

**REPORT OF THE SIXTY FOURTH GREATER HORN OF AFRICA
CLIMATE OUTLOOK FORUM (GHACOF 64) FOR THE JUNE-
SEPTEMBER (JJAS) 2023 RAINFALL SEASON
22-24, MAY 2023**

THEME: "CLIMATE SERVICES FOR ANTICIPATY ACTION"

Contents

PREFACE	4
EXECUTIVE SUMMARY	5
1. COPRODUCTION OF CLIMATE SERVICES OVER EASTERN AFRICA.....	6
1.1 Opening Remarks and Setting the Scene	6
1.2 Improving Usability of GHACOF Processes and Activities and Development of User Interface Platforms (UIPs).....	6
1.3 Enhancing Anticipatory Action in Climate Services.....	7
1.3.1 Towards Anticipatory Action (AA)	7
1.3.2 Flexible Forecast Presentation for Enhancing Anticipatory Action	8
2. LOOKING BACK: EASTERN AFRICA MAM 2023 SEASON.....	8
2.1 Climate Performance Analysis	8
2.2 Looking back on MAM season Impacts: Sector Users Feedback.....	10
2.2.1 Agriculture and Food Security	10
2.2.2 Disaster Risk Management	11
2.2.3 Water Resources and Energy	12
2.2.4 Livestock and Range lands.....	12
3. STATE OF THE CLIMATE: JUNE TO SEPTEMBER 2023 SEASONAL FORECAST	13
3.1 Eastern Africa June-September 2023 seasonal outlook	13
3.2 Importance of probability in seasonal, sub-seasonal and longer-term forecasts.....	14
4. LOOKING AHEAD: THE JUNE TO SEPTEMBER RAINFALL SEASON	15
4.1 Official Opening remarks for GHACOF 64	15
4.2 Looking ahead: State of Climate.....	17
4.2.1 The current state of global climate systems.....	17
4.2.2 June to September 2023 Season Outlook.....	18
4.3 Sector implications and management strategies for JJAS 2023 season.....	18
4.3.1 Agriculture and Food Security	18
4.3.2 Disaster Risk Management.....	19
4.3.3 Water Resources and Energy	19
4.3.4 Media	19
5. PARTNER DISCUSSIONS.....	20
5.1 RICCAMA Project.....	20
5.2 The IGAD Regional Platform on Transboundary Pest.....	20

6. Release of the Seasonal Forecast	21
Press Statement.....	21

PREFACE

The sixty-fourth Greater Horn of Africa Climate Outlook Forum (GHACOF64) was organized virtually and in person from 22-24 May 2023 at Skylight Hotel in Addis Ababa, Ethiopia. The main objectives of the forum were to provide feedback on the performance and impacts of the March to May 2023 season so far, present a consolidated objective regional climate outlook for the JJAS 2023 season, and then deliberate and provide implications of the JJAS 2023 outlook to climate sensitive socioeconomic sectors in the region.

The forum brought together climate scientists, researchers, decision-makers, and users from vital socioeconomic sectors, governmental and non-governmental organizations, development partners, and civil society, among other stakeholders. The main GHACOF64 event which was held on 24th was preceded by sector-specific workshops that focused on the co-production and co-design of climate services, feedback on impacts and measures taken during MAM, lessons learned, and co-design of forecast-based interventions and mitigation measures for the coming season. GHACOF is preceded by a 1-week climate scientists' workshop that bring together forecasters from RCCs, National Meteorological and Hydrological Services (NMHSs), GPCs among other invited participants. The scientists' workshop commonly referred to as Pre-GHACOF was held from 15th to 19th May 2023 at ICPAC, Nairobi. The regional as well as the national objective seasonal forecasts were produced during this workshop, and the regional forecast was the main input for GHACOF64.

The forum was organized by IGAD Climate Prediction and Applications Centre (ICPAC) in collaboration with the National Meteorological and Hydrological Services (NMHSs) of ICPAC's participating member countries and was supported by partners. The forum was held within the framework of the IGAD regional strategy for mainstreaming climate information in vital socioeconomic sectors for disaster risk reduction and sustainable development under the theme: "Climate Services for Anticipatory Action". The three day-event attracted online and in-person participants, of whom 115 attended in person at the Skylight hotel in Addis Ababa.

ICPAC will continue to organize GHACOFs as one of the most effective ways to strengthen the dialogue between producers, users, and all climate services value chain actors and proactively innovate and improve efforts to deliver better services to build resilience in the region.

Guleid Artan (PhD)

ICPAC Director

EXECUTIVE SUMMARY

ICPAC organizes GHACOFs 3 times a year to provide climate outlook for the 3 main rainfall seasons (MAM, JJAS, OND) in the region. COVID-19 pandemic brought about the shift in how these workshops are held with current formats being hybrid. The workshop adopted different formats of interaction including presentations in plenary and group discussions. The GHACOF64 workshop held in Addis Ababa comprised of fully in-person participation during the first 2 days and a hybrid format on the third day. The forum was supported by the European Union funded Climate Services and related applications (ClimSA), Coproduction of Climate Services for Eastern Africa (CONFER), projects funded by the European Union, the AICCRA project financed by the World Bank, and the Government of Ethiopia.

The forum was held within the framework of the IGAD regional strategy for mainstreaming climate information into key socioeconomic sectors for resilience and sustainable development. It brought together representatives from National Meteorological and Hydrological Services (NMHSs), global climate centers, regional partners, decision-makers, and users from critical socioeconomic sectors. The government of Ethiopia was represented by the minister in charge of Water and Energy.

average surface temperatures across most parts of the region. The forum provided a structured means for users, researchers, and climate services providers to interact at the regional level to ensure that user needs for the seasonal prediction are met.

1. COPRODUCTION OF CLIMATE SERVICES OVER EASTERN AFRICA

1.1 Opening Remarks and Setting the Scene

Mr. Zachary Atheru began the session by emphasizing the importance of co-production, co-design, and co-delivery of climate information services within the Greater Horn of Africa Climate Outlook Forum (GHACOF). He noted that GHACOF, which started 25 years ago in 1998, has recently been revamped to incorporate these collaborative approaches. He stated that the theme for this year's GHACOF is "climate services for anticipatory actions." and highlighted the significance of communication and user engagement in achieving a common understanding between scientists, information brokers, and users. This collaborative approach is crucial for improving the use and application of climate services. He emphasized the need to develop climate services tailored to specific target audiences and integrate them into socio-economic sectors, programs, policies, and development plans. Mr. Atheru also underscored the increasing risks posed by climate change and variability, calling for adaptation and resilience-building efforts across sectors. He encouraged maximum interaction and learning during the two-day session leading up to the main GHACOF event on May 24th, 2023.

1.2 Improving Usability of GHACOF Processes and Activities and Development of User Interface Platforms (UIPs)

Mr. Calistus Wachana made a presentation on the need to enhance the usability of GHACOF's outputs, such as seasonal forecasts, advisories, and mitigation measures, as well as the summary for decision makers. Revamping GHACOF processes was recommended as a way to achieve this goal and catalyze the usage of other ICPAC climate products. Mr. Wachana highlighted the progress made in identifying climate information needs and prioritizing products for enhancement during GHACOF 60. GHACOF 62 further identified specific improvements required for these products, while GHACOF 63 addressed usability gaps and proposed solutions.

He pointed out that several usability gaps were identified and the proposed solutions aimed to address these gaps through the development of fit-for-purpose products through co-production processes. It was suggested to improve forecast accuracy and include user-relevant information such as onset, cessation, and dry spells. Sector-specific User Interface Platforms (UIPs) were proposed to address interpretation issues and avoid scientific jargon. Translation of climate information into French and Arabic was deemed necessary, and user feedback was emphasized as important for continuous improvement.

It was also recommended that sector focal points identify data needed to overlay with climate information to understand impacts and develop relevant advisories.

Mainstreaming climate services at the national and subnational levels was also highlighted as a requirement. Greater engagement of National Sector Focal Points (NSFPs) beyond GHACOF was encouraged to support NCOFs and subnational level activities.

The development and support of global, regional, and national UIPs were deemed essential to enhance the usability of climate information while horizontal and vertical interactions and engagements were emphasized to scale up the usability of climate information. These platforms aim to facilitate the development, delivery, and use of climate information to support robust.

Mr. Wachana concluded by emphasizing that well-developed and strengthened regional sector UIPs would enhance the interpretation, communication, dissemination, application, and feedback of GHACOF's outputs. They would also serve as a stepping stone for revamping sector impact reporting. Additionally, he stressed the need to strengthen the roles and responsibilities of NSFPs during GHACOF preparation, advisory co-production, and the development of decision makers' summaries. Integration of climate change into GHACOFs, NCOFs, and subnational climate outlook forums (SNCOFs) processes was considered crucial.

1.3 Enhancing Anticipatory Action in Climate Services

1.3.1 Towards Anticipatory Action (AA)

Ms. Viola Otieno presented on the concept of Anticipatory Action (AA) and its significance in translating early warning into actionable measures. She emphasized that while early warning information is readily available from various sources, the challenge lies in taking early action. She raised the question of accountability when early warnings are not acted upon. Although AA does not have a universally agreed-upon definition, it generally involves acting ahead of predicted hazards to prevent or reduce acute humanitarian impacts before they fully unfold. Pre-defined triggers, pre-agreed actions, and pre-arranged financing are the components of AA. Pre-defined triggers rely on forecast and risk information, while pre-agreed actions refer to embedded action plans and standard operating procedures. Pre-arranged financing involves pre-allocated funds automatically released for targeted interventions.

Ms. Otieno provided a summary of statistics from the global anticipatory action report, which indicated that a total of US\$53.2 million has been spent on AA, with US\$26.3 million allocated to the IGAD region. Approximately 1.9 million people have been reached through AA interventions with five countries in the IGAD region having active AA frameworks, while seven countries are in the process of developing such frameworks.

She highlighted IGAD's efforts in advancing AA, including organizing regional multi-sectoral anticipatory workshops to ensure a shared common understanding of AA,

consolidate AA experiences across humanitarian, development, and government sectors, and develop thresholds and triggers for AA. ICPAC has also developed a regional roadmap for AA. Ms. Otieno stressed the importance of linking forecasts with prevailing conditions in different sectors, understanding the "what, when, and who," and making AA more practical on the ground to reduce emergency response and losses.

1.3.2 Flexible Forecast Presentation for Enhancing Anticipatory Action

Dr. Tufa Dinku's presentation focused on IRI's NextGen seasonal and sub-seasonal forecast system, flexible forecast presentation, and the associated challenges. He pointed out that the NextGen forecast system utilizes global ensemble forecast products, which can transform climate forecasting at regional and national levels. It allows customization of global model outputs to local and regional data, as well as user-relevant variables and threshold exceedances. The system also facilitates the automated generation of operational rolling forecasts at national and regional levels.

The flexible forecast presentation enables the exploration of the probability of total rainfall exceeding or falling below a given amount for the upcoming season. It provides location-specific information and allows for the extraction and comparison of specific locations, providing decision-makers with more specific information for anticipatory action.

He noted that flexible forecast products have been integrated into maprooms at regional and national levels in the Greater Horn of Africa (GHA) region, including Ethiopia, Uganda, and Kenya. Training on the flexible forecast tool has been conducted, and the products are already included in their respective systems. However, it is important to ensure regular updates of forecast products. The main challenges however, with the product is that it uses single forecast output instead of the average of three forecasts outputs used by ICPAC and national meteorological and hydrological services (NMHSs).

2. LOOKING BACK: EASTERN AFRICA MAM 2023 SEASON

2.1 Climate Performance Analysis

Mr. Anthony Mwanthi provided an analysis of the climate performance during the MAM (March-April-May) 2023 season in Eastern Africa. The forecast indicated a higher chance of below-average rainfall, with above-average rainfall being the next likely outcome in most parts of the region. Temperature predictions suggested that the northern sector would experience warmer than average conditions, while parts of the equatorial and southern sectors would be cooler than normal.

The onset of the rainy season was compared to climatology onset, revealing that most areas experienced an early onset by 1-2 weeks. However, some areas recorded a late onset. Dekadal analysis using the Standardized Precipitation Index (SPI) showed that rainfall peaked in most areas by the second dekad of March. The season's rainfall was

triggered by Cyclone Freddy, which tracked from northwest Australia. During the first and second dekads of April, a dry spell was observed in South Sudan and Uganda. However, the third dekad of April saw region-wide enhanced rainfall, with Kibre Dehar in Ethiopia recording 230 mm of rainfall in a single day. Several stations in the region reported new extreme rainfall events in April.

Overall, the rainfall during March to May 2023 ranged from normal to severely wet across the Greater Horn of Africa (GHA) region. The occurrence of tropical cyclones and the influence of the Madden-Julian Oscillation were attributed to the extreme rainfall. Sub-seasonal forecasts were identified as valuable tools for providing important updates within the season, capturing sub-seasonal variability that cannot be captured in seasonal forecasts.

Session II: Discussions

During the discussion session, Mr. Oliver Kipkogei raised a question regarding the implementation of Anticipatory Action (AA) in the region, considering competing priorities such as finance, livestock, and crop insurance. Ms. Viola responded by acknowledging the fragmented implementation of AA, primarily conducted on a pilot basis or through projects. She pointed that their recent meeting aimed to bring stakeholders together, identify existing governance and policy structures, and anchor AA. Pre-financing remains a significant challenge, but funds are available under the Green Climate Fund (GCF). The establishment of a disaster fund and the implementation of low-cost AA at the community level, in collaboration with meteorological services and disaster centers/offices, were highlighted as key steps to strengthen resilience.

Mr. Kassa Fekadu posed a question regarding the disparity between the MAM 2023 forecast of below-normal rainfall and the observed extremely wet conditions in most areas. Mr. Mwanthi explained that the forecast only showed the dominant category, with a 50% likelihood for below-normal rainfall, but there was also a 35% likelihood for above-normal rainfall. He also noted that predictability in the weekly and 10-day outlooks is improved through dynamic downscaling after the seasonal forecast is issued. He explained that seasonal forecast cannot account for the Madden-Julian Oscillation (MJO) or land-atmosphere interactions, which are better captured in sub-seasonal forecasts and through dynamical downscaling hence users should update their operations using the sub-seasonal forecasts.

Mr. Kanyiike Tom inquired about the parameters used in the NextGen forecasting system, whether it was gridded or vector, and the practicality of the approach. Dr. Tufa explained that two tools were presented: NextGen for downscaling information and developing forecasts using PyCPT, and the Flexible Forecast presentation for optimizing forecast utilization through Maprooms. Training on these tools has been conducted for ICPAC staff and staff in the meteorological services of Ethiopia, Kenya, and Uganda. He clarified that NextGen uses gridded data at 4-5 km resolution, and the outputs in the form of graphs and maps can be downloaded for specific applications and use.

2.2 Looking back on MAM season Impacts: Sector Users Feedback

This section provides a summary of the impacts of MAM season on the different sectors

2.2.1 Agriculture and Food Security

Mr. Oliver highlighted that MAM rainfall in the region has generally been abundant, supporting early-season crop growth, pastoral vegetation re-generation, and water reservoir replenishment. Despite these positive factors, prolonged droughts and other drivers have eroded livelihoods, and recovery will take time. Acute food insecurity remained high due to climate-related extremes, conflict, insecurity, macro-economic challenges, and forced displacement. Acute malnutrition levels were also concerning, with cereal price in March 2023 in BR, ET, RW, SD, SSD increasing by more than 50% compared to the recent five-year average.

Positive impacts were reported in (ETH, SSD, UG, RW, BR, TZ, KE, SOM, SD, DJ) include good crop prospects, relief for drought-stricken regions, availability of short-term crops and vegetables, and favorable conditions for sunflower, maize, and beans production. However, negative impacts such as flooding, landslides, soil erosion, post-harvest losses, dry spells, pests, diseases, and high market prices were observed. These challenges affected crops, infrastructure, and livelihoods across various regions.

Early action and response strategies implemented

The first initiative that was done is dissemination of climate information through organized stakeholder. Other initiatives that were done include;

- a). **Subsidized Fertilizer Program:** Governments (KE, TZ) supplied subsidized fertilizers to farmers. In Kenya, over 5 million farmers registered to benefit from the e-voucher program, enabling them to access fertilizers at a subsidized cost.
- b). **Timely Distribution of Agricultural Inputs:** ETH and BR emphasized the importance of timely distribution of agricultural inputs to farmers. Regular scouting and follow-up of crop production fields were conducted to ensure efficient utilization of the inputs.
- c). **Weather Forecast-based Agriculture Advisory:** ETH, RWD and UG, developed and disseminated weather forecast-based agriculture advisories and updates. These advisories were delivered through different channels, enabling farmers to make informed decisions within the season. Sub-national climate outlook forums were also organized for co-production of regional forecasts and advisories (UG, KE).
- d). **Post-harvest Technologies and Peace Dialogues:** In South Sudan, farmers were trained on post-harvest technologies to minimize losses in flood-affected areas.

Additionally, peace dialogues were promoted between pastoralists and farmers to foster better relationships and collaboration.

e). **Tree Planting and Soil Erosion Control:** Burundi implemented a national campaign on tree planting under the "EWE BURUNDI URAMBAYE Program" and established soil erosion control structures.

f). **Livestock Offtake Program and Import Duty Waiver:** Kenya implemented a livestock offtake program to support pastoral livelihoods and allowed the importation of a significant quantity of duty-free white maize, providing relief for food scarcity.

g). **Comprehensive Crop Insurance Program:** Kenya's Ministry, in collaboration with partners in the insurance sector, developed crop and livestock insurance programs. These programs aimed to support farmers in accessing agriculture insurance and mitigate risks associated with crop and livestock losses.

2.2.2 Disaster Risk Management

Impacts

The March to May (MAM) season brought various disasters and challenges to several countries in the region. Flooding was the major disaster, accounting for 80% of reported disasters in SOM, ETH, UG, and DJI. Other incidents included drought in SOM, ETH, and KE, landslides, lightning, tropical storms/cyclones in Uganda, and epidemics in SOM and SSD. Strong winds were observed in DJI, while hailstorms affected UG.

Approximately 2.2 million people were affected by floods and conflicts. Additionally, 108,374 individuals were displaced due to floods, drought, and landslides. The combination of conflict and floods resulted in 92 reported deaths in South Sudan, Somalia, Uganda, and Ethiopia. Floods affected 35,400 households in Kenya and Ethiopia, and 23,300 livestock deaths were reported by OCHA due to flooding.

Early action and response strategies implemented

Measures taken to address the situation included declaring a drought emergency in Ethiopia, issuing early warnings, implementing integrated multi-sectoral responses in disaster-affected areas, resource mobilization, and providing unconditional cash transfers(\$2.7M) to households in Uganda. The Somalia DMA Agency also sent food supplies (50 trucks) to people displaced by floods in Beledweyne, and essential non-food items were distributed to 2,418 families in northeastern and western Kenya by the Red Cross. Humanitarian response during this period amounted to 3.6 billion USD. South

Sudan, Somalia, and Uganda mobilized resources amounting to 8.14 million USD to support the affected populations.

2.2.3 Water Resources and Energy

Impacts

In terms of positive Impacts, the enhanced rainfall observed in DJI, ETH, KE, SOM, TZ, and UG, reduced water stress and drought intensity. Groundwater recharge was witnessed in BR, DJI, ETH, KE, SOM, TZ, and UG. Negative Impacts included riverine floods, which caused infrastructure damage in BR, DJ, KE, TZ, SOM, and UG. Flash floods led to landslides, destruction of river banks, and contamination of water sources in ETH, KE, SOM, and UG. Delayed rains extended the drought in southern and southeastern ETH, resulting in animal deaths. Water shortages for human and domestic use were observed in Hafiirs and Wadi SDN. Hydropower generation decreased in KE and SDN.

Observed Seasonal Changes of MAM (2023):

The rainy season was short in BR, while above-normal rainfall was observed in DJI. Substantial rains with an early onset were witnessed in SOM, resembling the wetness of the 1997 Deyr season. Above-normal temperatures were observed in April and May in SDN. The Lake Victoria basin experienced a delayed onset of rainfall, with most rainfall occurring from mid-April to the first weeks of May. Prolonged dry spells were observed in the northern and west Nile regions of UG.

Early action and response strategies implemented

Several measures were implemented to address the impacts of the MAM season. These included early dissemination of climate information to stakeholders, rainwater harvesting, maintenance of water pipes, and flood control measures. Water resources monitoring and flood advisories were implemented in KE and SSD. Catchment protection campaigns through tree growing and restoration were conducted in KE. Water trucking, borehole establishment and rehabilitation, and water treatment initiatives were undertaken in ETH.

2.2.4 Livestock and Range lands

Impacts

Dr. Dereje noted that the MAM season brought both positive and negative impacts in the reporting countries. Above-average rainfall led to improved pastures and animal feed availability. However, there were also negative impacts. Flash floods occurred in northern

and southern parts of KE, displacing households and causing livestock deaths. Livestock diseases such as CBPP, CCPP, PPR, and FMD were reported in several countries with tick-borne diseases, and Brucellosis emerging in DJI. Flooding in ETH and SSD led to the death of emaciated animals. SOM experienced river flooding, animal displacement, and decline in animal body condition. Uganda witnessed localized episodes of flash floods and increased weeds affecting pasture quality.

Early Action and response strategies implemented

In order to reduce the impacts, disease surveillance was conducted continuously, and timely vaccinations were administered against transboundary diseases. Water harvesting and conservation of fodder were promoted in areas with abundant pasture and crop residues. Awareness creation about weather forecasts was increased in UG, KE, ETH, and DJI. Additionally, restocking efforts were undertaken in affected areas of ETH and UG. These measures contributed to improved livestock health, increased resilience among pastoralist communities, and better utilization of available resources.

Discussion

A participant asked for clarification on how the deficit in the required funding for response (3 billion) was met given that the governments were only able to mobilize 8 million dollars. Mr. Ouma responded that the needs- in the region are more than what the countries are able to support and are therefore depending on donors.

A participant also wanted to understand why the IPC analysis for Ethiopia is not indicated and Mr. Belihu clarified that no recent analysis has been done for Ethiopia. It was also suggested that since DRC is not part of ICPAC, it should be masked out in the IPC analysis presentations

3. STATE OF THE CLIMATE: JUNE TO SEPTEMBER 2023 SEASONAL FORECAST

3.1 Eastern Africa June-September 2023 seasonal outlook

Ms. Eunice delivered an informative presentation on the seasonal forecast for JJAS 2023 season over Eastern Africa. The presentation began with an overview of the background on the rainfall distribution in space and time as well as the significance of the season and showed that the JJAS contributes more than 60% of the annual total in the northern parts.

She noted that the spatial and temporal distribution follows the north south movement of the rain belt with gradual decrease in rainfall starting in September. She also explained the different thresholds used to define below normal, normal and above normal rainfall

categories. To visualize the forecast, Eunice utilized a color-coded scheme to represent normal, above-normal, and below-normal thresholds.

In terms of forecast generation methodologies, the forecast is produced using three methods; linear regression, canonical correlation analysis and the logistic regression. These three methods are applied on individual models from the global producing centers (GPCs) and the results averaged to give the consolidated objective outlook. The JJAS outlook showed that there are high chances for wetter than usual conditions over northern and southern coastal parts of Somalia, southeastern Ethiopia, cross-border areas of Sudan-South Sudan-Ethiopia, and coastal Kenya. On the other hand, high chances for drier than normal conditions are indicated over most parts of Sudan, South Sudan, central to northern Uganda, western Kenya, Ethiopia, Djibouti & Eritrea. Models have no confidence over western, central to southeastern Sudan, and isolated areas in Ethiopia and western Kenya. In terms of SPI, isolated cases of long-term rainfall deficit are predicted for Northern Ethiopia, South Sudan, and Eritrea. Late onset of rainfall is expected in isolated areas of Northern Ethiopia, Central South Sudan, and Northern Uganda, while Western Ethiopia, Northwestern Eritrea, and Eastern South Sudan have a high likelihood of experiencing early and normal onset. Warmer than usual conditions are expected over the region.

3.2 Importance of probability in seasonal, sub-seasonal and longer-term forecasts

Dr. Peter Johnston's presentation was aimed at helping users get a better understanding and interpretation of probability forecast. Dr. Peter delved into the concept of probability and its significance in interpreting forecasts. He emphasized that a forecast is inherently probabilistic, prompting the question of how to effectively understand its implications. Using the example of a forecast indicating a high probability for below-normal rainfall, he sought to clarify its meaning. Dr. Peter introduced the idea of making sense of probability by discussing three distinct probabilities by spinning a wheel with 3 colors (white, yellow, and green). He explained that the yellow probability signifies the highest likelihood of below-normal conditions. By spinning the wheel a number of times, different outcomes were achieved, and this showed that despite below normal had the highest chance, the other outcomes were a possibility. In general, he stressed the importance of presenting a forecast in a format that highlights the highest probability. This enables the end user, whether in agriculture or other fields, to make informed decisions such as fertilizer application or seed selection based on the probability. Finally, Peter emphasized that the end user must consider the "what if" scenario and make decisions based on the forecasted probabilities.

Discussion

Dr. Tufa's sought to understand what is considered normal and whether there is be a normal season and Peter explained that normal is determined by analyzing long-term

data over a 20 to 30-year period, establishing a general tendency or average. Normal conditions represent what is expected based on this long-term average in a typical year. Dr. Peter emphasized that every location has its own range of highest and lowest values, and the normal average is calculated from that range.

Regarding the participant's question about planning and dealing with the probabilistic nature of forecasts, Dr. Peter emphasized the need to adjust decision-making and embrace anticipatory action. He highlighted that seasonal forecasts provide an outlook, and planning should involve a deeper analysis of the monthly distribution. Brenda suggested a phased approach, including early warning message dissemination to communities, as part of an anticipatory action plan.

Mulualem Abera from the Ethiopian Meteorology Department raised concerns about a potential mismatch between the first section and the summary of Eunice's presentation, specifically regarding the late onset and normal rainfall in Northwestern Ethiopia. He also wanted to understand if cases of flooding will be observed and which months in Ethiopia are expected to be dry. Eunice clarified that she had mentioned an early to normal onset. She explained that questions about flood vulnerability should be addressed by hydrologists in the water sector, as short-term forecasts are more suitable for capturing floods. Dr. Hussien added that northwestern Ethiopia is expected to experience below-average conditions in June and September, with an extended dry spell.

4. LOOKING AHEAD: THE JUNE TO SEPTEMBER RAINFALL SEASON

4.1 Official Opening remarks for GHACOF 64

The opening ceremony was graced by Mr. Zecharia Atheru, representing ICPAC Director Dr. Guleid Artan, along with Mr. Kife H Mariyam, Deputy Director General of Ethiopia Meteorological Institution, and H.E Dr. Eng Habtamu Hefu, Minister for the Ministry of Water and Energy.

Opening Remarks by Mr. Kife

Mr. Kife welcomed the guests to the 64th Greater Horn of Africa Climate Outlook Forum in Addis Ababa. He highlighted the impact of climate change, emphasizing the occurrence of extreme events such as the recent five failed seasons that have been followed by an extremely wet March to May season that has resulted in flash floods in the region. He mentioned that the Ethiopia Meteorological Institute is the authorized institution to provide weather and climate forecasts and has been organizing climate outlook forums for the past three years. Mr. Kife expressed the importance of early warning followed by early action and praised ICPAC for their efforts in capacity building, not only for meteorologists and scientists but also for various sectors. He expressed gratitude to ICPAC for their support in providing timely and high-quality climate services and early warning

information. He concluded by thanking the organizers on behalf of the Ethiopian government for selecting Addis Ababa as the venue for the forum.

Mr. Zachary Atheru on behalf of the Director ICPAC

Mr. Zachary Atheru, representing the Director of ICPAC, conveyed apologies on behalf of the director for his absence and warmly welcomed the participants. He highlighted the key activities conducted over the past two days, which included assessing the March-April-May season and analyzing the anticipated impacts for the June-July-August-September season. Mr. Atheru emphasized the significance of this season, as it contributes nearly 60 percent of the annual rainfall in the northern part of the Greater Horn of Africa. He noted that due to the changing climate, extreme events have become more frequent, resulting in either drought or floods in the region. Addressing these extreme weather patterns requires effective planning, resource sharing, and climate action, particularly in agriculture through climate-smart practices.

Mr. Atheru emphasized the need for preparedness to handle extreme weather events in the region, considering the changing patterns of La Niña and El Niño. He acknowledged that after three years of drought, the anticipated shift to a different weather pattern could bring some relief to communities, but it also carries the potential for increased damage. As part of ICPAC's mandate, Mr. Atheru highlighted their commitment to producing timely and high-quality early warning information for member countries.

He acknowledged the positive impact of sectoral climate assessments and forums hosted by ICPAC, which have facilitated significant improvements in understanding climate dynamics and informing decision-making processes. Mr. Atheru emphasized the importance of continued innovation and fostering dialogue between climate scientists and stakeholders across the region. In his conclusion, he expressed gratitude to stakeholders such as the European Union for their continued support to the center and the Greater Horn of Africa. Mr. Atheru closed his address by expressing his appreciation to all participants and wished them a successful and productive GHACOF 64.

H.E Dr. Eng Habtamu Hefu

H.E Dr. Eng Habtamu Hefu, the Minister for the Ministry of Water and Energy, delivered his welcoming address at GHACOF 64 and on behalf of the Ethiopian government, he expressed gratitude for the choice of Addis Ababa as the venue for the forum and extended a warm welcome to all participants. He acknowledged the significance of the forum, which was convened following the region's worst drought in recent history.

Minister Hefu highlighted the wide-ranging impacts of the drought on various sectors in Ethiopia, including agriculture, water, tourism, wildlife, hydropower, and health. With the upcoming June-July-August-September season being crucial for the member states of the Greater Horn of Africa, the minister expressed eagerness to receive information on

the expected seasonal outlook and how the lingering effects of La Niña or El Niño might influence the season.

He emphasized that the forum provides an opportunity for scientists and climate information users to collaborate and develop strategies to mitigate risks and minimize the impacts of extreme weather events. Minister Hefu commended ICPAC for its efforts in enhancing the capacity of users and acknowledged the center's contributions in delivering early climate information and services.

In his concluding remarks, he urged member states to expand their support and collaboration with ICPAC, emphasizing the importance of their collective work for the future. Minister Hefu extended his well wishes for a successful forum and encouraged participants to explore the diverse beauty of Ethiopia. He officially declared GHACOF 64 open.

4.2 Looking ahead: State of Climate

4.2.1 The current state of global climate systems

This session focused on the state of global climate systems and their expected impacts in the coming season.

Dr. Stefan Lines presented several key findings:

- April was identified as the fourth warmest month globally and the warmest April ever recorded. This trend suggests an increased likelihood of a warmer year in 2023.
- The El Niño-Southern Oscillation (ENSO) currently exhibits a positive temperature anomaly. The official status of ENSO is neutral but gradually approaching an El Niño phase.
- According to models, there is a 90 percent chance of an El Niño developing during the JJAS season.
- The data indicates a high probability of a moderate El Niño occurring.

He noted that although the influence of ENSO on East Africa rainfall is limited during the March-April-May (MAM) season, it has a significant influence during the JJAS. A La Niña phase is associated with enhanced rainfall and vice versa. He also pointed out that El Niño is associated with increased chances of wetter conditions in October-November-December (OND). If El Niño develops, it will likely bring changes and potentially lead to wetter conditions in OND 2023. El Niño is expected to cause a significant temperature increase of about 0.2 degrees Celsius in the region.

The Indian Ocean Dipole (IOD) also has a slight connection with East Africa during the MAM season, but it does not have a clear influence on the JJAS season. However, it does impact the OND rains.

4.2.2 June to September 2023 Season Outlook

The June to September 2023 Season Outlook was presented by Dr. Hussein Seid. He presented the climatological distribution of JJAS as well as percentage contribution of the season to annual totals. He pointed out that the ICPAC Objective forecasts is an average of model outputs obtained using logistic, Canonical Correlation Analysis and linear Regression methods. The JJAS outlook shows increased likelihood of below rainfall in northern parts of Sudan, Uganda and Kenya. July and August are expected to be dry, and based on SST evolution and forecasts over the NINO 3.4 region, 2002 was selected as the analogue year for the coming season. The SPI 3-9 indicates chances of depressed rainfall over isolated areas with most parts of the region being within the average thresholds. Warmer than average temperature are expected over most parts of the GHA region

4.3 Sector implications and management strategies for JJAS 2023 season

4.3.1 Agriculture and Food Security

Key Impacts

- Dry conditions suitable for palm date harvesting (DJI), crops harvesting (ETH, KE, UG, TZ).
- Enhanced pasture growth expected in areas where above normal rainfall is expected, thus crop production and support livestock value chains (KE, SOM)
- High temperatures, below-normal rainfall, prolonged dry spells may negatively impact main season crops and livestock stress (ETH, UG) .
- There is a likelihood of pests such as Fall Army Worms, as well as floods, landslides, and infrastructure damage in some areas (KE,SOM) .

Key Advisories

Users are advised to

- Make use of forecast updates for within-season planning.
- seek supplementary irrigation, backyard gardening, food storage, planting short-maturing crops, and promoting post-harvest handling practices, animal feed preparation, infrastructure maintenance, pest control, and early alert systems for humanitarian needs, water harvesting, moisture conservation practices,
- Timely distribution of farm inputs and creating awareness and control measures for flood possibilities as well as encouraging livelihood diversification and other income-generating activities.
- Governments to empower the National Food Reserve Agency, maximizing food storage, facilitating markets, and promoting the exportation of surplus agricultural products.

4.3.2 Disaster Risk Management

Key Impacts

- Risk of drought and water scarcity in the (DJI, KE, ETH)
- Risk of landslides and floods, which can lead to waterborne diseases affecting both humans and livestock (ETH, SOM, SSD),
- displacements, resource-based conflicts, and disease outbreaks (ETH, KE)

Key Advisories

- Preparation of humanitarian assistance to the population at risk by the end of June (ETH, KE, UG)
- Rehabilitate traditional wells, small water boreholes, underground cisterns, water reservoirs, and small dams. are responsible for carrying out these rehabilitation efforts (DJI, SSD).
- Establish protected areas for fodder storage and develop hydroponics k.
- livestock destocking system and disease surveillance and animal health monitoring is recommended (ETH, KE)
- Expand and/or adapt social protection programs and cash transfers (SOM, SSD).
- Engage multiple stakeholders in planning and coordination efforts (ALL).
- activate drought/flood anticipatory action (SOM, ETH, UG).

4.3.3 Water Resources and Energy

Key Impacts

- Potential conflict over water resources use (ALL).
- Hydropower production is expected to be stable due to enough water from MAM (ETH, KE, TZ) .
- Good water supply for domestic and livestock (SOM, BR)

Key Advisories

- Desilt water pans and other storage facilities
- Provide early warning information on potential risks
- Improve planning for hydropower operations
- Promote water conservation measures

4.3.4 Media

Ms. Bahati Musilu represented the media sector and pointed out its role and their needs going forward as they seek to improve delivery of climate services. She emphasized integration of the forecast into national planning. She also applauded the countries who utilize National Climate Outlook Forums (NCOFs) and Sub-national COFs to engage different sectors and share information on their expected actions during the season. The media plays a vital role in bridging the gap between scientific information and communities. They deliver the forecast, breaking it down and even translating it into local

languages for better understanding. Social media, particularly WhatsApp, emerged as a popular method for sharing weather and climate information, allowing for feedback and questions from the public.

Moving forward, there is a focus on implementing anticipatory action by telling stories that connect people with expected climate events and assist governments in making informed policy decisions. The network of climate journalists in the Greater Horn of Africa (NECJOGHA) was highlighted as a valuable resource that should receive support for capacity building and further outreach. Scientists are encouraged to be available and willing to answer questions and participate in interviews. The media's involvement should extend beyond information dissemination and include journalists specialized in different sectors throughout the entire process, from planning to delivery of climate information.

5. PARTNER DISCUSSIONS

5.1 RICCAMA Project

Dr. Omondi who is the project Manager of the RICCAMA projects informed the participants that the RICCAMA project, aimed at strengthening the resilience of member states in the region to climate change, will be ending on the 31st of May after four years. He pointed out that the project aligns with Goal 13 of the Sustainable Development Goals, which calls for urgent action to combat climate change and its impacts.

Since the project is ending, the focus now shifts to creating awareness and implementing the project's initiatives in the member states. Several issues related to climate change will be addressed and implemented. The region is expected to adopt a consolidated and structured approach to tackle climate change challenges. Dr. Philip, in his remarks, expressed the hope that the participants present will become advocates for the project upon returning to their respective homes. Their support in creating awareness and facilitating implementation is crucial for the project's success. After his brief address a clip showing a sustainable way to restore degraded land by involving the community was displayed. The clip is a documentary that collates all the best practices and lessons learnt from countries in the region.

5.2 The IGAD Regional Platform on Transboundary Pest

Mr Kenneth Mwangi presented an update on the inter-regional coordination platform for the management of desert locust and other transboundary pests in the region citing the need by IGAD Member States to strengthen the platform. He highlighted key achievements of the platform as well as the needs assessments, capacity building and resource mobilization. He further explained that the platform is looking into deploying drones in agriculture and pest control as planes are increasingly becoming expensive.

6. Release of the Seasonal Forecast

Mr. Atheru addressed the participants on behalf of the director. The director in his closing speech noted that this year marks the 25th anniversary of the Greater Horn of Africa Climate Outlook Forum (GHACOF), which has grown significantly since its inception. The first outlook took place in South Africa in 1997, followed by the Eastern Africa outlook in February 1998. Over the years, the RCOF forum has expanded to a global scale. He stated that a recent review of RCOFs recommended that the regional outlook forum should encompass a broader range of climate-related aspects, moving beyond just climate outlooks. The goal is to reform the forum, allowing for discussions on various climate-related topics. This shift necessitates a greater utilization of climate information, with the aspiration of providing services to a wider audience.

Dr. Artan also acknowledged that the process of developing climate services has evolved from global to regional to national levels, with the ultimate aim of reaching the community level. ICPAC is currently engaged in creating a regional framework for Climate Services, taking into account the recently released guidelines by the World Meteorological Organization in 2022. The first step in this process is the development of user interface platforms, particularly for the water sector, which is currently under discussion with member states.

He also noted that co-production is an essential element of the framework, emphasizing structured collaboration among various sectors. The regional outlook forum serves as one of the user interface platforms. Countries are encouraged to develop their national framework for climate service, with Ethiopia having already made progress in this area, while Kenya is in an advanced stage of development.

He emphasized that climate services extend beyond meteorological services and require collaboration from all sectors. The overarching goal is to deliver climate services to all stakeholders effectively.

Press Statement

Mr Fetene Teshome, Permanent representative Ethiopia with WMO made the press release.

IGAD'S Climate Prediction and Applications Centre today announces that the June to September 2023 forecast shows high chances of drier than usual conditions across the northern parts of the Greater Horn of Africa. Accordingly, Djibouti, Eritrea, central and northern Ethiopia, western Kenya, northern Uganda, and much of South Sudan and Sudan are expected to receive insufficient rainfall until the end of the season.

ICPAC's analysis also indicates an increased likelihood of warmer than usual conditions over the entire region, particularly over northern Sudan, parts of southern and central to

western Ethiopia, central and northern Kenya, central and northern Somalia, and coastal parts of Tanzania.

The June to September rainfall season is particularly important for the northern regions of the Greater Horn of Africa, where it contributes to more than 50% of the annual total rainfall.

Dr Guleid Artan, ICPAC Director, called for heightened vigilance “as this forecast could very well increase food insecurity in the region. Depressed rainfall, coupled with warmer than usual temperatures, are likely to affect crop productivity, with the risk of crop wilting and a hastened decline in pasture and water availability”. He asked IGAD’s partners to “stay mobilized and continue to respond to the crisis where 49 million people are still highly-food insecure in the IGAD region.”

In most parts of the region, above average rainfall was recorded during the March to May (MAM) 2023 season, bringing some respite to the communities most affected by five consecutive failed rainfall seasons in parts of Ethiopia, Kenya, and Somalia.

Hussen Seid, Climate Modelling Expert at ICPAC explains that: “It is now very likely that we will transition from La Niña to El Niño between July and September. At this stage, there is no indication of the strength or duration of El Niño, but in general it is associated with depressed rainfall between July and September in the north of the region and wetter conditions between October and December in the equatorial parts. So, we must get prepared for much wetter weather towards the end of the year. ICPAC encourage its users to consult its weekly and monthly updates that have a high degree of predictability”.

ICPAC is a designated Regional Climate Centre by the World Meteorological Organization. Its seasonal forecast is based on an analysis of several global climate model predictions customized for the Greater Horn of Africa. In this instance, ICPAC’s scientists have produced a consolidated forecast from seven models which increases its reliability, and the forecast indicates a drier July to September 2023 season.

The GHACOF64 is now officially closed.

Thank you for your participation to all participants/ Ethiopia for Hosting/ICPAC staff/Skylight hotel.