li> <li>Climate change and sustainable development in the GHA: Dr C. Oludhe Discussants: Dr B. Nyenzi (Impacts and vulnerability of the region) and Prof. Richard Odingo (Adaptation and mitigation)</li> <li>Climate services in support of Climate Smart Agriculture and Food Security: Prof. David Mungai; Discussants: Dr Stephen McDowell (food production in GHA); Dr Everline Komutunga (Crop) and Dr Samuel Wakusama (Livestock)</li> <li>Climate services in support of integrated Water Resources Management: UNESCO</li> <li>Review of needs, gaps and ongoing climate services to the Health sector in GHA: Mr James Sang</li> <li>Discussions</li> </ul>	Chair: Rappoteur:	
13.00-14.00	LUNCH BREAK / EXHIBITION		

14.00-16.45	SESSION II: CONTINUES	Chair:
	<ul> <li>Benefits of standardization in the initiatives that lead to the improvement of Agriculture, Pastoralism, Climate Change Interventions, sustainable development and trade in IGAD and Africa at large: <i>Dr Nsengimana Hermogene, ARSO</i></li> <li>Ocean Disaster Preparedness and Mitigation in the South Western Indian Ocean: <i>Dr Rajan Mungra</i></li> <li>Discussions</li> </ul>	Rappoteur:
	SESSION III: Climate Services	
	<ul> <li>WMO Global Framework for Climate Services: <i>Dr Rupa Kolli</i></li> <li>Gender and Civil Society dimensions in enhancing community resilience to climate related risks: <i>Dr Alice Odingo, Discussants: Lydia</i></li> <li>Integration of Indigenous Knowledge in community based climate services: <i>Dr . Maria Onyango and Dr. Gilbert Ouma</i></li> <li>Communication and dissemination of climate early warning advisories: <i>Mr Patrick Luganda&amp; Judith Akolo</i></li> </ul>	
15.45-16.00	HEALTH BREAK	
16.00-18.00	<ul> <li>SESSION IV: Development of consensus regional climate outlook</li> <li>Climate outlook from Global Climate Producing Centres (GCPCs) and GHA climate outlook: <i>UKMO</i></li> <li>Review of the current state of Climate over southern Africa: <i>SADC/CSC</i></li> <li>Review of the current State of climate over Africa: <i>ACMAD</i></li> <li>Review of the performance of GHACOF 34 Outlook and release of draft GHACOF 35 Outlook: <i>Dr. Joseph Mutemi, ICPAC</i></li> <li>Discussion</li> </ul>	Chair: Rappoteur:
18.00	CLOSURE OF THE DAY	

## THURSDAY 22 AUGUST 2013

Time	Activity	Facilitator
08.30-10.30	<ul> <li>SESSION V: Sector Specific parallel Workshops and development of GHACOF35 mitigation strategies (In this session, experts from various sectors meet to independently address sector specific climate services needs, gaps, priorities and challenges as well as propose how best to improve the use of RCOFs products to enhance sector specific resilience). The parallel workshops include the following:</li> <li>Climate Services</li> <li>Agriculture and Food Security</li> <li>Livestock</li> <li>Water Resources</li> <li>Health</li> <li>DRR, Socio-economics of climate services and conflict early warning</li> <li>Media</li> <li>Gender and civil society</li> <li>Marine and Coastal zones</li> <li>Geospatial Technologies</li> </ul>	Chair: Rappoteur
10.30-11.00	HEALTH BREAK	
12.00.14.00	SESSION V Continues	
13.00-14.00		

14.00-17.30	Session VI: Plenary: Recommendations from sector specific parallel workshops	Chair:
	Climate Services	
	Climate Agriculture and Food Security	Rappoteur:
	• Livestock	
	Water Resources	
	• Health	
	• DRR, Socio-economics of climate services and conflict early warning	
	• Media	
	Gender and civil society	
	Marine and Coastal zones	
	Geospatial Technologies	
	• Discussions	
15.45-16.00	HEALTH BREAK	
16.00-17.30	Session VII: Partnerships and Collaborations	
	• Socio-economic benefits of climate services: <i>Prof. J.N. Muthama</i>	
	Interlinking NMHSs and ICPAC in support of WMO RCC pilot activities: <i>Dr Joseph Instiful</i>	
	• IGAD UNOSAT Project: Ms Roshni Dave	
	MESA IGAD THEMA: Dr. Anders P. Pedersen	
	IGAD Disaster Risk Atlas: <i>Mr Dennis Macharia</i> . <i>RCMRD</i>	
	Discussions	
17.30	CLOSURE OF THE DAY	

### FRIDAY 23 AUGUST 2013

Time	Activity	Facilitator
08.30-10.30	Session VII: continues	Chair:
	<ul> <li>Revision ICPAC Strategic plan: Mr Alex Alusa</li> <li>Capacity Building for Disaster Risk Reduction: <i>Prof. S. B. Oteng'i</i></li> <li>ISACIP: <i>Mr Zachary Atheru, ICPAC</i></li> <li>USAID PREPARED Program: <i>Dr McCormick Scott</i></li> <li>Climate information users profile surveys: <i>Dr Sandra Baptista, CIESIN</i></li> <li>EUPORIAS project: <i>Dr Ronald Hutjes</i></li> <li>DFID-Met Office Climate Science Research Partnership for Africa: <i>Dr. R. Graham</i></li> <li>UNEP's Lessons in Early Warning and Assessments: <i>Dr Zinta Zommers</i></li> <li>UNISDR overview of DRR progress and future directions in eastern Africa: <i>Mr Julius Kabubi</i></li> <li>Opportunities for collaboration with UNESCO/IOC and WIOMSA: <i>Mr Mika Odido</i></li> <li>Discussions</li> </ul>	Rappoteur
10.30-11.00	HEALTH BREAK	
11.00-12.30	<ul><li>SESSION VIII: WAYFORWARD</li><li>Adoption of COF35 report and Way Forward</li><li>Discussions</li></ul>	Chair: Rappoteur
12.30-13.00	CLOSURE OF GHACOF 35	
13.00-14.00	LUNCH	
14.00-18.00	National Forum	