WORKSHOP REPORT

CSRD Technical Exchange: ICPAC and National Climate Maprooms – Existing and New Tools for Drought Monitoring and Forecasting in Eastern Africa



Zanzibar Beach Resort

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The opinions expressed in this report are those of the authors, and do not necessarily reflect the views of USAID or DfID.

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Acronyms

AGRHYMET	Agriculture, Hydrology, and Meteorology Research Center
AMCOMET	African Ministerial Conference on Meteorology (WMO)
AWS	Automated Weather Station
CARE	Cooperative for Assistance and Relief Everywhere
CCAFS	CGIAR Research Programme on Climate Change, Agriculture, and Food Security
CSRD	Climate Services for Resilient Development
DCCMS	Malawi Department of Climate Change and Meteorological Services
DFID	Department of International Development
DL	Data Library
ENSO	El Niño Southern Oscillation
ENACTS	Enhancing National Climate Services
GFCS	Global Framework for Climate Services
ICPAC	IGAD Climate Prediction & Applications Centre
IGAD	Intergovernmental Authority for Development
IRI	International Research Institute for Climate and Society
KMD	Kenya Meteorological Department
NMHS	National Meteorological and Hydrological Services
NMA	Ethiopia National Meteorological Agency
RCC	Regional Climate Center
SCIPEA	Strengthening Climate Information Partnerships - East Africa
TMA	Tanzania Meteorology Agency
WISER	Weather and Climate Information Services for Africa
WMO	World Meteorological Organization
UNMA	Uganda National Meteorological Authority

Executive Summary

In 2005, the International Research Institute for Climate and Society published its assessment of key gaps in the use of climate information for health, agriculture, water and other sectors in countries across Africa. The results from the report were less than stellar. After an extensive review of use of climate information in the development sectors of Africa, the authors concluded that the continent suffered from "market atrophy" – the reinforcing effect of inadequate effective supply of climate information and weak effective demand.

Twelve years later, organizations such as the IRI, CSRD program, CCAFS, ICPAC, and UKMO have made enormous strides at increasing both climate information supply and effective demand through the implementation of climate data platforms and the organizing of capacity-building seminars.

In order to capitalize on the presence of the many climate and sector experts from across the IGAD region, the organizations above held a joint event, the CSRD Technical Exchange: ICPAC and National Climate Maprooms – Existing and New Tools for Drought Monitoring and Forecasting in Eastern Africa, in Zanzibar on August 23-25, 2017, immediately after the 47th Greater Horn of Africa Climate Outlook Forum (GHACOF47). The workshop was designed to offer potential and existing users a platform to voice their needs for the development and better use of historical, monitored and forecast information for the management of drought across climate-sensitive sectors.

Day 1

After opening remarks from the Tanzania Ministry of Agriculture, CSRD, DfID/WISER, and ICPAC, Maurine Ambani walked the 60 plus participants through the agenda and expectations for the workshop. The main activities of the day began with a panel discussion and open Q&A on policy and operational needs from drought-related disasters, featuring panelists from the Red Cross and IGAD ministries of livestock, agriculture, and health. This was followed by four key presentations on existing climate data and Maproom tools within the region. In particular, presenters from ICPAC, WISER-SCIPEA, WISER-ENACTS, and CCAFS, highlighted and showcased the existing ICPAC drought risk analysis, monitoring and production tools; the WISER-SCIPEA portal within the IRI Data Library and Maprooms; the ENACTS Climate Data and Maprpoms Tools; the and CCAFS Climate Data and Maproom, respectively. The day closed with a panel discussion, focused on how Kenyan, Ethiopian, Rwandan, and Tanzanian users were using SCIPEA, ENACTS, and CCAFS Maprooms and associated tools within the agricultural, health, and humanitarian sectors.

Day 2

The second day was primarily focused on three training sessions for past/historical, present/ENSO, and future/forecast products and tools. Originally these training sessions were aimed to be more hands-on and within smaller groups were intended to rotate; however, due to limited internet bandwidth, the

larger group were exposed to past, present, and future Maprooms in succession. Designated facilitators and experts then guided the group through short, 1-hour training sessions and demonstrations of the Maproom products and tools. Individuals were asked to take notes and observations, and asked questions about the Maprooms during these sessions.

During the latter part of the day and after the training sessions were complete, the larger workshop group was divided into three sector groups (agriculture, health, and DRM) in order to identify challenges/issues and formulate corresponding strategic and tactical recommendations to address the improvements of the Maprooms showcased and developments for new ones. Chairs and rapporteurs were preselected to guide the groups through the brainstorming exercises. At the end of the day, each group assembled their final recommendations into a presentation to share at the beginning of the third day.

Day 3

The third day of the workshop began with each sectorial group's chair and scribe presenting the strategic and tactical recommendations for existing Maproom improvement and new development, followed by open-floor discussion, questions and answers. UKMO then led a panel session focused on climate service co-development through user and provider interaction with panelists featured from the Kenyan Red Cross, KenGen, the NDRMC Ethiopia, MAAIG Uganda, TMA, and KMD. As a preface to the panel, the WISER-SCIPEA prototype services were showcased along with the climate service development approach at TMA. The IRI then gave a short presentation on the global drought tools being housed at the IRI before another panel session was held in which members from the ICPAC and the national meteorological agencies responded to user priorities. During the plenary, a consolidated list of recommendations was presented with final discussion/Q&A, and closing remarks were given by UKMO, CCAFS, IRI, ICPAC and CSRD. It was the official close to the CSRD Technical Exchange Workshop.

Organization and Sponsorship

The three-day workshop was convened by the IGAD Climate Prediction & Applications Centre (ICPAC), with technical guidance from the IRI, WISER-ENACTS/SCIPEA, and CCAFS, and supported by the World Meteorological Organization (WMO), the World Health Organization (WHO) and the Global Framework for Climate Services (GFCS), amongst others.

The workshop was funded by:

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Objectives

The workshop aimed to strengthen the interaction between stakeholders from climate-sensitive sectors and climate services' suppliers by increasing awareness, enhancing relevance and enabling use of national and regional data, and historical, monitored, forecast Maproom products and tools, for the management of drought risk in IGAD countries.

Specific objectives are to:

- Identify policy and operational needs for drought-related information from relevant sectors, national and regional;
- Showcase current and prototype Maprooms products associated with the WISER-ENACTS/SCIPEA and CCAFS initiatives;
- Provide training and experience to key stakeholders in climate-sensitive sectors nationally and regionally, in the use of climate information for the management of drought risk; and
- Inform stakeholders of what new forecast information and tools are being developed, in addition to garnering feedback;
- Understand and document the needs, challenges and recommendations of stakeholders for drought-related products, tools, and services

Expected Outcomes

Through this workshop, we hope to accomplish the following:

- Increased awareness of available climate information and its utility for drought management in IGAD countries;
- Enabled stakeholders with capacity to use of Maprooms products and tools to better manage drought risk;
- Stakeholder knowledge of new opportunities in climate services;
- Climate information products, tools and services further developed based on the recommendations from key stakeholders in climate-sensitive sectors.

Outcomes and Recommendations

Following presentations, group work and open discussions, the three sectorial groups were asked to brainstorm challenges and corresponding strategic and tactical recommendations for improvements and new developments for the Maprooms presented. Included here are the consensus recommendations and feedback of the participants at the workshop:

AGRICULTURE GROUP – RECOMMENDATIONS

STRATEGIC	TACTICAL
• Improve packaging of the products to fit user needs	• Build more awareness on the capabilities and what can be done with Maprooms, including packaging Maprooms with training materials
• Incorporate Maproom the products into apps, agro-meteorological advisories and alerts	• Improve options for assessing onset of the rainfed growing season
• Include Soil Moisture and Relative Humidity as part of drought monitoring parameters	• Maintain the current flexibility for advanced users, and develop a simpler interface for general users
• Enhance collaboration among the NMHS, with research institutions, and line ministries at the National level to ensure sustainability	• Add Effective Rainfall to the Maprooms
• Promote the mainstreaming of the ENACTS approach into strategic planning of the NMHS	

HEALTH GROUP – RECOMMENDATIONS

STRATEGIC	TACTICAL
• Extend Maproom tools to other priority climate-sensitive diseases and health conditions (e.g. vector borne diseases - Dengue fever, yellow fever, Lymphatic Filariasis), water borne diseases (cholera) and health-related diseases (malnutrition).	• Use Maproom tools for planning of disease control interventions including surveillance activities.
• Create an interface to upload non-climate data e.g. epidemiological data.	• Incorporate learning of Maproom tools into postgraduate training e.g. FELTP epidemiology
• Develop offline access to the Maproom tools especially during training sessions due to network challenges.	• Create platform to extend partnership across various sectors such as agriculture, nutrition, international health regulations and global security.
• Link Maproom tools to the health management information systems of the countries e.g. DHIS2.	• Create awareness and advocacy on importance of climate information in the health sector through various channels such as policy briefs, health blogs, health bulletins, climate links on institutional websites.
• Increase capacity building to equip health professionals on the usage of Maproom tools and incorporating biostatisticians and geospatial experts in the health sector.	• Increase capacity building on the use of Maproom tools – Have master trainers from each country who can then cascade the training in their respective countries.

• Raise awareness on the existence of the Maproom tools and its benefits among health professionals.	• Participate in local and international conferences related to climate.
• Strengthen engagement between climate and health policy makers on the benefits of Maproom tools for decision making and understanding the challenges of climate from the policy context.	
• Extend the establishment of the Maprooms in all member countries of ICPAC.	
• Make available disaggregated data at sub-national levels	

DRM GROUP – RECOMMENDATIONS

STRATEGIC	TACTICAL
• Harmonize Maprooms Colors and Codes	• Develop capacities of national users to use IRI Maprooms
• Ensure usage of IRI Maprooms at national level while considering internet challenges	• Provide offline access (Stand-alone versions) with Mobile friendly interface mode
• Develop and maintain partnerships with development, humanitarian, academia institutions, Town/City Municipalities, Private Sector at national level	• Generation of partnerships (MOUs) at national level through NMHS
• Develop capacities of national users to use IRI Maprooms	• Dissemination, prepositioning and collaborative research of predictive weather and climate

Conclusion

The workshop was well attended with knowledgeable and enthusiastic participants. It achieved its objectives in terms of identifying pathways and recommendations towards ENACTS sustainability and defining the role of ICPAC in this; and by allowing users to share their climate information services' experience and by allowing ENACTS' countries to showcase their Maprooms. The presence of individuals representing the agricultural, health, and DRM sectors, and ENACTS' NMHS', GFCS, CCAFS, UKMO, CARE/ALP, researchers, international partners and local Non-Governmental Organizations provided the opportunity for a rich discussion going forward.

The strategic and tactical recommendations provided by workshop participants as opportunities for Maproom improvement and development were considered to be timely, needed and practical Overall, the organizers were delighted with the level of active engagement by participants in the workshop and the detailed recommendations provided for next steps.

CSRD Technical Exchange Workshop

Day 1: Opening Session



Figure 1: Opening remarks by key organizations. From left to right: Steve Zebiak (CSRD), Elimpaa Kiranga (Tanzania Ministry of Agriculture), John Mungai (DfID/WISER), and Guleid Artan (ICPAC). Photo Credit: Catherine Mungai (CCAFS)

Opening Remarks

Elimpaa Kiranga (Tanzania Ministry of Agriculture)

Jambo. Hello.

My name is Elimpaa Kiranga and I am the Director National Food Security Department, Ministry of Agriculture, Livestock and Fisheries work at the Tanzanian Ministry of Agriculture. Climate has a significant impact on the agriculture and food security sector in Tanzania, as drought is a critical risk and impact for both crop production and livestock cultivation.

Heavy rains and flooding risk can also have an adverse impact on the agricultural sector in some instances by increasing the likelihood of certain diseases; including rift valley fever and crop blights. I would like to thank the organizers for coordinating this meeting that will help to identify operational tools for agricultural decision making through important national partners, especially the Tanzanian Meteorology Agency.

The tools and approaches that we are going to discuss here may help add value to agricultural and livestock decision making in Tanzania and elsewhere. I understand from the organizers that in the next few days, we will explore tailored climate information and Maproom tools which may improve monitoring and forecasting of agricultural production and risk indicators such as drought.

It is a learning by doing process and I am pleased to be able to participate in the process. I am very pleased also to be able to welcome everyone to Tanzania and Zanzibar and to the Climate Services for Resilient Development (CSRD) workshop.

Karibu.

Steve Zebiak (CSRD)

Good morning. My name is Steve Zebiak, and I am the Global Coordinator for the Climate Services for Resilient Development partnership.

I would like to extend a warm welcome to you all for this Technical Exchange on ICPAC and National Maprooms – Existing and New Tools for Drought Management in Eastern Africa.

The CSRD partnership was launched 2 years ago. It is a public-private partnership dedicated to promoting climate services that enhance climate resilience and enable decision makers to address significant problems and create solutions in a variety of sectors in developing countries. The initial CSRD partners include the U.S government, the UK government, American Red Cross, Asian Development Bank, InterAmerican Dev. Bank, the Skoll Global Threats Fund, Esri, and Google. We have a number contributing partners as well, which include IRI (who are co implementers of this event).

CSRD seeks to foster user-centric, collaborative climate services that effectively harness the power of information, technology, and information from around the world. CSRD works to build local capacity to sustain the development and use of climate services in specific national or regional settings; it also works at the global level to promote knowledge sharing, learning, and the identification of good practices, in collaboration with partners including the Global Framework for Climate Services.

Earlier this year CSRD launched a Technical Exchange program. The intention for the program is to provide a means to build awareness, and promote the uptake and use of information, technology, and practices with demonstrated potential to support effective climate services. In addition, the exchanges are intended to address practical problems, and to promote enhanced communication and collaboration at the regional level.

The first TE was held in Cali, Colombia in January 2017. It was supported by USAID on behalf of the CSRD partnership, and implemented in collaboration with CIAT and FEWSNET. The exchange focused on tools for analyzing climate and food security risks, and brought together representatives of agricultural and meteorological services from seven countries in S. and C. America.

This forum represents the second CSRD Technical Exchange. It is a collaborative effort among several CSRD partners, including USAID, DfID, and UKMO (through the WISER program), as well as IRI… and is further strengthened by collaboration with CCAFS. We have been able to join forces among several programs to offer an Exchange we hope will have added value for all the participating stakeholder groups of the region, and addresses a key concern of the region – drought. I want to acknowledge also our regional partner, ICPAC, which is serving as the local convener, and also has provided invaluable support to the planning and organization of this event.

We hope the Technical Exchange will build awareness of existing information and technology that can support climate services addressing drought and other risks. We hope it will identify the uses and practitioner needs to inform the further development of these resources (to make them increasingly useful and useable), and finally we hope it will enhance dialogue and collaboration among relevant professional communities throughout the region, to the benefit of all.

I'm looking forward to a lively and productive exchange here, and wish you all a very successful workshop!

Introduction to Workshop (Outline)

Maurine Ambani (CARE/ALP) walked the larger group through the objectives, expected outcomes, method of work and workshop agenda. She emphasized that knowledge of the climate and its sound interpretation can help manage climate-sensitive impacts. Ambani also explained that the workshop would give all participants a chance to interact with different climatic products and tools.

Day 1: Summary of Panel Session: Policy and Operational Needs for Drought-Related Disasters

Moderator: Dawit Solomon (CCAFS)

- *Panelist 1 (Livestock): Hiatham Fadllala (Sudan Ministry Livestock)*
- *Panelist 2 (Agriculture): Hakuza Annuncita (Uganda Ministry of Agriculture)*
- *Panelist 3 (Health): James Sang (Kenya Ministry of Health)*
- *Panelist 4 (DRM): Brian Kanahe (Uganda Red Cross)*

Key questions and answers of the session:

Solomon (CCAFS): Climate exposes human livelihoods to many agricultural risk. Millions of people in East Africa and the Greater Horn side of Africa are affected due to drought.

Q1: Since 2000, there have been a significant number of major droughts in East Africa (2000, 2003, 2005, 2011, etc). Can you elaborate on the impacts of these droughts within your specific sector?

- *Fadllala (Sudan Ministry Livestock): The livestock sector in Sudan contributes to 20% of GDP and 60% of the Agricultural GDP. The livestock risk to diseases is heightened.*
- *Annunciata (Uganda Ministry of Agriculture): The livelihood of the community is dependent on the crop, and drought has affected the sector in terms of crops hence relying to food security effects. Looking at the livestock sector there is an increase of movement from one place to another and hence spreading of diseases. There is an epidemic of caterpillars and a pest increase in crops that has been increased due to the drought. There is also an increase of vector borne diseases in the livestock.*



Figure 2: CSRD Technical Exchange participants during the Panel Session on Policy and Operation Needs for Drought-Related Disasters, Photo Credit: Catherine Mungai (CCAFS)

- *Sang (Kenya Ministry of Health): A lot of malnutrition in underage children has been due to the long food insecurity because of the drought. Drought in relation to water such as cholera, scarves, and trachoma in pastoral communities. Drought preceding a heavy rain season produces vulnerability of malaria. Dengue*

and Chikungunya are also heightened in other countries. Some populations also have dust-related allergies as well as some cases of heat strokes.

- *Kanahe (Uganda Red Cross): Internal migration from community members is also recognized during droughts and there is issue in response to the effect of impact. There still needs to be improvement and this requires trans-sectorial work.*

Q2: From your own sectorial experience, what has changed in terms of country/organizational policy responses to drought over this period? And how is this being implemented in practice?

- *Kanahe (Uganda Red Cross): Drought management has to do with how we view drought and define it. Now we have a heightened knowledge of what drought is and this is due to the access to climate information and finding ways to send SMS to local communities through UNICEF once forecasts are available. To help communities prepare to respond, we have high risk map exercises. And in Uganda, we are looking for ways to send funds to these communities to respond to the forecast. We are looking to work at the national and local levels so the collaboration has increased due to the acknowledgement of expertise.*
- *Sang (Kenya Ministry of Health): There is a greater awareness of climate change and its impact. Regional and global strategies have been in place in the community of health sectors and practitioners which has been progressive. The effort of merging early warning with early action is in motion especially when a forecast is released. And disease prevention for climate-sensitive hazards is being worked on as well as collaboration of human and animal health collaboration.*
- *Annunciata (Uganda Ministry of Agriculture): Since 2000, the government has shown commitment to understanding climate. The country has developed a climate change policy and disaster management policy, cutting across through the various sectors. Within agriculture, we have developed guidelines and irrigation policies as well as sectoral investment plans. We have been promoting research, water harvesting, and creating disease control for crops and livestock.*
- *Fadllala (Sudan Ministry Livestock): Strategic policy is in place for migratory people including the increase of genetics of animals and decrease the number of animals to help the environment.*

Q3: What do you see as the priorities areas for investment in drought management moving forward?

- *Fadllala (Sudan Ministry Livestock): Build capacity building for the community level.*
- *Annunciata (Uganda Ministry of Agriculture): Invest in research to develop more technology to address drought tolerant animals and crops.*
- *Sang (Kenya Ministry of Health): (1) Conduct risk assessment and profiling, (2) research the current and upcoming impact of drought, and (3) strengthen the world health agenda*
- *Kanahe (Uganda Red Cross): (1) An updated risk atlas, (2) early warning and early action, (3) ecosystem management, and (4) provisional fees at a community/local level.*

General Questions from the Audience:

Q1: How do you use community mobilization, organizations and their capacity building?

- *A1: In these risks areas, we have given a number of training and equipment for disaster response, preparedness and early warming. The FBF (forecast based finance) approach started in 2015 (piloted). It was started because there were poor alerts associated with flash floods. Now response materials are in place before a disaster happens such as soap for safe water. Sometimes*

you get an alert when the flood does not happen but it is a win because things such as life cannot be quantified in terms of money.

Q2: Does anyone have any experience using index insurance?

- *A2.a: The insurance industry is not capable of being paid in Sudan - the nomadic and migratory people do not pay for the insurance. The system does not allow poor people to access those financial organizations.*
- *A2.b: Insurance index is on the way and we are developing a policy for agricultural insurance. A study has found that the policy works but we are still not practicing.*

Q3: Is there climate information that you need and how can you work with Met officers to get the info you need?

- *A3.a: We use radio stations/Facebook to get the information on the weather but we do not have a direct communication line with the Met agency.*
- *A3.b: We would like to have a stronger connection with UNMA and the agricultural ministry. The stations across the country are not great so they require help there. Sometimes we need a product (e.g the early warning product), and this is not available to us.*
- *A3.c: Kenya has a good relationship with their Met agency. We get what we want if we can articulate what we are looking for. Requesting products is essential to the collaboration.*
- *A3.d: Timeliness is still an issue. E.g there is radio but communities have to be informed and interested in hearing them as well.*
- *A3.e: Sometimes the information is not packaged the way the sectors or sub sectors need it to be.*

Q4: What can we do outside normal thinking so we can lobby and get budgets?

- *A4.a: The linkage is strong between met and agriculture. For example, we get updates for the seasonal forecast. But getting early warning information is still hindered by timeliness.*
- *A4.b: Sudan's sanction has tampered with the funding. We would like to have more opportunities in Sudan and Eritrea. ICPAC and IGAD are required to help Sudan get to the level so we can achieve better partnership.*
- *Solomon (CCAFS): There is a lack of information packaging and delivery.*

Q5: In Uganda, how do you sustain finance and can you expand to other countries?

- *A5.a: The FBF approach is just a pilot, and we are still gathering of information to respond in an early action/warning method. Potential for scaling is possible as we are working with other donors to scale up the initiative.*
- *A4.b: Kenya is working with insurance companies and other partners to get index insurance for livestock. This is something that other climate-sensitive sectors could do as well.*

Final Closing Remarks

- *Fadllala (Sudan Ministry Livestock): It is essential that ICPAC provides support in developing drought tools, drought risks assessment in livestock*
- *Annunciata (Uganda Ministry of Agriculture): Drought monitoring should be at the country level, and I would like to see the scale-up of the remote sensing initiative for ICPAC. There should be country level monitoring and emergency preparedness for crops across IGAD.*

- ***Sang (Kenya Ministry of Health):*** *There must be a multi-sectoral assessment of drought.*
- ***Kanahe (Uganda Red Cross****): Gender sensitivity is an issue to be assessed. For example, women own the crop but not the land and this is a message to send across.*

Day 1: Summary of Climate Data and Maprooms Tools Presentations

Title: Climate Data and Maproom Tools Presentations
Moderator: Erica Allis (GFCS/WMO)

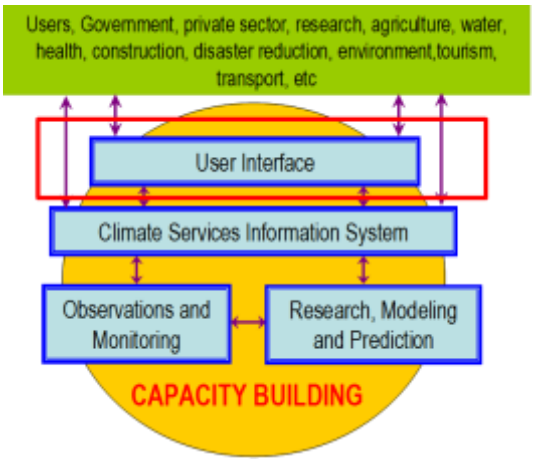


Figure 3: GFCS Components

Key Messages:

- Components of GFCS
  - User Interface Platform: Users can make their voices heard through the Platform and make sure climate services are relevant to their needs.
  - Climate Service Information System: The production and distribution system for climate data and information products that address user needs.
  - Observations and Monitoring: The essential infrastructure for generating the necessary climate data.
  - Research, Modeling and Prediction: To advance the science needed for improved climate services that meet user needs.
  - Capacity Development/Building: It will support the systematic development of the institutions, infrastructure and human resources needed for effective climate services.
- GFCS Implementation: Five Step Approach (Current Status)
  - Step 1: Assessing the baseline
  - Step 2: Initial National Consultation Workshop
  - Step 3: Joint Development of the National Action plan on Climate Services
  - Step 4: High-level endorsement of the National Action Plan on Climate Services by all entities
  - Step 5: Launch of the Framework at the national level, followed by implementation of the priority activities of the National Action Plan, rigorous monitoring and evaluation

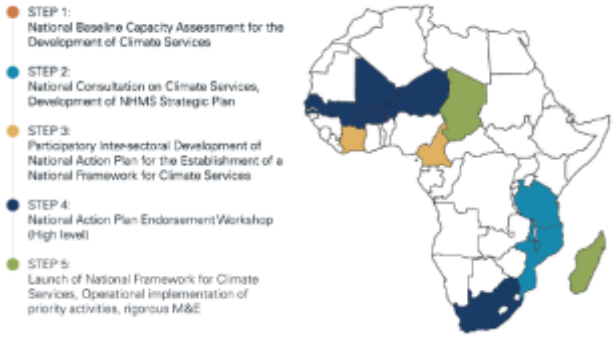


Figure 4: GFCS 5-Step Implementation Approach

Title: Existing ICPAC drought risk analysis, monitoring and prediction tools
Presenter: Philip Omondi (ICPAC)

Key Messages:

- Background of ICPAC
  - Established in 1988 as the Drought Monitoring Centre (DMC) for Eastern and Southern African countries with Head office in Nairobi, Kenya (DMC-N) and sub Centre in Harare, Zimbabwe (DMC-H);
  - In 2000 DMCN was adapted as a project of IGAD;
  - In April 2007, the Protocol establishing the Centre as a Specialized Institution of IGAD was signed and the name changed from DMCN to: *IGAD CLIMATE PREDICTION AND APPLICATIONS CENTRE (ICPAC)*
- Why Drought Matters to ICPAC
  - Drought is a natural hazard that has significant impact on economic, agricultural, environmental, and social aspects of Horn of Africa countries.
  - Much of eastern Africa is arid or semi-arid with very large inter-annual climate variability;
  - Rainfall is the most critical climate element due to high degree of variability and very strong seasonality;
  - Risk and vulnerability of the society to climate extremes is increasing due to increasing population, change in land use and climate change;
  - Drought is a slow creeping hazard that can be forecasted 6 months' lead time
  - Heads of state summit in 2009 to stop drought emergency
- Drought tools currently used by ICPAC
  - Meteorological Drought: It describes a situation where there is a reduction in rainfall for a specific period (days, months, seasons or year) below a specific amount (long term average for a specific time).
  - Agricultural drought: concerned with the impact of meteorological/hydrological drought on crop yield. When soil moisture and rainfall conditions are not adequate enough to support a healthy crop growth to maturity thereby causing extreme moisture stress and wilting major crop area, it leads to Agricultural drought
  - Hydrological drought: associated with the effects of periods of precipitation (including snowfall) shortfalls on surface, subsurface water supply (i.e., stream flow, reservoir and lake levels, groundwater).
  - Socioeconomic Drought: It reflects the reduction of availability of food and income loss on account of crop failures endangering food and social security of the people in the affected areas.

- Indicators for monitoring drought in GHA
    - Operationally, ICPAC uses Drought Watch with various Indices for Monitoring three types of droughts and can be access via below link

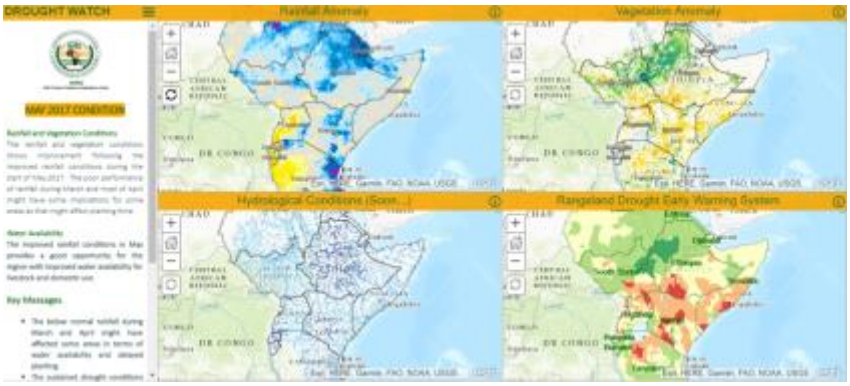


Figure 5: ICPAC Drought Monitoring/Watch Tool

- Strengths and Limitations
    - Not all required parameters used to comprehensively measure drought (soil moisture, humidity, temperature, ….) e.g., WMO/TD No. 1572; WAOB-2011. 197 pp
    - Lack of use of primary data to compute drought indices (rely on space borne-derived relationships between land surface temperature and NDVI
    - Isolation of livestock browse from shrubs using NDVI hence difficulty in advising pastoralists
    - Lack of socio-economic data to fully compute drought
    - Real time drought monitoring tools
- Users
    - Agriculture – small scale peasant farmers
    - Pastoralists
    - National drought management authorities
    - National Meteorological and Hydrological Services (NMHSs)
    - Health – drought related diseases (cholera)
    - Humanitarian organizations (a lot of interest in ENSO events)
    - Water & Energy (hydrologists, HEP, …)
- Presentation of ICPAC Drought Tool

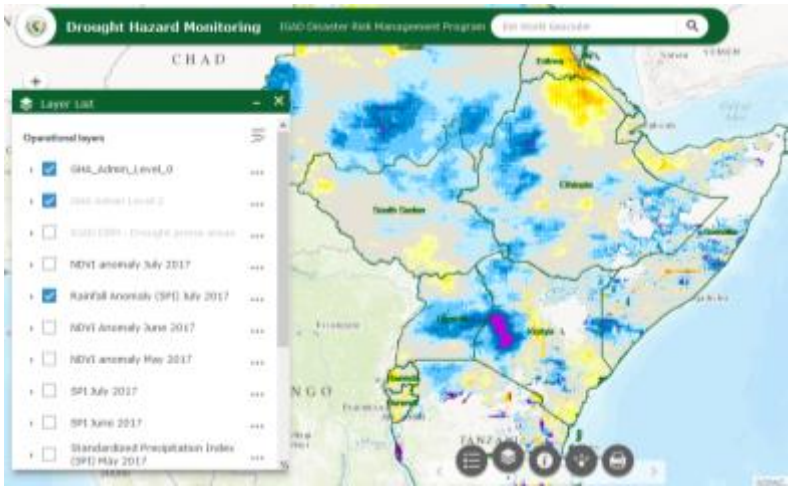


Figure 6: ICPAC Drought Tool

WISER-SCIPEA Portal to the IRI Data Library and Maprooms
Presenter 2: Oliver Kipkogei (ICPAC)

Key Messages:

- SCIPEA: Strengthening Climate Information Partnerships – East Africa (Structure)

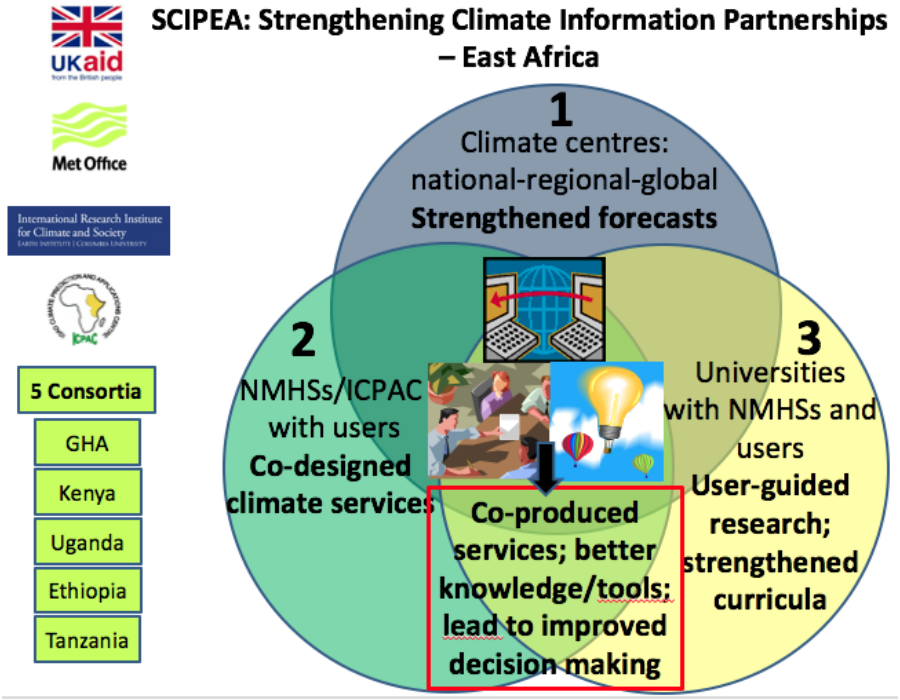


Figure 7: SCIPEA Co-Produced Services w/ Climate Centres, NMHSs/ICPAC and Universities

- The Data Portal and Maprooms
  - The SCIPEA Portal - enhanced access to Global Producing Centres' seasonal forecasts and associated climate data – facilitating integration into the forecast and service delivery process
  - Model forecast data is automatically updated on the ICPAC portal as soon as released
  - Forecasts are updated each month – aiding seasonal forecast updates: rolling forecasts – e.g. SON, OND, NDJ, DJF
  - The model output from these models and UKMO is now available in the ICPAC Data Library as part of DFiD's WSIER SCIPEA Project
  - SCIPEA portal: data download and visualisation

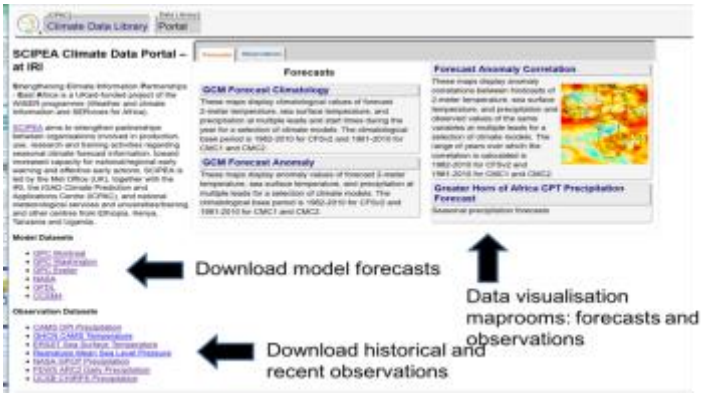


Figure 8: Screen shot of SCIPEA Climate Data Portal housed on the IRI Data Library

- Maprooms: Quick visualisation of the forecast, and forecast skill as well as observational information

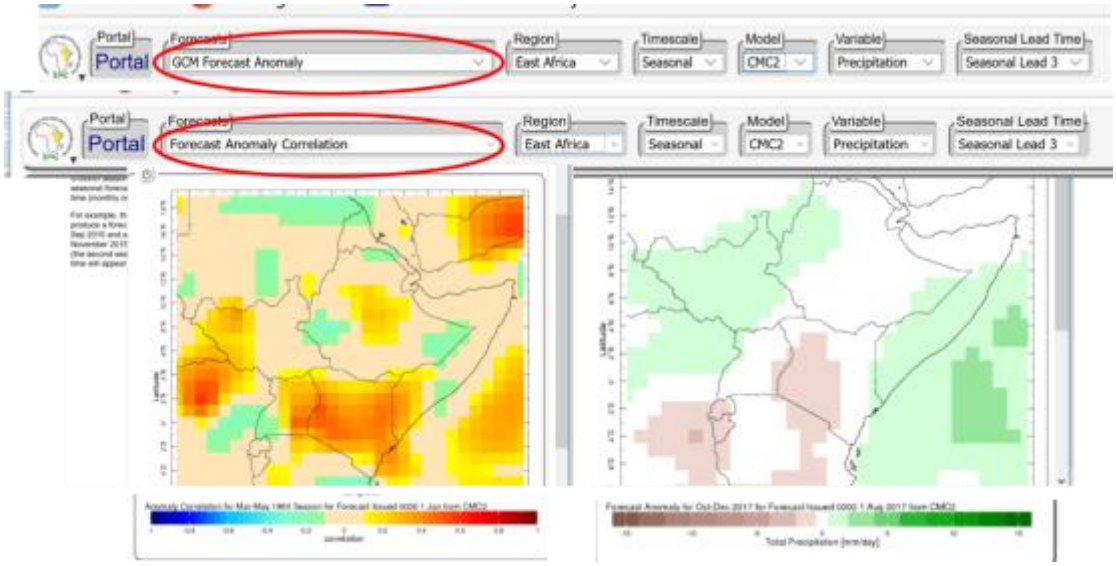


Figure 9: Screenshots of Maprooms within the SCIPEA Portal

- Summary
  - The SCIPEA data portal has made a step-change improvement in access to model-based seasonal forecasts and other data by East African climate centres
  - Developed by IRI with inputs from SCIPEA partners
  - The portal draws on large database of climate data on the IRI data library – and "points" directly to data needed for seasonal forecasting
  - Data updates every month at ICPAC host (mirrored at IRI)
  - With associated SCIPEA tools and training the portal has increased capacity of ICPAC and NMHSs to serve the climate information needs of users

ENACTS Climate Data and Maproom Tools
Presenter 3: Tufa Dinku (IRI)

The ENACTS (Enhancing National Climate Services) initiative, led by the International Research Institute for Climate and Society (IRI) of Columbia University, is a unique, multi-faceted initiative designed to bring climate knowledge into national decision-making by improving availability, access to, and use of climate information. Availability of climate data is improved by combining quality-controlled data from national observation networks with satellite estimates for rainfall, elevation maps, and reanalysis products for temperature. Access to information products is enhanced by making derived information products available online. The use of climate information is facilitated by engaging and collaborating with potential users.

ENACTS has already been implemented in the following eight African countries: Ethiopia, The Gambia, Ghana, Madagascar, Mali, Rwanda, Tanzania and Zambia, and there are plans to add at least two more in 2016. Implementation has already started in Kenya, and Uganda will follow

within a couple of months. ENACTS has also been implemented at a regional level in West Africa in collaboration with the Agriculture, Hydrology, and Meteorology (AGRHYMET) Center in Niamey, Niger. Implementation has also started at the IGAD Climate Prediction and Application Center (ICAPC) in East Africa

Key Messages:

1. Why ENACTS?
    a. IRI's Mission: is to enhance society's capability to understand, anticipate and manage the impacts of seasonal climate fluctuations in order to improve human welfare and the environment, especially in developing countries.
        i. ENACTS is a very good means/vehicle by which IRI can fulfill its mission, particularly in Africa
    b. Climate data is the foundation of Climate Services
2. What is ENACTS?
    a. ENACTS is a unique, multi-faceted initiative to build capacity to incorporate climate information into national decision-making for development by improving availability of, access to, and use of climate information.
    b. Three Components of ENACTS
        i. Enhance access
        ii. Improve data availability
        iii. Promote use

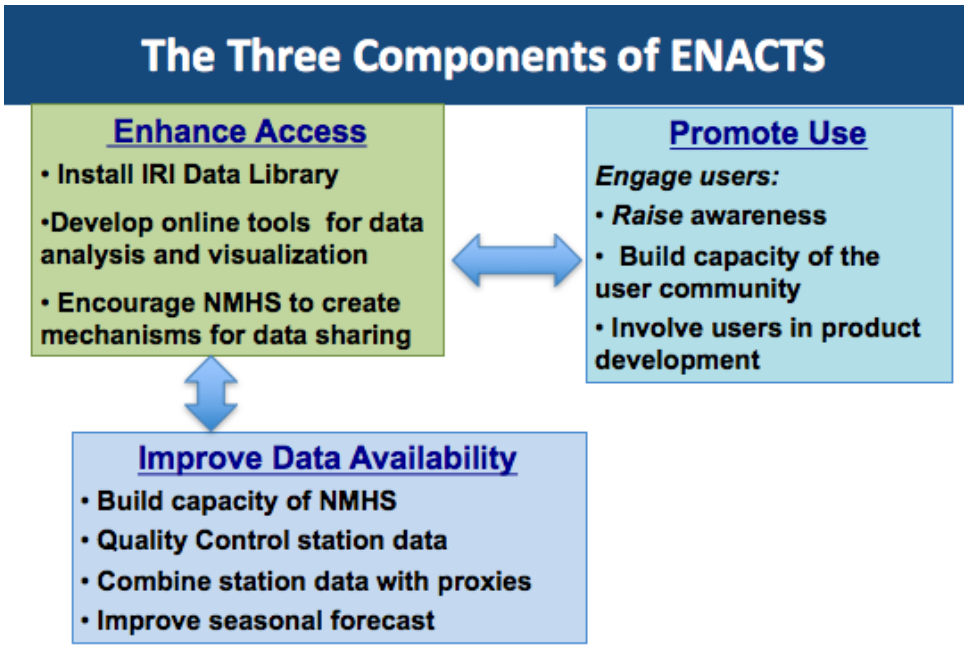


Figure 10: The Three Components of ENACTS - Enhance Access, Improve Data Availability, and Promote Use

3. How is ENACTS Implemented?
    a. Via the three components: improve availability, enhance access, and facilitate use

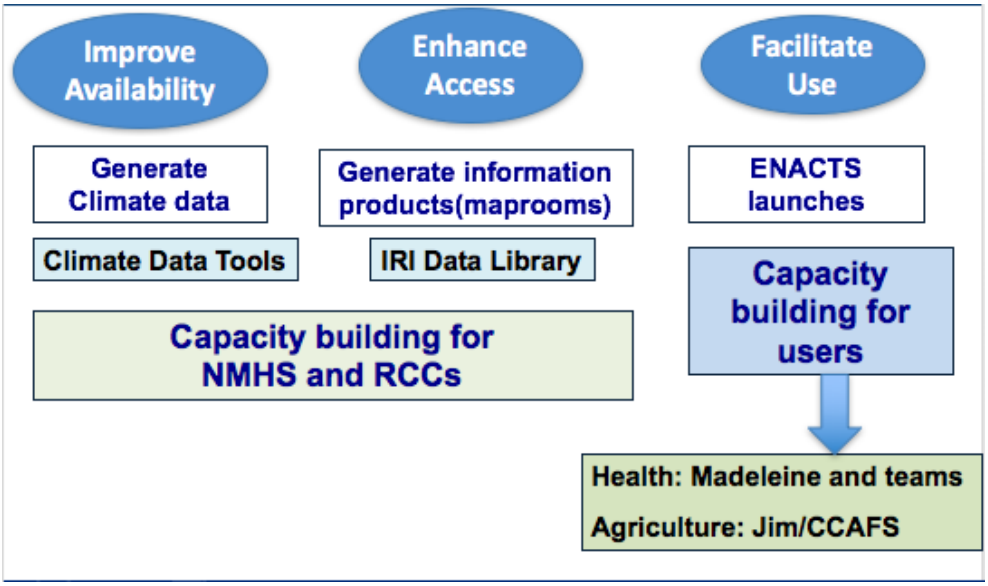


Figure 11: Implementation of ENACTS

b. At the country and regional levels

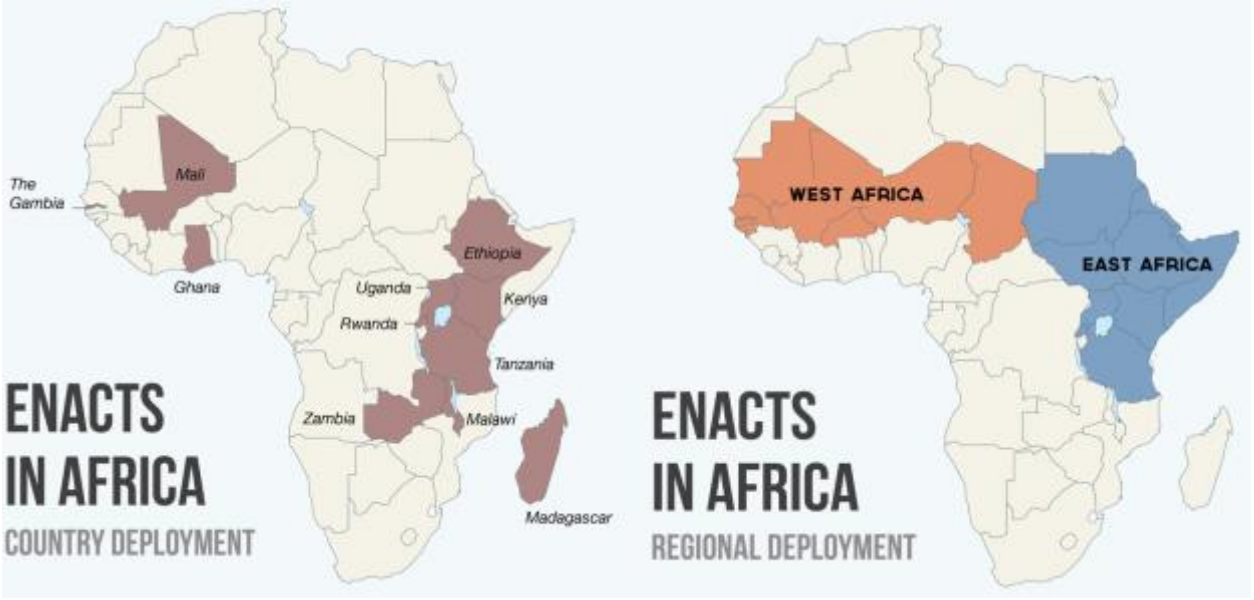


Figure 12: ENACTS Implementation in Countries and Regions

4. Main Strengths

a. Assess data availability – This has helped the NMS look at their own data in a different way
b. Data quality control
c. Use of historical data – Making use of data from the 'good old days'
d. Use of all nationally available data
e. Unprecedented online access to information products

i. The Maprooms are just demonstrations of what can be done with improved climate data and the IRI Data library
ii. Many more additional climate information products can be generated

5. Major Challenges
    a. Sporadic funding
    b. Slow uptake by NMHS
    c. Slow uptake by users
    d. Sustainability issues
6. Opportunities
    a. Climate Services is the focus of the day at global, regional, and national levels.
    b. There are a lot of challenges to improving climate services that ENACTS can overcome.
    c. We just need to be able to sell it properly

Discussion/Q&A - Questions from the Audience:

Questions for Philip Omondi (ICPAC):

Q1: Are the ICPAC drought tools operational, following WMO standards, and being used by the communities?

- ***Omondi (ICPAC):*** *The tools are there but awareness and expertise is not still up to par. A few of the WMO indicators are outside the reach of ICPAC. They use less that 50% of the indicators, due to limitations in internet for example. The health people reply on the monitoring tools.*

Q2: Most of the ICPAC activities are monitoring when drought has occurred but how do we predict or are we able to with a lead time of 6 months?

- ***Omondi (ICPAC):*** *The tools are existing such as IRI and UK met models but since drought creeps in it is hard to know when drought starts. The indicators we look at also progress with time. The situation varies from place to place and any forecast cannot be implemented unless we have a multi risk hazard put in place.*

Q3: What is the problem with obtaining the data to produce drought forecast?

- ***Omondi (ICPAC):*** *We do not have all the arrays of data needed to monitor drought. A Maproom is a very simple way for a non-scientist to manipulate the data and use. There is still a "Firefighting" approach in countries, and they do not use the drought alert.*

Questions for *Oliver Kipkogei (ICPAC)*:

Suggestion: *Having a plan to do a model assessment within the regions and put some plans and strategy.*

Q1: What is exactly is SCIPEA doing in comparison to IRI/ENACTS?

- ***Kipkogei (ICPAC):*** *Portal is a contribution by IRI e.g. to access data that needs to be used by CPT*

Q2: We understand consensus forecasts but who moderates the rolling forecasts?

- ***Kipkogei (ICPAC):*** *Rolling forecasts are new and are currently not governed by a consensus.*

Questions for Tufa Dinku (IRI):

Comment from Erica Allis (GFCS): *We need to find ways to disseminate this information within your communities*

Q1: We have tried to promote the use ENACTS within the agency and it is still not there. But what are the predictors used in ENACTS? What is the reliability of the forecasts?

- *Dinku (IRI):* *Met services should use ENACTS, and we have made sure they are not overlooked. ENACTS does not produce forecasts we just use CPT forecasts to use those outputs to generate the maps. The met agency should be in charge of addressing the reliability question.*

Q2: Sustainability issue on ENACTS?

- *Dinku (IRI):* *The more it expands the more IRI is expected so we are trying to build expertise within the region.*

Q3: Is there a danger of using ENACTS Maprooms and not use the national met services?

- *Dinku (IRI):* *No, the met services host the maprooms, it is their data and their products.*

Comment: *ENACTS should be documented and followed up as it is an elite knowledge in climate and weather.*

Q4: What is the blending aspect?

- *Dinku (IRI):* *We use TAMSAT for blending for rainfall, and climate model reanalysis for temperature.*

Q5: How do we link the user with researchers and allow them to connect and build synergies for the benefit of farmers for example?

- *Dinku (IRI):* *We use extension systems that take the Maprooms to the users.*

Day 1: Summary of Country User Experiences w/ Maproom Tools

Moderator: Madeleine Thomson (IRI)

- *Panelist 1 (Kenya): Maureen Anyango (ICPAC), Use of SCIPEA Maprooms and Portal*
- *Panelist 2 (Ethiopia): Adugna Woyessa (EPHI), Use of NMA ENACTS Maproom and ENSO/Malaria Analysis*
- *Panelist 3 (Rwanda): Gloriose Nsengiyumva (CIAT-Climate Services for Agriculture Project), Use of Rwanda Maprooms/PICSA*
- *Panelist 4 (Tanzania): Sumaiyya Thawer (MOH/NMCP), Use of Maprooms in NMCP Surveillance Guidelines*
- *Panelist 5 (Kenya): Maurine Ambani (CARE/ALP), Use of Maprooms in PSP/Education*

Key questions and answers of the session:

Q1. How are met service and SCIPEA portal linked?

- *Anyango (ICPAC):* *SCIPEA is trying to strengthen the link between national and regional met services*

Q2: What are the variables you look at in ENSO with malaria? and what other conditions apart from ENSO are playing a factor?

- *Woyessa (EPHI):* *The malaria epidemic in Africa is not well recorded. Through publications we noticed that we can see the years when El Niño occurs but looking at min temperature. There are non-climatic factors that affect malaria such as migration due to socioeconomic issues. Ethiopia*

is a complicated landscape hence we need to zoom into specific areas. Ethiopia has 51% of highlands of Africa. The underlying cause of malaria is the rise of minimum temperature and in El Nino the high temperature is present in summer so the limited water present is a great breeding site for mosquitos.

Q3: Are you dealing with individuals or a group of farmers? How are you engaging the different agents that can help revise their plans? How do you accommodate indigenous knowledge (for PICSA)?

- *Nsengiyumva (CIAT-Climate Services for Agriculture Project): PICSA doesn't go to each farmer, but we train the partners and the partner trains the farmer on PICSA. The work is hosted at CIAT which are agronomist, met agency and agricultural experts in Rwanda. Making use of the climate services information and is discussed with the farmers. But indigenous is not used and I do not have knowledge on that.*
- *Ambani (CARE/ALP): There is more trust on the Met agency, whereas the indigenous knowledge, the language might be too ambiguous.*

Q4: Why do you prefer DHIS rather than HMIS?

- *Thawer (MOH/NMCP): We also use survey data but we use DHIS because it is monthly and easily available and has recently approved with 90% reporting rate. We also have composite database that we plan on getting from different sources and monitor them at the same time.*

Q5: ENSO is an inter-annual variability and we should not make assumptions because there are other factors that come into play. Is there a threshold for minimum temperature? Enhancing Observation and monitoring was not mentioned why?

- *Woyessa (EPHI): The ENACTS Maprooms have helped in the research of malaria and climate but it does not hold all the answers. Most of the malaria cases are documented during the drought years. We did literature review to see the abnormal conditions (above or below normal) predispositions for malaria. Epidemiologists have a view on it using observations.*

Q6: What is the malaria surveillance in Ethiopia, and is the malaria map now representative enough?

- *Woyessa (EPHI): Yes, we have surveillance and it is a strong one such as HMIS, DHS where there is a weekly reporting system coming from the health posts. Weekly reporting starts from district level and is passed to the national health stakeholders.*

Day 2: Summary of Rotating Hands-On Training



Figure 13: Jim Hansen (IRI) and Asher Siebert (IRI) giving a demonstration of the CCAFS Rwanda Maproom for Rotating Hands-On Training. Photo Credit: Catherine Mungai (CCAFS)

This session was composed of three training sessions for past/historical, present/ENSO, and future/forecast products and tools. Designated facilitators and experts (as seen below) then guided the large group through short, 1-hour training sessions and demonstrations of the Maproom products and tools. Individuals were asked to take notes and observations, and asked questions about the Maprooms during these sessions.

TRAINING 1	TRAINING 2	TRAINING 3
Past/Historical Products and Tools	Present/ENSO Products and Tools	Future/Forecasts Products and Tools
FACILITATORS: 1. Tufa Dinku (IRI) 2. Yohana Tesfamariam Tekeste (IRI) 3. Jasper Mwesigwa (ICPAC)	**FACILITATORS:** 1. Madeleine Thomson (IRI) 2. Adugna Woyessa (EPHI) 3. Victor Massam (TMA)	**FACILITATORS:** 1. James Hansen (IRI) 2. Asher Siebert (IRI) 3. Floribert Vuguziga (Rwanda Meteo)

Day 2: Summary of Working Groups by Sector: Maproom Improvement and New Development

Ambani (CARE/ALP) facilitated this session, inviting all participants to divide their three (3) sectorial groups. She then explained how Maproom improvement and new development required an enhanced approach to goals, recommendations and solutions. She then gave a brief presentation and introduction on strategic and tactical recommendations, emphasizing that strategies should be seen as overarching plans and tactics are the means used to achieve specific objectives.

1. The difference between Strategic and Tactical Decision-Making and Recommendations

STRATEGIC	TACTICAL
Direction	Implementation
Strategy statement	Annual plans
Broad	Specifically detailed
Unstructured	Structured
Problem solving	Problem solving
Creativity	Analytical
External focus	Internal focus
Irregular	Regular
Long term	Short term
Difficulty to evaluate	Easy to evaluate
Senior management	Middle-level management

2. Malaria Example

Goal: manage climate related risks in malaria control and elimination

STRATEGIES	TACTICS
Help reduce the burden of ill health and deaths in Africa by enabling climate smart malaria control	Seed ENACTS into multiple training opportunities as resource
Routine incorporation of climate in to malaria planning, implementation and assessment activities of Key malaria players – WHO, PMI, WMO	Targeted research publications showing evidence of value of quality ENACTS data
Long term partnerships committed partnerships with national players (EPHI, NMHSs) etc.	Health and Climate Colloquium to give visibility and confidence to partners
Building body of knowledge – from research to field experience and making it widely shared	Book project to provide concrete resource to health community going forward
Large scale funding for Partners and IRI for long term activities.	Small to medium project grants to fund IRI staff to do specific work.
	Attendance at specific meetings to help drive strategic long term objectives – e.g. recent WMO meeting

After the explanation and group exercise instructions (below), Ambani asked the groups to brainstorm challenges and corresponding strategic and tactical recommendations for the improvements and new

development of Maprooms for their particular sector based impressions during the rotating training sessions.

Instructions:

1. Based on training, exercises, and the framing questions (at the end of these slides) brainstorm specific STRATEGIES and TACTICS for improvement of the Maprooms showcased and developments for new ones. Feel free to CREATE and DELIBERATE over other relevant questions as well.
2. A chair been selected; however, as a group, please select a scribe/rapporteur.
3. If there are more than seven (7) individuals in your sectorial groups, please split into subgroups so that everyone can participate in discussion and contribute to recommendations. There are two sessions - use the first to brainstorm, and the second to pull your entire sector together and coalesce the recommendations
4. Once you have finalized your strategic and tactical recommendations, please have your scribe/rapporteur transfer these to 2-3 PPT slides to present during session for Day 3.

Framing Questions for each of the Three (3) Sectorial Groups:

Agricultural Group

1. What are you experiences in using the Maproom products and tools?
2. What Interventions are available for managing drought risk in Agriculture and Food Security sectors?
3. What role does climate–related information play in drought risk management?
4. Are the Maprooms adequately responding to the constraints and the needs of the Agricultural Sector?
    1. Responses and strength
    2. Challenges and needs for improvements
    3. Other challenges and gaps that affects drought monitoring
5. What needs to be done to improve the Maproom to make it more efficient?



Figure 14: Maurine Ambani (CARE) answering questions about the Maprooms with the Agricultural Group during the recommendation session. Photo Credit: Catherine Mungai (CCAFS)

Health Group

1. What are you experiences in using the Maproom products and tools?
2. What Interventions are available for managing drought risk in Health sector?
3. What role does climate–related information play in drought risk management?
4. Are the Maprooms adequately responding to the constraints and the needs of the Health Sector?
    1. Responses and strength
    2. Challenges and needs for improvements
    3. Other challenges and gaps that affects drought monitoring
5. What needs to be done to improve the Maproom to make it more efficient?



Figure 15: Sumaiyya Thawer (TZ MoH) demonstrating the Tanzania ENACTS Health Maprooms. Photo Credit: Catherine Mungai (CCAFS)

Disaster Risk Management Group

1. What are you experiences in using the Maproom products and tools?
2. What is the potential for ENACTS products and services to meet those needs at a national level? e.g:
    a. What do you see as major opportunities looking forward?
    b. What barriers need to be overcome to get those opportunities?
3. What are the needs for climate services tools and information? (With a emphasis on drought) e.g:
    a. What are the Disaster Risk Management issues related to drought?
    b. Do you use climate information? If Yes… What tools do you use?
    c. What have you learned from the hands-on training session?
4. What are the barriers to a successful uptake and how can they be overcome? e.g:
    a. What are the challenges in using Maproom/ Climate Information in disaster risk management decision making processes?
    b. What recommendation do you have on the current Maprooms (i.e. content and design)?
    c. What recommendation do you have on the new Maprooms to be developed (i.e. content and design)? Including drought related tools.
    d. What new/additional partnerships (NMHS, school of Public Health, Emergency Response) and capacities would you recommend for using climate information and Maprooms for disaster risk management decision making?



Figure 16: Tufa Dinku (IRI) fielding questions about the Maprooms to the DRM Group. Photo Credit: Catherine Mungai (CCAFS)

Day 3: Summary of Presentations and Discussion from Day 2 Workshop Groups

Chair(s): Jasper Mwesigwa (ICPAC) and John Obita Pangech (South Sudan Ministry of Agriculture)

- *Group 1 (Agriculture)*
- *Group 2 (DRM)*
- *Group 3 (Health)*

As per the instructions from the previous day, each sectorial group was given time to present their reactions and thoughts in using the Maprooms. Each group had their own unique way of presenting their recommendations. Some chose to give their first impressions, others chose to answer each framing question, but all provided strategic and tactical recommendations for Maproom improvement and development. Below are the consolidated lists of the recommendations from each group:

AGRICULTURE GROUP – RECOMMENDATIONS

STRATEGIC	TACTICAL
• Improve packaging of the products to fit user needs	• Build more awareness on the capabilities and what can be done with Maprooms, including packaging Maprooms with training materials
• Incorporate Maproom the products into apps, agro-meteorological advisories and alerts	• Improve options for assessing onset of the rainfed growing season
• Include Soil Moisture and Relative Humidity as part of drought monitoring parameters	• Maintain the current flexibility for advanced users, and develop a simpler interface for general users
• Enhance collaboration among the NMHS, with research institutions, and line ministries at the National level to ensure sustainability	• Add Effective Rainfall to the Maprooms
• Promote the mainstreaming of the ENACTS approach into strategic planning of the NMHS	

HEALTH GROUP – RECOMMENDATIONS

STRATEGIC	TACTICAL
• Extend Maproom tools to other priority climate-sensitive diseases and health conditions (e.g. vector borne diseases - Dengue fever, yellow fever, Lymphatic Filariasis), water borne diseases (cholera) and health-related diseases (malnutrition).	• Use Maproom tools for planning of disease control interventions including surveillance activities.

• Create an interface to upload non-climate data e.g. epidemiological data.	• Incorporate learning of Maproom tools into postgraduate training e.g. FELTP epidemiology
• Develop offline access to the Maproom tools especially during training sessions due to network challenges.	• Create platform to extend partnership across various sectors such as agriculture, nutrition, international health regulations and global security.
• Link Maproom tools to the health management information systems of the countries e.g. DHIS2.	• Create awareness and advocacy on importance of climate information in the health sector through various channels such as policy briefs, health blogs, health bulletins, climate links on institutional websites.
• Increase capacity building to equip health professionals on the usage of Maproom tools and incorporating biostatisticians and geospatial experts in the health sector.	• Increase capacity building on the use of Maproom tools – Have master trainers from each country who can then cascade the training in their respective countries.
• Raise awareness on the existence of the Maproom tools and its benefits among health professionals.	• Participate in local and international conferences related to climate.
• Strengthen engagement between climate and health policy makers on the benefits of Maproom tools for decision making and understanding the challenges of climate from the policy context.	
• Extend the establishment of the Maprooms in all member countries of ICPAC.	
• Make available disaggregated data at sub-national levels	

DRM GROUP – RECOMMENDATIONS

STRATEGIC	TACTICAL
• Harmonize Maprooms Colors and Codes	• Develop capacities of national users to use IRI Maprooms
• Ensure usage of IRI Maprooms at national level while considering internet challenges	• Provide offline access (Stand-alone versions) with Mobile friendly interface mode
• Develop and maintain partnerships with development, humanitarian, academia institutions, Town/City Municipalities, Private Sector at national level	• Generation of partnerships (MOUs) at national level through NMHS

• Develop capacities of national users to use IRI Maprooms	• Dissemination, prepositioning and collaborative research of predictive of weather and climate

Day 3: Summary of Climate Service Co-Development through User/Provider Interaction Panel Session

Moderator: Tracy Small (UKMO)
Introductory Presentations:

- *WISER-SCIPEA Climate Service Development Teams and Prototype services, Richard Graham (UKMO)*
- *Climate service development approach at TMA – Ladislaus Chang'a (TMA)*

Panel Session:

- *Willis Ochieng (KenGen, Kenya)*
- *Jasper Mwesigwa (FSNWG/ICPAC)*
- *Hakuza Annunciata (MAAIF, Uganda)*
- *Ladislaus Chang'a (TMA, Tanzania)*
- *James Muhindi (KMD, Kenya)*
- *Joseph Mutemi (KMD, Kenya)*
- *Discussion/Q&A*

Title: WISER-SCIPEA Climate Service Development Teams (SDTs) and Prototype Climate Services (PCSs)
Presenter: Richard Graham (UKMO)

Key Points:

- Strengthening partnership on 3 levels:
  - Global centres; ICPAC and NMHSs: to strengthening access to and use of climate model-based forecasts
  - Users and climate providers (4 NMHSs and ICPAC): to strengthen user engagement and develop prototype climate services
  - NMHSs and academic partners:
    - Strengthen capacity retention through developing seasonal



Figure 17: Richard Graham (UKMO) giving a presentation about the WISER-SCIPEA Climate Service Development Teams (SDTs) and Prototype Climate Services (PCSs). Photo Credit: Catherine Mungai (CCAFS)

forecast training modules and assisting with service development
        - Assist with science insight to Prototype Climate Service development
- Service Development Teams (SDTs)
    - Each of the 5 climate provider partners selected 2 user partners they were already engaged with
        - Those selected are in the agriculture, food security, DRR, water, energy and media sectors
        - The users, NMHS partners and academic partners formed the core of the SDTs
    - The SDTs were tasked with:
        - defining the user's priority requirements for seasonal climate forecast information
        - researching potential and co-developing Prototype Climate Service products to address the requirement
- SDT's mode of working
    - Core Service Development Teams (SDTs): established and met 3 times (as part of larger SCIPEA project meetings)
    - Intensive 1-2 day workshops were held at users organization HQs – other stakeholders also included
    - Feb. 2017: tabulation of (10) user requirements finalized, components include:
        - timely (earlier) issue; "rolling" forecasts; onset timing; temporal frequency; rainfall amounts; drought indices, reservoir inflow, crop yield
    - Science visits by NMHS and academic partners to IRI and Met Office – to facilitate research and develop services
    - Results fed back to users – August 2017
- Experimental services for OND 2017
    - 2-3 page documents containing agreed climate information products
    - Moving towards ideal requirement while retaining scientific justification
    - As per agreed target - so far for just for 3 of the 10 active users
    - FSNWG, KenGen, Kenya Red Cross Society
    - Services are real-time for Oct-Dec 2017 season, but experimental – precedence of operational forecasts emphasized
    - First review by users was on GHACOF47
    - Next: Continue development cycle: evaluate; review; re-design; re-trial

Title: Climate service development approach at TMA
Presenter: Ladislaus Chang'a (TMA)

Key Points:

- Reason for Concern
    - Livelihoods and socio-economic sectors are increasingly impacted by climate variability and change
    - More than 70% of all natural disasters are hydro-meteorological related
    - Large Gaps in Observation and Monitoring
    - Challenges in Availability, Accessibility and Application of information

    - Keeping pace with rapid changing and evolving technology
    - Increasing needs and demand for high resolution climate information
- Aligning Services Provision to National Development Vision, Policies Strategies, and International Agenda and Goal
    - National Development Vision (Vision 2025)
    - National Climate Change Strategy and other policies and strategies
    - East African Climate Change Strategy
    - Sustainable Development Goals
        - 1. No Poverty
        - 2. Zero Hunger
        - 3. Good Health and Well Being
        - 4. Climate Action
    - Global Framework for Climate Services (GFCS)
- Establishing Agency Vision and Mission
    - Vision - To stand out as a center of excellence in accelerating the National Development Vision through provision of world class meteorological services
    - Mission - To provide quality, reliable and cost effective meteorological services to stakeholders' expectations thereby contributing to the protection of life and property, environment and national poverty eradication goal.
- Developing five Year Strategic Plan, Annual and Action Plan
    - Climate Services Development approach is linked to the five-year strategic plan which has 6 GOALS
        - a) Infrastructure Development - Modernization of Infrastructure for
            - Observation and Monitoring Infrastructure
            - Data processing, analysis and forecasting Infrastructure
            - Data rescue and archival process and DBMS Infrastructure
        - b) Human Capacity Development – Enhancing human capacity
            - Agro-meteorological services and NWP – Meteorologist
            - Weather Observation – Meteorological Assistants
            - Data processing, Analysis, Forecasting and Visualization
            - Building Staff capacity to utilize ENACTS MAPROOM
        - c) Technological Development
            - Developing Locally based tools and software for enhancing effectiveness
            - Acquiring and adopting new and latest technology including AWS
        - d) Establishing and developing effective Service Delivery processes and Procedure
            - Reviewing Organization Structure to accommodate emerging needs
            - User engagement Strategy and being Customer focused
        - e) Promoting Education and Awareness on Climate Services and CC
- Enhancing User engagement in core-production and promoting Meteorology and application of climate
    - Following & embedding the WMO Service Delivery Framework into our way of working



Figure 18: The WMO Service Delivery Framework

- Tanzania Meteorological Agency (TMA) & the Met Office have worked together to establish and operationalize user-engagement strategy at TMA and enhancing services delivery through:
- User-engagement:
  - i. Identification of priority areas (Agriculture, Water and Energy) through desk research
  - ii. Mapping user needs
  - iii. Establishing Stakeholders Manager
  - iv. Establishing Sector Stakeholders Champions for respective priority areas
  - v. Enhancing the capacity of zonal manager and stakeholders' champions in effectively engaging users
  - vi. Working to improve packaging of seasonal forecast
  - vii. Improve communication - organizing media training for zonal Managers
  - viii. Understanding their needs and promoting climate services application

- Enhancing National and International collaboration
  - Enhancing Collaboration with Higher Learning and Research Institutions within and outside the Country (example in GFCS)
  - Working closely with MEDIA and stakeholders from climate sensitive sectors including NGOs
  - Recent Collaboration with IRI, UKMET, PREPARED and ICPAC have been very useful in the improvement of service delivery
  - The need to involve private sectors
- Implementing GFCS and Developing and Operationalizing National Framework for Climate Services
  - Inception Meeting about GFCS concepts
  - Stakeholders consultative workshops: understanding user needs and NMHS capacities
  - Setting out priorities and choosing pilot areas
  - Setting three tier governance structure – PSC, NSC and PDT

- Implementation of agreed GFCS activities
- Key achievements and outcome:
  - The Establishment of the Platform (DRR platform) for sustained dialogue between Provider and User of climate services
  - TANDREC taking the role of the National Steering committee for GFCS implementation and Establishment of the National Framework
  - National Framework is in the final stage of development: four stakeholders workshop has been organized to discuss and review the draft
  - Lesson learned, best practices and experience gained in the implementation of GFCS in Tanzania are being documented in a Book, which will be finalized by the end of the year or early next year

- Conclusion and Recommendation
  - Climate Services development need to be user and demand driven
  - User-Engagement Strategy and Customer focus is an important part of climate service
  - Establishing mechanisms or platform for sustained dialogue between Provider and User of Climate Services
  - Preparing National Framework for Climate Services
  - As much as possible Use existing structure in the establishment of platform or governance
  - It is important to sensitize and engage Private Sectors in climate services development
  - Establishing mechanism within NMHS to sustain and enhance the application of ENACTS



Figure 19: Tracy Small (UKMO) moderates SCIPEA-user panel session. Photo Credit: Catherine Mungai (CCAFS)

Key panel questions and answers of the session:

Q1: WHY the emphasis on co-development? We often hear that one-to-one working of climate providers with users is crucial in developing climate services. As a user in an agricultural early warning unit – can you give some examples of how this approach can overcome barriers experience to date?

- *Annunciata (MAAIF, Uganda) – The main concern is the timeliness of forecast. In agriculture, we get the forecast and internalise. The government gives seeds to farmers and then a forecast was held to advise the halt of seed distribution because of the lack of rains in November. Now we receive monthly updates from the met agency. We should include policy makers into the forecast. Users need to participate in adding value to the forecast (e.g. how much above normal). Users also add value to how you communicate to decision makers. Currently the Maprooms will be useful in getting a forecast for a particular location and giving it to a minister so that they are confident in what they are saying when presenting to parliament. I chair a technical committee to analyse food security for the past and coming season, and it needs a forecast. The Maproom would give more detailed information*

including climate, to speak with confidence and justification. And the use of climate information could be used to analyse shifts in agro-climatic zones.

Q2: HOW should interactions between climate providers and users take place? TMA have done considerable work in this area. As a climate information provider can you tell us what mechanisms have been well tried and tested?

- *Chang'a (TMA) - Mechanisms for engagement have been well received; however, we need to move from business as usual scenario and be more proactive and innovative on how we engage with our user. User engagement strategy is the core of our work and the work is more user driven. We are broadening the engagement on the different sectors. We are looking for user champions and stakeholder champion expecting on marine and fishery champions as well just like the ag etc.*

Q3: WHAT are the potential benefits in terms of decision making? In your role on the Regional Food Security and Nutrition working group you have been working with ICPAC in the Regional SCIPEA Service Development Team – could you describe the changes in forecast information that resulted from the team's deliberations and the impacts?

- *Mwesigwa (ICPAC) - Early information, good analysis of information, dissemination helped to reduce food insecurity in the region. Once the forecast for the season was received the alert was formulated and was sent out. The scale of famine and death in the season was not as big as 2010 because of the alerts.*

Q4: WHAT's next? As a climate provider working in the Kenya Service Development Team what are the key benefits from KMD perspective and how do you see the process moving forward over the next say 5 years?

- *Mutemi (KMD) – It was very entertaining to see the competitive side of the media to be the first one to release the alert or forecast on drought. National agencies' have not have established a communication officers and they are vital because they are the "mouthpieces" and national channels in communication of climate information. The benefit of engagement of training journalists on the terminology of climate and its impacts. At ICPAC, now the climate information news is highly requested.*

Q5: WHAT are the potential benefits in terms of decision making? As a decision maker in a very different sector, that of Energy Planning. How has the Kenya Service Development Team worked in your case and what are the potential benefits?

- *Ochieng (KENGEN) - Before we started our partnership with KMD, it was BAU strategy to assess the impact of a forecast, and there were only monitoring tools. Now there are interactions to incorporate forecast into planning. However, specific information needed and it needs to be in a specific format. This will require the understanding of the KENGEN system and how to use info. The climate information is needed early enough to plan rather than planning to avoid crisis. Power rationing did not happen as planed to close the major reservoir for only 3 weeks.*

Q6: WHAT's next? As a climate provider working in the Kenya Service Development Team what are the key benefits from KMD perspective and how do you see the process moving forward over the next say 5 years?

- *Muhindi (KMD) - Engagement with users such as KENGEN has made KMD become a stronger institution in our services. We are not just giving a forecast for the sake but with thinking of how it will help the user. There is the possibility of drought forecast with KRC and the ingestion of dam and water catchment data. We are hopeful that in the coming years (5 years) we will be able to incorporate all the sectors, test more prototypes in order to evaluate, redesign, and review.*

General Questions from the Audience:

Q1: In Uganda, are met agencies the only ones allowed to release forecasts, and are they only for the ag sector?

- *A1: The met agencies have easily and readily-prepared information for Ag sector but not for the health sector. The met services should have products for the health sector or interpretation and also get user feedback. The only authority to release a forecast is the met agency for Uganda.*

Q2: What do the user champions do?

- *A2: Champions establish contact with user communities and are the focal point at a national and regional level. They also establish relationships so we can understand the merging issues.*

Q3: How can KMD, food security, and media work closely together to produce a forecast in time?

- *A4: ICPAC did have a joint media release but there was no agreement with whom should release it. Also, the media's capacity is still very limited so weather and climate information should still be requested from KMD.*

Q4: What challenges do you encounter?

- *A5a: The Food security sector has a hard time defining certainty and uncertainty. The timing of dry spells is a challenge.*
- *A5b: Infrastructure is a challenge especially in observations and monitoring. Timeliness is also a challenge especially in regards to onset. The rapid changing technology is also a challenge.*
- *A6c: The forecasts are seen at the country-level but now we need to be able to obtain them at the basin level.*

Day 3: Summary of "Looking Forward Presentation"

Title: Looking Forward
Presenter: Tufa Dinku (IRI)

Key Points:

- Availability: Data Products
  - Keep striving to improve data quality
  - Add more climate data products
    - Relative humidity
    - ET/PET
    - Wind
    - Solar radiation and Sunshine hours
    - Soil moisture
  - Improved seasonal and sub-seasonal forecasts
    - Including parameters other than total rainfall



Figure 20: Tufa Dinku (IRI) giving a presentation on the future of Maproom development and improvement. Photo Credit: Catherine Mungai (CCAFS).

- Access: Climate Information Products
  - Improved presentation of current products
    - Integration with other tools (Google layers, google charts, etc)

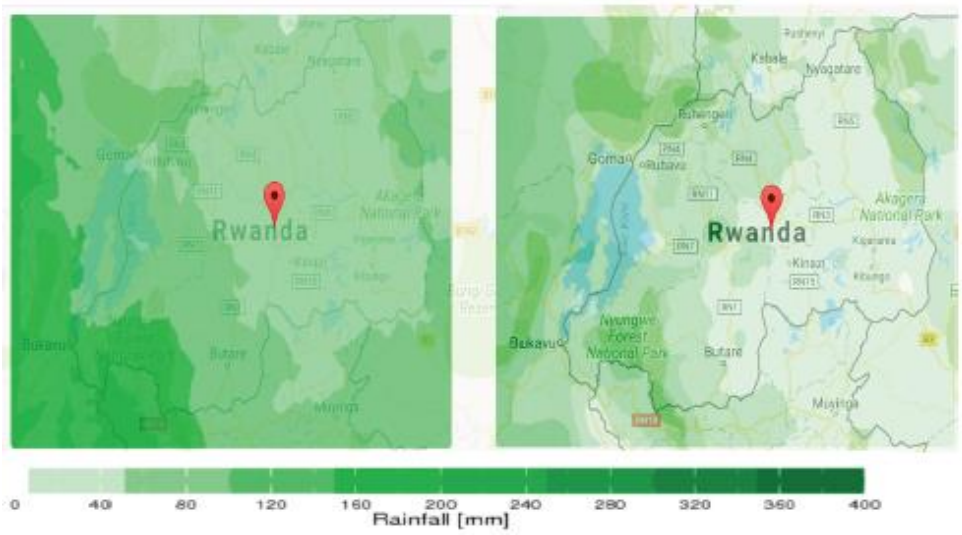


Figure 21: The integration of Google Layers into the Rwanda Maproom

  - Expand/add Sector-specific Maprooms:
    - Agriculture

        - Health
        - Disaster
        - Water
        - Energy
        - Tourism
    - Decision-support tools for specific applications
    - New technologies for dissemination
- Use: User Engagement and more
    - Very critical component
    - Requires:
        - Awareness raising
        - Training – professional training and formal education
        - Collaborations and co-developments
    - Needs to be jointly developed by user communities and NMHS and RCC
    - Should include use of ENACTS data and information products for operational activities, research and education:
        - Integrate ENACTS products and services into routine planning by operational sectors
        - Promote research at national and regional levels by fostering collaborations among NMHS, RCCs, national universities, research institutions, etc.
        - Use ENACTS data and information products to develop education materials for training/education at all levels (High school to University, specialized training institutions…)
    - NMHS need to create suitable mechanisms for sharing the ENACTS data products with operational partners, researchers, students and other institutions
    - User data upload and analysis
    - Climate data as a national resource for development – integrated into national databases that includes sectoral and socio-economic data
- Sustainability
    - National level
        - Constant dialogue and co-development between NMHS and users
        - Integrate ENACTS into NMHS operational activities
        - Making ENACTS part of NMHS core strategy to deliver improved climate services;
        - ENACTS could serve as the foundation for the implementation of GFCS at national level
    - IRI/Global level
        - So far only 12 countries in Africa has implemented ENACTS
    - ENACTS is a process: we need to strengthen existing countries while expanding to new ones;
        - We may also need to expand to other parts of the world
        - These all requires a lot of resources (financial as well as manpower)
        - This would be daunting for IRI to do it by itself

- Thus, collaborations with regional climate centers (ICPAC, AGHYMET, ACMAD, AMCOMET), global technical institutions(WMO/GFCS), other players (e.g. UKMO) would be needed.

Day 3: Summary of Panel Session: Information Providers Responding to User Priorities

Moderator: Tufa Dinku (IRI)

- *Panelist 1: Ladislaus Chang'a (TMA)*
- *Panelist 2: Edward Amoni (KMD)*
- *Panelist 3: Zewdu Segele (ICPAC)*
- *Panelist 4: Clement Boyce (Malawi DCCMS)*
- *Panelist 6: Amani Elrayah (Sudan Meteorological Agency)*
- *Panelist 7: Moses Ojara (UMNA)*



Figure 22: Tufa Dinku (IRI) leading a panel of NMHS personnel in a discussion about information providers responding to user priorities. Photo Credit: Catherine Mungai (CCAFS)

Tufa Dinku (IRI) posed the below three questions to the panelists and asked for their responses:

1. *What are the opportunities that your met agency has identified in relation to the development of climate services?*
2. *What are the challenges?*
3. *What are your priorities and upcoming plans going forward?*

- ***Ojara (UMNA):*** *We are looking to build the capacity of the UNMA starting with the minimum skills to our met agency personnel.*
- ***Segele (ICPAC):*** *Challenges include not knowing what the user really needs, so knowing their specific needs of the user is useful. Lack of operational research is a challenge as research is not emphasized enough. Also limit of data or the data exchange is an issue.*
- ***Changa'a (TMA):*** *Technological development is an opportunity and these kinds of workshop needs to be sustained. Challenges lie in infrastructure, observation and monitoring. Another challenge is how to sustain services as well as high resolution data. GFCS national framework implementation of the 4 pillars is also vital. Also, enhancing user engagement.*
- ***Boyce (Malawi Met):*** *The major opportunity for us has been the establishment of GFCS. Challenges are human and institutional capacity. In addition, the availability of info from internet is a challenge. Implementation of ENACTS is in the works but there is also a demand for other sectoral Maprooms including DRM.*
- ***Amoni (KMD):*** *There are now many more dissemination technologies are available for climate information. Terminology of the ENACTS 'below-' and 'above-normal' parameters are not easy to interpret. We need user friendly and cheap ways of accessing farmers - summarizing too much lets you lose a lot of information. The enhancement of country services is also necessary.*

General Questions from the Audience:

Q1: Do you see any role that the private sector can play? And what modality would be needed?

- *A1: We are enhancing the climate information and the private sector is welcome but the standard or quality of our services is necessary. We encourage collaboration with the climate change department where communities can really showcase in terms of resilience.*

Q2: We are still not meeting the demand of the user so how do you plan on doing that?

- *A2: We need a strategy…It needs to be demand and user focused and once again needs sector and stakeholder champions. We need to enhance this and sustain it.*

Q3: Are you planning on providing gridded forecast tools?

- *A3: ICPAC is already working on this - the forecasts that we produce are actually gridded so it can be re-gridded*

Q4: What countries are GFCS reaching?

- *A4: Malawi has started GFCS for the last 3 years from 2014. But the National technical committee still has to decide the final say on the implementation of ENACTS.*
- *A5: Effective implementation of the GFCS is useful. We are now working closely with Red Cross, WHO and other organizations. Need to document best practices.*

Q5: The research component is missing so how is this being addressed?

- *A6: We definitely need to have research; we have impressed mechanisms to enhance research and need to enhance our work with research institutions.*

Day 3: Plenary & Closing Remarks: CSRD Technical Exchange Workshop

Chair: Ladislaus Chang'a (TMA)

- *Presentation of Recommendations, Maurine Ambani (CARE/ALP)*

Closing Speakers:

- *Richard Graham (UKMO)*
- *James Hansen (CCAFS)*
- *Madeleine Thomson (IRI)*
- *Guleid Artan (ICPAC)*
- *Steve Zebiak (CSRD)*



Figure 23: Ladislaus Chang'a (TMA) gives closing remarks and thanks participants for attending. Photo Credit: Catherine Mungai (CCAFS)

Ambani (CARE/ALP) once again reviewed what had been accomplished over the course of the three days and presented the recommendations for improvements and new developments for the Maprooms. Closing remarks were then given by Richard Graham (UKMO), James Hansen (CCAFS), Madeleine Thomson (IRI), Gulied Artan (ICPAC), Steve Zebiak (CSRD), and Ladislaus Chang'a (TMA).

<u>Gulied Artan (ICPAC)</u>

Throughout the three days you have had a lot of discussions and interactions between users and the met agencies. We have acknowledged the need and demand for climate information in a timely manner from

all the various sectors. We have been able to get an introduction to the Maprooms and each sector has come up with recommendations which I am sure will be utilized and I hope that now there is adequate awareness on the Maprooms, you will be able to carry it forward and be the champions in your perspective field. Looking forward we hope to obtain better packaging of the maprooms, capacity building within ICPAC and countries as well as better collaboration with various sectors and met Agencies. I would like to thank the participants of this CSRD Technical Exchange workshop, which is one of the biggest technical exchanges of its kind within our region. Thank you also to the government of the Republic of Tanzania for hosting this workshop also thanks to CSRD, WISER, CCAFS, IGAD and IRI for all their facilitation for make this meeting a success.

- Graham, Hansen, Thomson and Zebiak thanked all participants and organizing staff for attending the first CSRD Technical Exchange Workshop and recalled/reviewed the progression of Maprooms. They asked for continual participation and collaboration from ICPAC, CCAFS, the IRI, the engaged NMHS,' and the sectors in order to promote the sustainability of the Maprooms.
- Within the closing remarks from Chang'a and Artan, they indicated the importance and timeliness of the workshop and urged all sectors and NMHS' to share the responsibilities of enacting the recommendations. Artan reiterated the role that ICPAC hoped to take in the uptake and technical assistance of the Maprooms across the region. Chang'a once again thanked everyone for traveling to Zanzibar and wished everyone well.

Appendices

Appendix 1: Agenda

Day 1: Wednesday, August 23, 2017 (Zanzibar Beach Resort)

Rapporteurs of Day: Yohana Tesfamariam Tekeste (IRI) and Oliver Kipokogei (ICPAC)

8:00-8:45
Registration

9:00-10.00
Opening Session: Official Welcome and Introductions
Chair: Steve Zebiak (CSRD)
Welcome Address: Elimpaa Kiranga (Tanzania Ministry of Agriculture)
Opening Remarks

- Steve Zebiak (CSRD)
- John Mungai (DFID/WISER)
- Guleid Artan (ICPAC)

10:00-10:30
Introduction to the Workshop (Outline) - Maurine Ambani (CARE/ALP)

- Basic Concept
- Method of Work
- Expected Outcomes

10:30-11.10
Group Photo & Coffee Break

11:10-12:30
Panel Session: Policy and Operational Needs for Drought-Related Disasters
Moderator: Dawit Solomon (CCAFS)

- Panelist 1 (Livestock): Hiatham Fadllala (Sudan Ministry Livestock)
- Panelist 2 (Agriculture): Hakuza Annuncita (Uganda Ministry of Agriculture)
- Panelist 3 (Health): James Sang (Kenya Ministry of Health)
- Panelist 4 (DRM): Brian Kanahe (Uganda Red Cross)

12:30-2:00
Lunch

2:00-4:00
Climate Data and Maproom Tools Presentations
Moderator: Erica Allis (GFCS/WMO)

- Presenter 1: Existing ICPAC drought risk analysis, monitoring and prediction tools: Philip Omondi (ICPAC)
- Presenter 2: WISER-SCIPEA Portal to the IRI Data Library and Maprooms: Oliver Kipkogei (ICPAC)
- Presenter 3: ENACTS Climate Data and Maproom Tools: Tufa Dinku (IRI)
- Discussion/Q&A

4:00-4:30
Coffee Break

4:30-5:30
Country User Experiences w/ Maprooms Tools
Moderator: Madeleine Thomson (IRI)

- Panelist 1 (Kenya): Maureen Anyango (ICAPC), *Use of SCIPEA Maprooms and Portal*
- Panelist 2 (Ethiopia): Adugna Woyessa (EPHI), *Use of NMA ENACTS Maproom and ENSO/Malaria Analysis*
- Panelist 3 (Rwanda): Gloriose Nsengiyumva (CIAT-Climate Services for Agriculture Project), *Use of Rwanda Maprooms/PICSA*
- Panelist 4 (Tanzania): Sumaiyya Thawer (MOH/NMCP), *Use of Maprooms in NMCP Surveillance Guidelines*
- Panelist 5 (Kenya): Maurine Ambani (CARE/ALP), *Use of Maprooms in PSP/Education*

5:30-5:45
Wrap-Up and Review of Day 1: Maurine Ambani (CARE/ALP)

Day 2: Thursday, August 24, 2017 (Zanzibar Beach Resort)

Rapporteur of Day: Yohana Tesfamariam Tekeste (IRI) – if necessary

8:30-9.00
Review of Day 1 and Introduction to Hands-On Training, Maurine Ambani (CARE/ALP)

9:00-10.00
Rotating Hands-on Training: Groups 1-3 (10-15 ppl in each group)

- Group 1: Past/Historical Products and Tools
  Facilitators: Tufa Dinku (IRI), Yohana Tesfamariam Tekeste (IRI), and Jasper Mwesigwa (ICPAC)
- Group 2: Present/ENSO Products and Tools
  Facilitators: Madeleine Thomson (IRI), Adugna Woyessa (EPHI), Victor Massam (TMA) and Steve Zebiak (CSRD)
- Group 3: Future/Forecasts Products and Tools
  Facilitators: James Hansen (IRI) and Asher Siebert (IRI)

10:00-11.00

Hands-on Training

- Past/Historical Products and Tools
  Facilitators: Tufa Dinku (IRI), Yohana Tesfamariam Tekeste (IRI), and Jasper Mwesigwa (ICPAC)
- Present/ENSO Products and Tools
  Facilitators: Madeleine Thomson (IRI), Adugna Woyessa (EPHI), Victor Massam (TMA) and Steve Zebiak (CSRD)
- Future/Forecasts Products and Tools
  Facilitators: James Hansen (IRI) and Asher Siebert (IRI)

11:00-11.30

Coffee Break

11:30-12:30

Hands-on Training

- Past/Historical Products and Tools
  Facilitators: Tufa Dinku (IRI), Yohana Tesfamariam Tekeste (IRI), and Jasper Mwesigwa (ICPAC)
- Present/ENSO Products and Tools
  Facilitators: Madeleine Thomson (IRI), Adugna Woyessa (EPHI), Victor Massam (TMA) and Steve Zebiak (CSRD)
- Future/Forecasts Products and Tools
  Facilitators: James Hansen (IRI) and Asher Siebert (IRI)

12.30-2:00

Lunch

2.00-3:30

Working Groups by Sector: Maproom Improvement and New Development

**If more than seven (7) Individuals, please divide into 2-3 subgroups*

- Group 1 (Agriculture): Chair: Dawit Solomon (CCAFS) and Group Selected Rapporteur
- Group 2 (DRM): Chair: Brian Kanahe (Uganda Red Cross) and Group Selected Rapporteur
- Group 3 (Health): Chair: James Sang (Kenya Ministry of Health) and Group Selected Rapporteur

3:30-4.00

Coffee Break

4:00-5:30

Working Groups by Sector: Maproom Improvement and New Development

**All groups come together to collect final list of recommendations and create presentation for Day 3*

- Group 1 (Agriculture): Chair: Dawit Solomon (CCAFS) and Group Selected Rapporteur
- Group 2 (DRM): Chair: Brian Kanahe (Uganda Red Cross) and Group Selected Rapporteur

- Group 3 (Health): Chair: James Sang (Kenya Ministry of Health) and Group Selected Rapporteur

5.30-5.45
Wrap-Up and Review of Day 2, Maurine Ambani (CARE/ALP)

Day 3: Friday, August 25, 2017 (Zanzibar Beach Resort)

Rapporteurs of Day: Yohana Tesfamariam Tekeste (IRI) and Catherine Mungai (ILRI)

9:00-9.05
Review of Day 2, Maurine Ambani (CARE/ALP)

9:05-10.30
Presentations and Discussion from Day 2 Working Groups
Chair(s): Jasper Mwesigwa (ICPAC) and John Obita Pangech (South Sudan Ministry of Agriculture)

- Group 1 (Agriculture)
- Group 2 (DRM)
- Group 3 (Health)
- Discussion/Q&A

10:30-11.00
Coffee Break

11:00-12.30
Climate Service Co-Development through User/Provider Interaction
Moderator: Tracy Small (UKMO)
Introductory Presentations:

- WISER-SCIPEA Climate Service Development Teams and Prototype services, Richard Graham (UKMO)
- Climate service development approach at TMA – Ladislaus Chang'a (TMA)

Panel Session:

- *Willis Ochieng (KenGen, Kenya)*
- *Jasper Mwesigwa (FSNWG/ICPAC)*
- *Hakuza Annunciata (MAAIF, Uganda)*
- *Ladislaus Chang'a (TMA, Tanzania)*
- *James Muhindi (KMD, Kenya)*
- *Joseph Mutemi (KMD, Kenya)*
- *Discussion/Q&A*

12.30-2.00
Lunch

2.00-2.15
Looking Forward - Short Presentation: Global Drought Tools from the IRI, Tufa Dinku (IRI)

2.15-3.15
Panel Session: Information Providers Responding to User Priorities
Moderator: Tufa Dinku (IRI)

- *Panelist 1: Ladislaus Chang'a (TMA)*
- *Panelist 2: Edward Amoni (KMD)*
- *Panelist 3: Zewdu Segele (ICPAC)*
- *Panelist 4: Clement Boyce (Malawi DCCMS)*
- *Panelist 6: Amani Elrayah (Sudan Meteorological Agency)*
- *Panelist 7: Moses Ojara (UMNA)*

3:15-3.45
Coffee Break

3:45-4.30
Plenary & Closing Remarks
Chair: Ladislaus Chang'a (TMA)

- Presentation of Recommendations, Maurine Ambani (CARE/ALP)

Closing Speakers:

- Richard Graham (UKMO)
- James Hansen (CCAFS)
- Madeleine Thomson (IRI)
- Guleid Artan (ICPAC)
- Steve Zebiak (CSRD)

Appendix 2: Participant List

Day 1 – Wednesday, August 23, 2017 (CSRD Technical Exchange Workshop)

No.	Surname	First Name	Organization	M/F	Email
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Appendix 3: Workshop Organizing Institutions and Projects

IGAD Climate Prediction & Applications Centre (ICPAC):

In 1996, Intergovernmental Authority on Development (IGAD) was formed to supersede Intergovernmental Authority on Drought and Development (IGADD). In October 2003, the Heads of State and Governments of the Intergovernmental Authority on Development (IGAD) held their 10th Summit in Kampala, Uganda, where Drought Monitoring Center-Nairobi (DCMN) was adopted as a specialized IGAD institution. The name of the institution was at the same time changed to IGAD Climate Prediction and Applications Centre (ICPAC) in order to better reflect all its mandates, mission and objectives within the IGAD system. A Protocol integrating the institution fully into IGAD was signed on 13 April 2007. The Centre is responsible for eight member countries namely: Djibouti, Eritrea, Ethiopia, Kenya, Somalia, South Sudan, Sudan and Uganda as well as Burundi, Rwanda and Tanzania. The vision of ICPAC is to be a world-class center of excellence in climate services for sustainable development in the Greater Horn of Africa. The mission is to foster climate services and knowledge to enhance community resilience for prosperity in the Greater Horn of Africa. ICPAC objectives are to become the regional organization/ institution on climate information, disaster risk management and land use/change within the Greater horn of Africa region.

International Research Institute for Climate and Society (IRI) | Columbia University:

The mission of the IRI is to enhance society's capability to understand, anticipate and manage the impacts of climate in order to improve human welfare and the environment, especially in developing countries. The IRI conducts this mission through strategic and applied research, education, capacity building, and by providing forecasts and information products with an emphasis on practical and verifiable utility and partnership.

The IRI was founded in 1997 on the belief that scientific breakthroughs in our understanding of climate can help developing countries defeat persistent and often devastating problems. Climate has an impact on health, water, agriculture and most other vital sectors, giving us the opportunity to help societies confront a whole range of hardships-from malaria epidemics to food shortages. Population growth, changing livelihoods, rapid urbanisation, and climate uncertainty put pressure on resources and ecosystems. Under these heightened stress conditions even minor climate fluctuations are significant.

The IRI is a catalyst for the creation and provision of scientific information that meets the needs of the developing world. We collaborate with partners in Africa, Asia and Latin America, with local institutions that understand local needs and capacity. Our research and tools are "demand-driven" in that they help solve specific development, adaptation and research management issues.

Climate Services for Resilient Development (CSRD):

CSRD is an international public-private partnership committed to working with partners and countries around the globe in support of increasing resilience to climate variability and change. CSRD is a unique and innovative addition to the fast-growing field of climate services. CSRD was founded by eight partner institutions: the United States Government, the American Red Cross, Asian Development Bank, Inter-American Development Bank, Esri, Google, the Skoll Global Threats Fund and the U.K. Government.

CSRD's core commitment is to foster climate services that enable decision makers to address significant problems and create solutions in a variety of sectors. Toward this end, CSRD supports user-centric, collaborative climate services that effectively harness the power of information, technology, and innovation from around the world. CSRD aims to build local capacity to sustain the development and application of scalable and replicable climate services, starting in an initial three focus countries: Colombia, Ethiopia, and Bangladesh. This partnership will promote knowledge sharing, learning, and the identification of good practices. By enabling better management of climate risks, CSRD contributes to the vision of the Global Framework for Climate Services.

CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS):

CCAFS seeks to ensure a food-secure world in the face of a variable and changing climate, through a strategic research-for-development collaboration between the CGIAR and FutureEarth. CCAFS brings together agricultural, climate, environmental and social sciences to identify and address the most important interactions, synergies and trade-offs between climate change and agriculture. CCAFS is implementing a uniquely innovative and transformative research program that addresses agriculture in the context of climate variability, climate change and uncertainty about future climate conditions. Two CCAFS-led projects are represented in the workshop: Rwanda Climate Services for Agriculture, and Climate Services for Africa.

United Kingdom Meteorological Office (UKMO):

Officially known as the Met Office, the UKMO is the United Kingdom's national weather service. It is an executive agency and trading fund of the Department for Business, Energy and Industrial Strategy. The Met Office makes meteorological predictions across all timescales from weather forecasts to climate change. The main role of the Met Office is to produce forecast models by gathering information from weather satellites in space and observations on earth, then processing it with a variety of models. The Met Office makes seasonal and long range forecasts and distributes them to customers and users globally. The Met Office was the first climate and weather forecast provider to be recognized as a Global Producing Centre of long range forecasts by the World Meteorological Organisation and continues to provide forecasts to the WMO for dissemination to other national meteorological services worldwide.

Global Framework for Climate Services (GFCS):

The Global Framework for Climate Services (GFCS) was established in 2011 as a global, multi-stakeholder framework to reduce the vulnerability of society to climate-related hazards through better provision of climate services – or tailored weather and climate information designed to inform decision making across a number of different sectors. The overarching goal of the Framework is to enable better management of the risks of climate variability and change at all levels, through development and incorporation of science based climate information and prediction services into planning, policy and practice.

World Health Organization (WHO):

The World Health Organization (WHO) is a specialized agency of the United Nations that is concerned with international public health. It was established on 7 April 1948, headquartered in Geneva, Switzerland. The WHO is a member of the United Nations Development Group. Its predecessor, the

The constitution of the World Health Organization had been signed by 61 countries on 22 July 1946, with the first meeting of the World Health Assembly finishing on 24 July 1948. WHO's goal is to build a better, healthier future for people all over the world. Working through offices in more than 150 countries, WHO staff work side by side with governments and other partners to ensure the highest attainable level of health for all people. WHO supports countries as they coordinate the efforts of multiple sectors of the government and partners – including bi- and multilaterals, funds and foundations, civil society organizations and private sector – to attain their health objectives and support their national health policies and strategies.

As the directing and coordinating authority on international health within the United Nations' system, the WHO (1) provides leadership on matters critical to health and engaging in partnerships where joint action is needed; (2) shapes the research agenda and stimulates the generation, translation and dissemination of valuable knowledge; (3) sets norms and standards and promotes and monitors their implementation; (4) articulates ethical and evidence-based policy options; (5) provides technical support, catalyzes change, and builds sustainable institutional capacity; and (6) monitoring the health situation and assessing health trends. WHO's main areas of work are: health systems, promoting health through the life-course, non-communicable diseases, communicable diseases, corporate services preparedness, and surveillance and response.

Climate Services for Africa Project:

The Climate Services for Africa project, funded by USAID and led by CCAFS, seeks to strengthen capacity to develop climate services for agriculture and food security in Africa through regional organizations and processes. The project works with ICPAC to develop expanded suites of online, gridded historical and seasonal forecast Maproom products tailored to the needs of agriculture, building on the IRI's ENACTS initiative. A parallel activity works with AGRHYMET in West Africa. In both regions, new products will be introduced to country stakeholders, and serve as a basis for supporting the development of national Maproom products for member countries' agricultural sectors.

Enhancing National Climate Services (ENACTS) Initiative:

The ENACTS initiative is an ambitious effort to simultaneously improve the availability, access and use of climate information by working directly with National Meteorological and Hydrological Services (NMHS). It is led by the International Research Institute for Climate and Society (IRI) and is designed to transform local, national and regional climate-sensitive development decisions through the widespread uptake of timely, relevant, locally enhanced and quality assured climate information at relevant spatial and temporal scales. A priority outcome for long-term sustainability is the development of effective demand from national stakeholder communities able to understand and use information on the past, present and future climate in development decisions. This is to be achieved through the following objectives:

- Improve the availability of quality assured climate information products on the past, present and future climate at the national and local levels through the development of historical and monitoring climate information at the national level by blending all relevant national observations with global products.
- Enhance access to climate information products and services relevant to the needs of the public, national and local practitioners in climate sensitive sectors, policy makers, private sector and

researchers through web interface that uses IRI Data Library technology and linked to National Meteorological Agency's Website.

- Unleash pent up demand for locally relevant, high quality, climate information through effective stakeholder engagement in health, agriculture, water, disasters, national planning etc.

WISER-ENACTS Project:

There has an ongoing effort to strengthen ENACTS where it has been implemented and expand to new countries. The current effort, "Expanding and Strengthening ENACTS availability, access, and use across Easter Africa" project, is funded by the Department of International Development (DFID)'s WISER, under which the IRI has be implementing ENACTS in two new countries (Uganda and Kenya), and been strengthening the initiative in countries where it has already been implemented (Ethiopia, Tanzania and Rwanda).

WISER-SCIPEA Project:

Strengthening **C**limate **I**nformation **P**artnerships - **E**ast **A**frica (SCIPEA) aims to strengthen partnerships between organisations involved in production, use, research and training activities regarding seasonal climate forecast information, toward increased capacity for national/regional early warning and effective early actions. SCIPEA is led by the Met Office (UK), together with the IRI, the IGAD Climate Prediction and Applications Centre (ICPAC), and national meteorological services and universities/training and other centres from Ethiopia, Kenya, Tanzania and Uganda.

Appendix 4: Links to Presentations

Day 1:

- Climate Data and Maproom Tools Presentations
  - GFCS Implementation, Erica Allis (WMO)
  - Existing ICPAC drought risk analysis, monitoring and prediction tools: Philip Omondi (ICPAC)
  - WISER-SCIPEA Portal to the IRI Data Library and Maprooms: Oliver Kipkogei (ICPAC)
  - ENACTS Climate Data and Maproom Tools: Tufa Dinku (IRI)
- Country User Experiences w/ Maprooms Tools
  - Use of SCIPEA Maprooms and Portal, Maureen Anyango (ICAPC)
  - Use of NMA ENACTS Maproom and ENSO/Malaria Analysis, Adugna Woyessa (EPHI)
  - Use of Rwanda Maprooms/PICSA, Gloriose Nsengiyumva (CIAT-Climate Services for Agriculture Project)
  - Use of Maprooms in NMCP Surveillance Guidelines, Sumaiyya Thawer (MOH/NMCP)
  - Use of Maprooms in PSP/Education, Maurine Ambani (CARE/ALP)

Day 2:

N/A

Day 3:

- Presentations/Recommendations
  - Group 1 (Agriculture)
  - Group 2 (DRM)
  - Group 3 (Health)
- Climate Service Co-Development through User/Provider Interaction
  - WISER-SCIPEA Climate Service Development Teams and Prototype services, Richard Graham (UKMO)
  - Climate service development approach at TMA – Ladislaus Chang'a (TMA)
- Looking Forward - Short Presentation: Global Drought Tools from the IRI, Tufa Dinku (IRI)

Appendix 5: References

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