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PREFACE

A hybrid sixtieth Greater Horn of Africa Climate Outlook Forum (GHACOF60) was organized both virtually and in person on 15-17 February 2022. The main objectives of the forum were to review the feedback the performance and impacts of the previous rainfall season including the users feedback, provide the regional consolidated climate outlook for March to May (MAM) 2022 rainfall season and assess implications of the forecast in key socio-economic sectors over the region. The online forum brought together climate scientists, researchers, decision-makers and users from key socio-economic sectors, governmental and non-governmental organizations, development partners and the civil society among other stakeholders. GHACOF60 was preceded by sectors specific workshops that focused on co-production of climate services, feedback on the use of the previous forecast and impacts of the following season, lessons learned and mitigation measures, and co-production of climate services. This was in addition to week-long climate prediction development workshop which was held from 7 to 11 February 2022 to co-develop regional and national climate forecasts.

The GHACOF60 was organized by the IGAD Climate Prediction and Applications Centre (ICPAC) in collaboration with the National Meteorological and Hydrological Services (NMHSs) of ICPAC's participating member countries and supported by partners. The forum was held within the framework of the IGAD regional strategy for mainstreaming climate information in key socio-economic sectors for disaster risk reduction and sustainable development. The theme of GHACOF60 was "***Early Warning for Early Action***".

The three days-event was attracted 698 participants, 115 of whom attended in person at the Pridelnn Paradise Resort in Mombasa.

ICPAC would continue to organize GHACOFs as one of the most effective ways to strengthen the dialogue between climate scientists and the users of climate services, proactively innovate and improve efforts to deliver better services to intermediary and end-users in the coming seasons.

Guleid Artan (PhD)

ICPAC Director

EXECUTIVE SUMMARY

Due to the COVID-19 pandemic, the IGAD Climate Prediction and Applications Centre (ICPAC) held the sixtieth Greater Horn of Africa Climate Outlook Forum (GHACOF60) using a hybrid format done both in person and using zoom platform. The GHACOF60 issued the March to May (MAM) 2022 climate outlook for the region and formulated mitigation and response strategies as a consequence of the MAM 2022 seasonal climate outlook. It also reviewed the October-December (OND) 2022 seasonal rainfall performance and impacts on the different socio-economic sectors. The forum was supported by the ClimSA and CONFER Projects funded by the European Union as well as DRESS-EA project funded by Adaptation Fund through OSS.

The forum was held within the framework of the IGAD regional strategy for mainstreaming climate information into key socio-economic sectors for resilience and sustainable development. It brought together representatives from National Meteorological and Hydrological Services (NMHSs), global climate centers, regional partners and decision-makers and users from key socio-economic sectors. The agriculture, water, livestock and disaster risk management sectors were held in person. All the sectorial sessions were held two days before the main event to formulate responses to the regional climate outlook for the MAM 2022 rainfall season over the GHA region. The sectors involved during the sectoral sessions were Agriculture and Food Security, Disaster Risk Management (DRM), Water Resources Management and Energy, Livestock, Health, Environment and Forestry, Media, and the Conflict Early Warning and Response Mechanism (CEWARN). Climate Change experts also had a parallel workshop on day one but later joined the various sectors on the second day.

The objective seasonal forecast was developed during the PreCOF60 climate capacity building workshop held from 15-17 February 2022. The consolidated objective climate outlook generally indicated higher chance of drier conditions over much of the region specifically over Tanzania, Burundi, Rwanda, Kenya, southern, central and north-western Somalia, southern and south-eastern Ethiopia, and the Red Sea coast of northern Eritrea. Consistent with increased probabilities for below normal rainfall, the start of the season predicted to be delayed, especially over eastern Kenya and southern Somalia. The temperature outlook indicates an increased likelihood of warmer than 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. The forum attracted 698 participants, 115 of whom attended in person.

1.1 Introduction

The organization of Regional Climate Outlook Forums (RCOFs) was initiated in 1996 in Victoria Falls, Zimbabwe, by the WMO's Climate Information and Prediction Services (CLIPS) project in collaboration with NMHSs. RCOFs gained momentum as a regional response to the major 1997–1998 El Niño event. The IGAD Climate Prediction and Applications Centre (ICPAC), formerly known as Drought Monitoring Centre (DMC), organized the first RCOF in Nairobi, Kenya, for the March to May (MAM) 1998 rainfall season in February 1998.

The sixtieth Greater Horn of Africa Climate Outlook Forum (GHACOF59) was organized by ICPAC in collaboration with the GHA National Meteorological and Hydrological Services (NMHSs), World Meteorological Organization (WMO) and other partners to document and share the climate impacts across the region and to formulate responses to the regional climate outlook for the March to May 2022 rainfall season over the GHA region. March to May (MAM) is an important rainfall season for the equatorial parts of the Greater Horn of Africa (GHA) region.

This report presents summarizes the activities and discussions the fifty-ninth Greater Horn of Africa (GHA) Climate Outlook Forum (GHACOF60) which was held both in person at the PridelInn Paradise Resort in Mombasa and virtually on 17 February 2022.

1.2 Objective of the forum

The main objective of the forum was to provide the regional climate outlook for the March to May (MAM) rainfall season, analyze the potential impacts of the expected climate conditions on different socio-economic sectors, and formulate appropriate mitigation measures as well as advisories. Assessment of the performance and impacts of the preceding seasonal climate was also undertaken. Experiences and lessons learned in using the forecast together with good practices were highlighted in the sectoral reports. The challenges encountered during the season were also reported.

1.3 Participants for the forum

The hybrid forum was composed of climate scientists from the National Meteorological and Hydrological Services (NMHSs) of ICPAC member countries, universities, research institutions, regional and international organizations engaged in climate modelling, prediction and applications for the region. Others were from socio-economic sectors such as agriculture and food security, health, water resources, energy, disaster risk reduction, civil society, and conflict early warning response, among other users. Various regional and international Governmental and Non-Governmental organizations and the donor community are also participated in the forum. Not all participants gave their details in the registration

forms, of those that did, the number and percentages are broken down per country and sector in table 1 and 2, respectively. About 34% of the participants are based in Kenya. This is because Kenya is a regional hub for most of the Intergovernmental organizations and NGOs in the region. It is also the host country and institution of the forum. In terms of sectors, the meteorology and climate services comprised of 28.0% of the total participants who listed their sector.

Table 1: Participants by countries and their percentages out the total participants

No	Countries	Number of participants	Percentage out of total number of participants
ICPAC countries			
1	Kenya	130	34.03%
2	Ethiopia	50	13.09%
3	Somalia	36	9.42%
4	Sudan	33	8.64%
5	Uganda	27	7.07%
6	South Sudan	14	3.66%
7	Tanzania	14	3.66%
8	Rwanda	13	3.40%
9	Burundi	8	2.09%
10	Djibouti	7	1.83%
11	Eritrea	1	0.26%
Subtotal			87.20%
Participants from outside of the region			
12	United Kingdom	11	2.88%
13	Norway	6	1.57%
14	Netherlands	5	1.31%
15	Italy	4	1.05%

16	South Africa	4	1.05%
17	United States	4	1.05%
18	Cameroon	2	0.52%
19	Germany	2	0.52%
20	Turkey	2	0.52%
21	Belgium	1	0.26%
22	Botswana	1	0.26%
23	Cocos (Keeling) Islands	1	0.26%
24	Malawi	1	0.26%
25	Niger	1	0.26%
26	Nigeria	1	0.26%
27	Senegal	1	0.26%
28	Sweden	1	0.26%
29	Switzerland	1	0.26%
Subtotal		22	3.7%

Table 2: the percentage of participants according to their sectors

No	Sector	Percentage out of total
1	Agriculture and Food Security	14.4%
2	Conflict / Law enforcement and Security	0.5%
3	Disasters Risk Reduction	9.2%
4	Education / Academia and Research	3.1%
5	Environment and Climate Change	18.1%
6	Health	2.4%

7	Humanitarian Assistance	3.7%
8	Livestock	3.9%
9	Media / Communication and Information Technology	8.6%
10	Meteorology and Climate Services	28.0%
11	Migration and Social Protection	0.8%
12	Water and Energy	6.0%
13	Other	1.3%

1.4 Methodology

Presentations and plenary discussions were some of the main modes used during the online forum. On 15 February 2022 sectors organized a working session to review and discuss the climate products needed by each sector and on the 16 February 2022, the sectors review the impact of the OND 2021 season, share lesson and good practices, discuss the outlook of MAM 2022, and generate advisories to mitigate the climate. On the 17th February, the sectors gave consolidated presentations on the impacts and advisories discussed in the previous days. Ten side event on various topics were held during the afternoon sessions on the 16-17 February 2022.

2. FEEDBACK ON OND 2021 SEASONAL CLIMATE PERFORMANCE AND IMPACTS

This session was mainly dedicated to showing the meeting participants the performance of the previous season and to showcase some of the impacts observed during the season with regards to the observed rainfall and temperature from seven sectors including Agriculture and food security, Conflict, Disaster Risk Management, Livestock and Rangelands, Health, Water resources and energy and Environment and forestry.



3. MARCH - MAY 2022 SEASONAL FORECAST

The focus of the first part of the discussions in the session was to understand the status of global climate drivers; and their expected impact on the short rains season. The second part of the session was to discuss the forecast for the MAM 2022 season with associated intra-seasonal characteristics.

It was stated that 2022 will continue to be among the warmest years with an average increase of about 1.09 OC above the pre-industrial time period. Sea surface temperatures (SSTs) were said to be below average across the eastern and central tropical pacific. A weakening of the La Niña event was reported that was projected with high likelihood to persist in throughout the season. The signal between rainfall and El Niño-Southern Oscillation (ENSO) during the MAM season was reported as weak and IOD conditions were also expected to remain neutral throughout the MAM season, Just like in the case of ENSO, the link between rainfall and IOD was also reported as very weak.

The prediction skill is of the March to May season was reported as generally low due to lack of large-scale drivers that could occur during the season and participants were advised to follow the updates

given during the season. The MAM season was said to account for up to 70% of total annual rainfall over the Horn of Africa. 2012 and 2021 were identified as the analogue years for reference to the 2022 MAM season. Canonical correlation and linear regression techniques were utilized to downscale General Circulation Models (GCMs). Eight models were utilized to predict the March to May forecast. Wetter than usual conditions are expected in most parts of the Greater Horn of Africa, while drier conditions are predicted over north eastern Ethiopia and western parts of South Sudan. Normal rainfall onset dates are predicted over most parts of the region except parts of northern Burundi.



4. SECTOR REPORTS ON IMPACTS AND MANAGEMENT STRATEGIES

This session covered the impacts on the MAM 2022 forecast for the sector with recommended advisory on the anticipated impacts. The season is generally forecasted to have normal or above normal rainfall, and the anticipated impacts and advisories from the different sectors were agreed on and presented.

The need for increased efforts in making seasonal predictions more reliable was stated as it would encourage proactive as opposed to reactive responses to emergencies. Water storage technologies during flooding seasons was also mentioned as a need for the region. It was noted that the policies in place were not being implemented, like the Water Harvesting Act, 2002 in Kajiado County, Kenya.

GHACOF was stated as improving as an information sharing forum, but the gaps remained in cascading the information downwards still remained. National governments were encouraged to work closely with lower level government structures in order to communicate and improve the accuracy of predictions. Kenya was stated as a good case of how to effectively and regularly disseminate forecasts at sub-national level.

The Disaster Risk Management (DRM) presentation showed the affected population by drought, flood and COVID as 2.4million. This was stated as far below the affected population estimate from different reports. Harmonization of figures across government was encouraged so as not to confuse the decision making or response planning process.

The livestock team reported death of livestock due to the drought in a few specific parts of the region. Livestock deaths were reported in Somalia, Kenya and also in Borana, Somali region and SNNPR regions in Ethiopia. The importance of getting feed balance process working, coupled with close monitoring of the seasonal performance was stated as critical as drought was still impacting pockets of the region. The use of plant residuals was proposed as a way to contribute to the feed value chain. Countries were encouraged to adopt WMO's Common Alerting Protocols (CAP) for early warnings warnings on high-impact hazards.



5. SESSION V: PANEL DISCUSSION ON THE IMPLICATIONS OF THE FORECAST

The panel discussion on early action planned for the MAMA 2022 while reflecting on the current drought conditions were presented by representatives from the three affected member states, Ethiopia, Kenya and Somalia and partners supporting response in the affected areas. Their input was as follows:

Somalia

Based on the early warning given in 2020, Somalia has been coordinating meetings and sensitization launching and resource mobilization for the drought response. Over 70 meetings have been conducted over the past 15 months that brought relevant stakeholders including, donors, community-based organizations, and local and national communities. Wide response has been done based on the needs assessment. Challenges to the response include accessibility, the government took advantage of the structures already available such as 'shock response' and were able to send cash to the needy population. Conditions however continue to remain dire.

Ethiopia

Oromia, and Somali regions were stated as the most affected with more than 2600 livestock fatalities. The government had timely responses to the risks posed to the population thus no fatalities were reported. Livestock migration was prevalent in search of pastures. Early dissemination of forecast information was released through the early warning bulletins. A task force has been contributed to disseminate information in local media and also languages. Water rationing was put in place in affected areas. Food was also been distributed to the affected population. Provision of animal feed and forage though not enough was also provided, including animal health equipment. Activation of an emergency operating center was done.

Kenya

Severe and devastating drought were reported in some parts of the country due to the three failed seasons. The government stated that provision of food and water, livestock treatment in the affected areas will continue. The government would also further formulate advisories in the Kenya National Climate Outlook Forum and convene the National platform for actors in Disaster Risk Reduction (DRR), for a detailed analysis of likely impacts and take appropriate action.

The Food Security and Nutrition Working Group (FSNWG)

The Food Security and Nutrition Working Group (FSNWG) released a special report on drought and Food security over Eastern Africa in the reporting period. The region was experiencing high levels of food insecurity, water scarcity, malnutrition rates (Garisa, highest ever global malnutrition level about 24.7%, emergency threshold is 15%) and rising food prices. 12 to 14 million people are food insecure due to drought alone. Two different food security projections were given due to high uncertainty and low skill of forecasts during the Long Rains: Normal to above projections would lead to improved forage though food security was not likely to improve within the season; Below average rainfall projections would lead to 15 to million people being be food insecure. Multisectoral actions were called for.

European Commission Humanitarian Aid Office (ECHO)

European Commission Humanitarian Aid Office utilises climate information for extreme events such as droughts and floods. They use information from the weather forecast to determine the level of severity of risk. In addition, they also use the Integrated Phase Classification (IPC) analysis to determine the food insecurity and nutrition level. ECHO posed a question on how to better capitalize the forecasts and how IGAD can downscale the forecasts further to the local level.

Redcross

Redcross stated that they use climate information for forecast based financing advocacy, preposition food and emergency supplies that will be needed in disaster. They stated that they further provide animal insurance and fodder storage. They further stated that they supplement the regional forecast with county-based forecasts.

UN World Food Programme (WFP)

The UN World Food Programme responds immediately once the forecast is released based on their analysis of the severity and impact. They then downscale the key impact for each geographical location. WFP then activates their immediate response fund that each relevant WFP local office country can apply, and the funds made available after twenty-four hours for anticipatory actions. The forecast enables pre-deployment of technical staff and resources to projected areas of crisis. WFP is working with the private sector to provide insurance. Response is normally to droughts and floods, examples of region include Karamoja, west Nile, and parts of Ethiopia. Challenges faced in planning are in identifying the thresholds to trigger action.

5. SESSION VI: SIDE EVENTS

INNOVATION FOR CLIMATE SERVICES



FUTURE OF WEATHER SECURITY AND INTELLIGENCE POWERED BY SPACE
Ari Davidson, Tolerorow.io

UNLOCKING EARTH OBSERVATION AND SCIENCE FOR A RESILIENT PUBLIC SECTOR
Keiko Nomura, Climate Engine

GLOBAL WEATHER FORECAST AS OPEN DATA
Håvard Alsaker Futsater, Yr, Meteo, Norway

INNOVATIVE SOLUTIONS FOR CLIMATE SERVICES
Anca Brookshaw, ECMWF

GSMA CLIMATE TECH PROGRAMME
Dulip Tilakaratne, ClimateTech programme, GSMA

Feb 17, 2022 | 14:30 PM - 16:00 PM
Contribute to the conversation on Twitter #GHACOF60

NATURE-BASED SOLUTIONS



FOREST WATCH
Kenneth Mwangi, ICPAC

REFORESTING WITH SEED BOMBS
Hajana Teklu, SeedBomb Ethiopia

WATER HYACINTH RECYCLING
Joseph Nguthiru and Charles Kinyua, Egerton University

URBANIZATION VS CONSERVATION
Irene Amoko Executive Director, Kenya Wildlife Trust

Feb 16, 2022 | 2:00 PM - 3:00 PM
Contribute to the conversation on Twitter #GHACOF60

CLEAN ENERGY



DOMESTICATING CLEAN ENERGY IN RURAL COMMUNITIES
Joseph Apalok, Solar Test

ADAPTATION FINANCING FOR LOW TO MIDDLE INCOME ECONOMIES: CHALLENGES AND OPPORTUNITIES
Oluwajoba Somorin, African Development Bank

MAINSTREAMING CLEAN ENERGY
Willy Odongo, Gridlines

POLICIES FOR CLEAN ENERGY
Tade Noyia Mosek, Batavia University

Feb 16, 2022 | 2:00 PM - 3:00 PM
Contribute to the conversation on Twitter #GHACOF60

INFRASTRUCTURE AND DATA SHARING



DATA SHARING IN EASTERN AFRICA
Paulino Omay, ICPAC

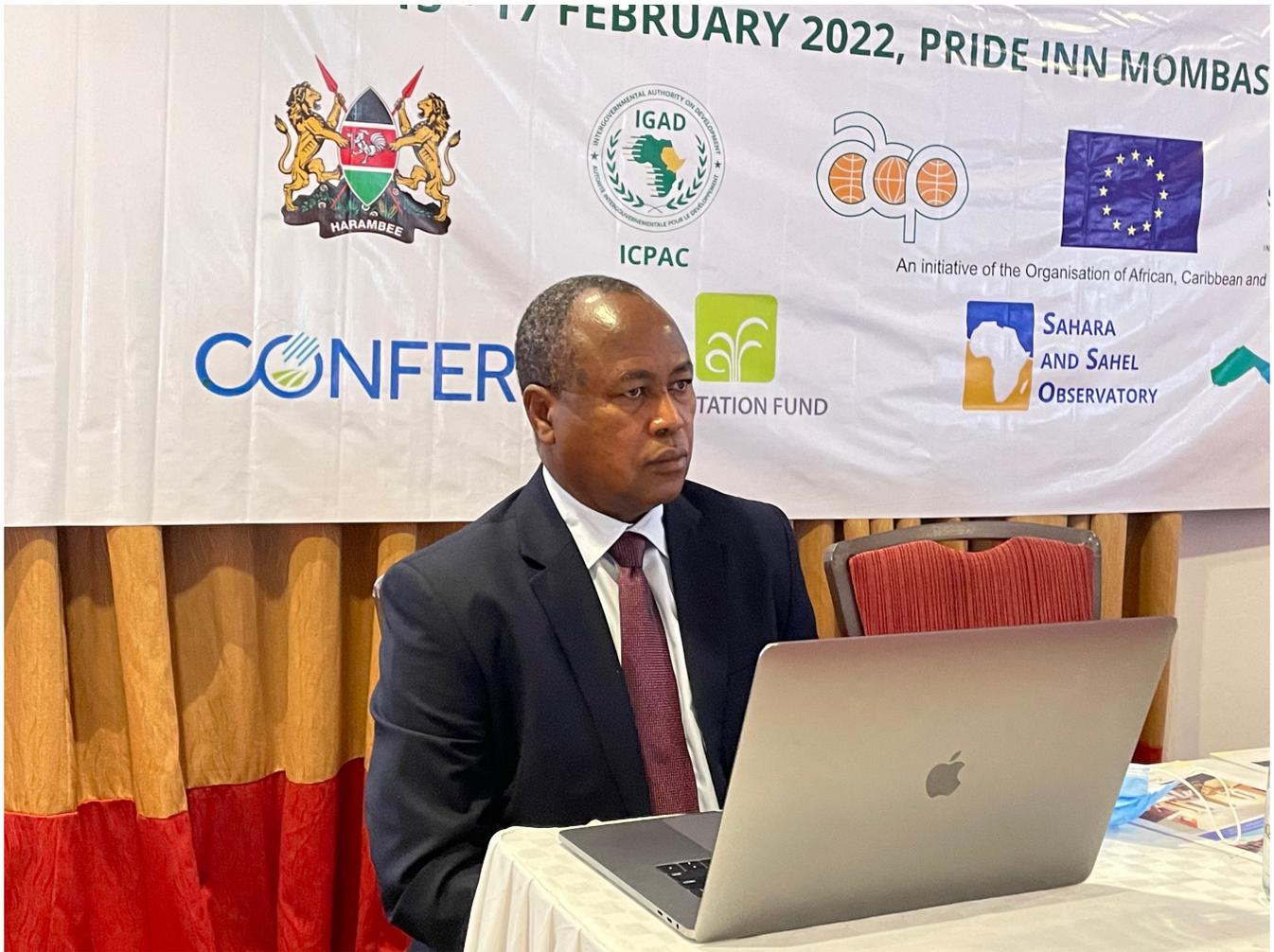
NEW UNIFIED DATA POLICY AND THE SYSTEMATIC OBSERVATION FINANCIAL FACILITY
Lara Peter Rishvajard, WMO

DATA SHARING POLICY AND FUNDING OPPORTUNITIES
Lorena Santamaría, WMO

BRIDGING THE WEATHER DATA GAP USING MOBILE NETWORKS
Dulip Tilakaratne, ClimateTech programme, GSMA

Feb 16, 2022 | 03:15 PM - 04:15 PM
Contribute to the conversation on Twitter #GHACOF60

ICPAC held ten side events in a hybrid fashion on the 16-17 Feb 2022. The topics covered in the side events included Clean energy; Indigenous traditional knowledge; Nature-based solutions; Risk Assessment, Insurance and banking for Resilience; Climate Information for Resilience; Meteorological infrastructure and data sharing; Hydrological forecasting for Eastern Africa; Innovation for Climate Services; Cloud storage, High-Performance Computing (HPC), machine learning and AI; and Media for Climate.



6. SESSION VII: RELEASE OF FORUM STATEMENT AND CLOSING OF THE FORUM



After the reporting and discussions, ICPAC director was invited to officially release the statement and thereafter officially closed the meeting. The statement for the GHACOF60 is provided in **Annex I**. The summary of Advisories presented by the sectors is provided in **Annex II**.

ANNEXES

Annex I: Statement for the GHACOF60

STATEMENT FROM THE SIXTIETH GREATER HORN OF AFRICA CLIMATE OUTLOOK FORUM (GHACOF60): 15-17 FEBRUARY 2022; MOMBASSA, KENYA

1. Consolidated Objective Climate Outlook for March to May 2022 Rainfall Season.

March to May (MAM) constitutes an important rainfall season, particularly in the equatorial parts of the Greater Horn of Africa (GHA), where the MAM rainfall contributes up to 70% of the total annual rainfall over the eastern part of the region. Analysis of global climate model predictions from 8 Global Producing Centres (GPCs) customized for GHA indicates increased chances for enhanced rainfall during March to May 2022 over the southern to central regions (Figure 1). Specifically, there are higher chances of a wetter than average rainfall over southern, central and northern Tanzania, Uganda, northern Burundi, eastern Rwanda, southern and western Kenya, eastern South Sudan, western Ethiopia, a few localities in southern and south eastern Ethiopia and parts of southern and northern Somalia. Probabilities are especially enhanced for wetter conditions over some areas of northern and central Tanzania. On the other hand, western South Sudan and central and north-eastern Ethiopia are likely to experience drier than average rainfall conditions.

The consolidated objective temperature forecast from 8 GPCs indicates an increased likelihood of warmer than average surface temperatures over southern Tanzania, much of Kenya, Ethiopia, Djibouti, Eritrea, and northern Sudan (Figure 2). Probabilities for warmer than average temperatures are most enhanced over central Ethiopia and Djibouti. Cooler than average surface temperatures are expected over north-eastern Tanzania and southern parts of Sudan. Probabilities favour near average temperatures over Burundi, Rwanda, north-western Tanzania and Uganda.

Standardized Precipitation Index (SPI) analysis of observed and predicted precipitation from 6-15 months period ending on 31 May 2022 indicates long-term rainfall deficits in many parts of the equatorial and southern regions (Figure 3). Notably, a 12-month SPI represents a moderate to severe multi-season drought conditions in the region, particularly over Uganda, southern and south-eastern Ethiopia, eastern Kenya, and southern Somalia. However, the expected wetter than average conditions will likely increase water availability over eastern Kenya and northern Somalia during the March to May 2022 season.

As a supplemental product, the predicted start of the March to May 2022 season is provided in Figure 4. Accordingly, analysis of a 51 ensemble-member ECMWF model forecasts shows higher chances of

near normal onset dates across much of the region. A few areas in Uganda, north-western Tanzania, northern Burundi/southern Rwanda are indicated to experience delayed onset, while parts of Somalia and south-eastern Ethiopia are likely to have early onset. The longest continuous dry spells of 8-12 days are expected to occur over Tanzania, eastern Kenya, and north-eastern Somalia from mid-March to mid-April 2022.

The World Meteorological Organisation (WMO) and the major global climate centres have noted that Sea Surface Temperatures (SSTs) over the equatorial central Pacific Ocean are likely to return to neutral situation over the coming months. Likewise, global models further indicate that the Indian Ocean Dipole (IOD) will likely remain neutral. Updates on the El Niño Southern Oscillation (ENSO) condition will be provided regularly by WMO and the major climate centres.

[Whilst MAM is the wettest time of the year for much of the GHA, seasonal anomalies are generally less predictable during the MAM wet season than in the other wet season, OND. This is largely a consequence of the association between rainfall and teleconnections such as ENSO and IOD being much weaker in MAM than in OND.](#)

The outlook is relevant for seasonal timescales and covers relatively large areas. Local and month-to-month variations might occur as the season progresses. Spells of heavy rain and above normal rainfall may occur in areas with an increased likelihood of below normal seasonal totals and vice versa. ICPAC will provide regional updates on a regular basis while the National Meteorological and Hydrological Services (NMHSs) will provide detailed national and sub national climate updates.

2. The Climate Outlook Forum

The Sixtieth Greater Horn of Africa Climate Outlook Forum (GHACOF60) was convened on 15-17 February 2022 by the IGAD Climate Prediction and Applications Centre (ICPAC) in collaboration with the National Meteorological and Hydrological Services (NMHSs) of IGAD Member States, World Meteorological Organization (WMO) and other partners. The objective was to document and share the climate impacts across the region, and formulate responses to the regional climate outlook for the March to May 2022 rainfall season over the GHA. The GHA region comprises Burundi, Djibouti, Eritrea, Ethiopia, Kenya, Rwanda, Somalia, South Sudan, Sudan, Tanzania and Uganda. The forum reviewed the state of the global climate system including the ENSO conditions, IOD, and SSTs over the Pacific and Indian Oceans, and considered their impacts on the GHA during March to May 2022 rainfall season. Climate information users from all relevant sectors (disaster risk management, agriculture and food security, livestock, health, environment, water resources, conflict and media) as well as NGOs and development partners actively participated in the formulation of mitigation strategies.

3. Methodology

Guidance and valuable forecast information on factors expected to influence the upcoming season were drawn from a wide range of sources. Predictions from dynamical seasonal climate models, including those of the World Meteorological Organisation's Global Producing Centres Long-Range Forecasts (WMO GPCs-LRF) formed the primary forecast inputs.

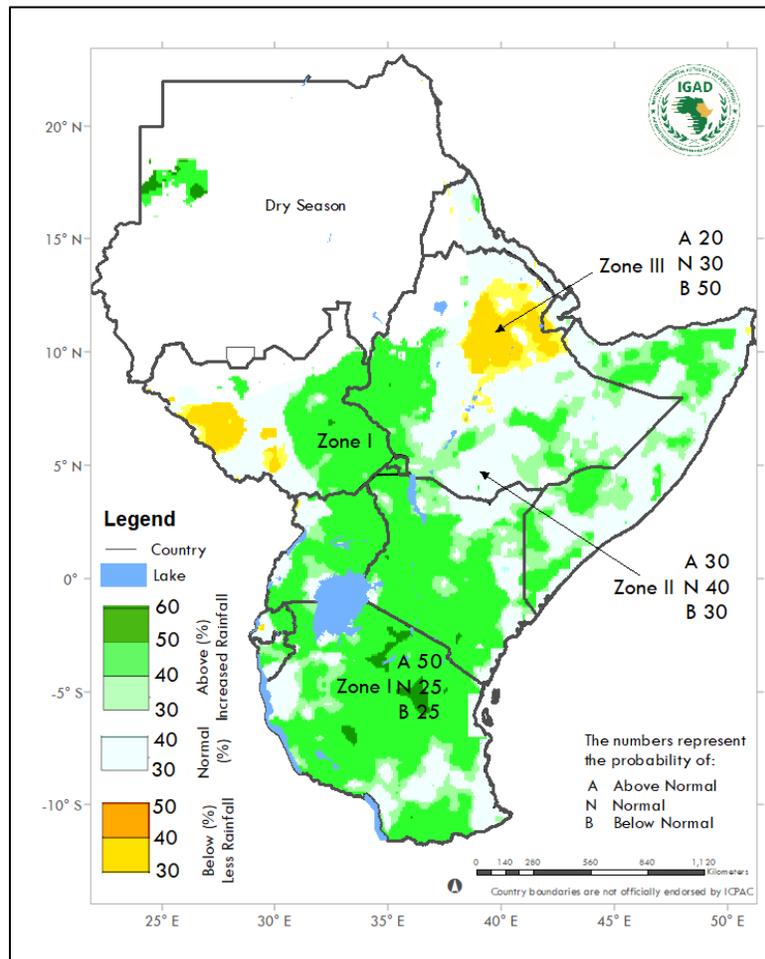
The objective seasonal forecast was developed during PreCOF60, a one-week climate capacity building workshop held from on 7-11 February 2022. Experts examined the prevailing and predicted SSTs over the Pacific, Indian and Atlantic Oceans as well as other global, regional and local climate factors that affect the rainfall evolution during MAM season. These factors were assessed using dynamical and statistical models. The regional consolidated objective forecast is produced by recalibrating outputs from 8 global state-of-the-art seasonal prediction systems (WMO GPCs-LRF and other models). Regional scientists and national forecasters from 10 ICPAC Member States used ICPAC's High-Performance Computing (HPC) cluster through remote connection to co-develop regional and national-level climate outlooks. Climate prediction products were used by sectoral experts and climate providers to co-assess expected impacts, draft mitigation strategies, and co-produce advisories.

The current capability of seasonal to inter-annual climate forecasting allows for the prediction of departures from climatology on a regional domain, with consideration of scales of processes that contribute to regional and sub-regional climatic conditions. Forecast probability distributions are established objectively to indicate the likelihood of above-, near-, or below-normal rainfall for each zone. Above-normal rainfall is defined as within the wettest third of recorded rainfall amounts in each zone; near-normal is defined as the middle third of the recorded rainfall amounts; below-normal rainfall is defined as occurring within the driest third of the rainfall amounts. Climatology here refers to weather conditions, averaged over a 30-year period (1991-2020). Probability distributions for temperature are also established.

The rainfall and temperature outlooks for March to May 2022 for various zones within the GHA region are given in Figure 1 and Figure 2, respectively. Figure 3 provides Standardized Precipitation Index for 3-, 9, and 12-month time scale. Figure 4 provides an outlook for onset dates of the March to May 2022 season.

4. Rainfall Outlook for March to May 2022

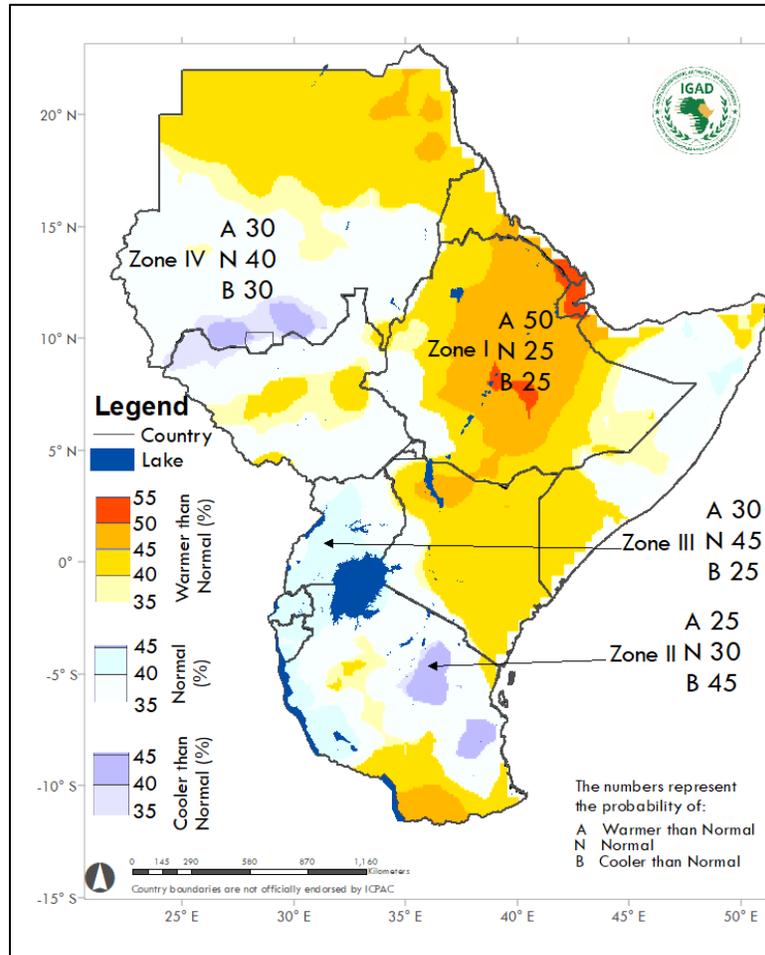
The rainfall outlook for various zones within the GHA region is given in Figure 1 below.



- Zone I:** In this Zone (light to dark green), wetter than average rainfall category has the highest probability (50%). The probability for near average and drier than average categories are each at 25%.
- Zone II:** In this Zone (light blue), the near normal rainfall (average) category has the highest probability (40%). The probabilities of the below and above normal categories are 30%.
- Zone III:** In this Zone (orange), the below normal rainfall (drier) category has the highest probability (50%). The probabilities of the normal and above normal categories are 20% and 30%, respectively.

5. Temperature Outlook for March to May 2022

The temperature outlook for various zones within the Greater Horn of Africa is given in Figure 2 below.



Zone I: In this Zone the above normal mean temperature (i.e., warmer) category is most likely at 50% (the probabilities of the other categories are also provided).

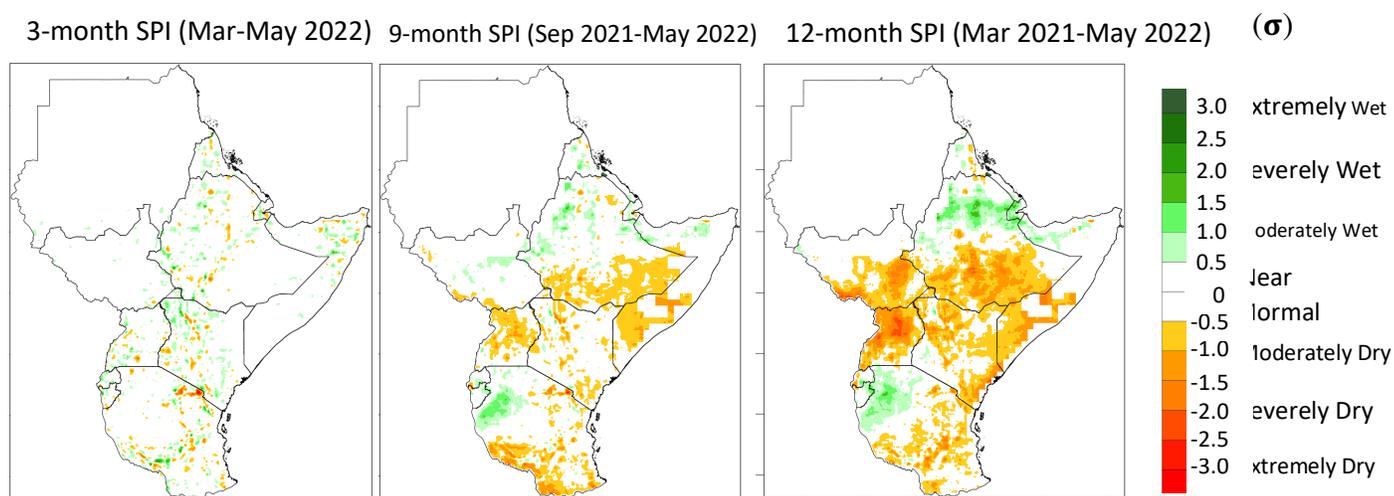
Zones II: In this Zone the normal mean temperature (i.e., average) category has the highest probability (at 45%).

Zones III: In this Zone the below normal mean temperature (i.e., cooler) category has the highest probability (at 40%).

Note: The numbers for each zone indicate the probabilities of rainfall/temperature in each of the three categories, above-, near-, and below-normal. The top number (A) indicates the probability of rainfall occurring in the above-normal category; the middle number (N) is for near-normal and the bottom number (B) for below-normal category. For example, in Zone I in Figure 1, there is 50% probability of rainfall occurring in the above-normal category; 25% probability of rainfall occurring in the near-normal category; and 25% probability of rainfall occurring in the below-normal category.

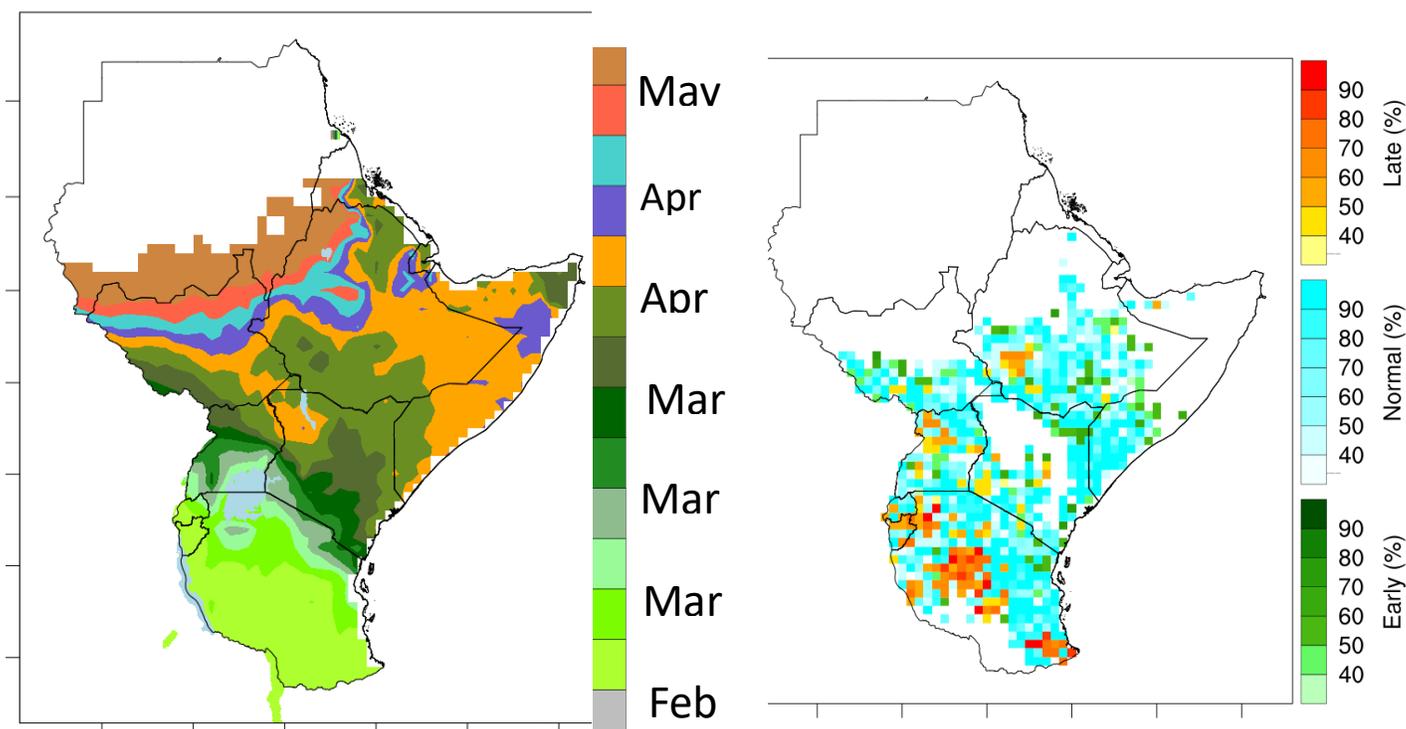
6. Precipitation-based Drought Outlook based on Standardized Precipitation Index (SPI)

The intensity and duration of droughts are indicated in the 3, 9, and 15 months SPI ending on 31 of May 2022 in Figure 3 below.



7. Probability forecasts of the start of MAM 2022 season and the expected average onset dates

The average start dates of March to May 2022 season and their probability outlook are provided in Figure 4. The forecast was processed from the ECMWF daily forecast data obtained from the C3S Climate Data Store.



Note: The map on the left indicates the expected rainfall onset dates from model ensemble mean values. The map on the right indicates the probabilities of the start of the rainfall season in each of the three categories, early-, normal-, and late.

Contributors

GHACOF 60 was jointly organized by the IGAD Climate Prediction and Applications Centre (ICPAC) and National Meteorological and Hydrological Services (NMHSs) of the Greater Horn of Africa (GHA). The forum was supported by the ClimSA and CONFER projects funded by the European Union, as well as the AICCRA project funded by the World Bank. Contributors to the regional climate outlook included representatives of NMHSs from GHA countries (Institut Géographique du Burundi; Météorologie Nationale de Djibouti; National Meteorological Agency of Ethiopia; Kenya Meteorological Service; Rwanda Meteorological Agency; South Sudan Meteorological Service; Sudan Meteorological Authority; Somalia Meteorological Authority, Tanzania Meteorological Authority and Uganda National Meteorological Authority) and climate scientists, as well as other experts from national, regional and

international institutions and organizations: ICPAC, UK Met Office, and WMO Global Producing Centres (GPCs).

Annex II: Summary for decision makers

See attached document