ACMAD
African Center of Meteorological Applications for Development
Centre Africain pour les Applications de la Météorologie au Développement

www.acmad.ne

Effective Climate Services for an Enhanced Multi-Hazard Early Warning Systems

Nov. 11, 2024, Baku, Azerbaijan

African Union

Prepared by the ACMAD Team
Presented by
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Faire du temps, du climat et de l'environnement des ressources pour le développement
Making weather, climate and environment resources for development

ACMAD CORES MISSIONS

Created trough resolution 540 of the UNECA Conference of Ministers in April 1985 following the droughts of the 70s and 80s , ACMAD is established in Niamey-Niger since October 1992

- Continental Weather and Climate Watch Centre for Africa with Monitoring, *forecasting* and *early warning for* droughts, floods, tropical cyclones and other extreme events as functions

  - ✓ ***The Continental Climate Watch Centre was achieved with ACMAD designated by the WMO Congress after a successful demonstration phase as a Regional Climate Centre for Africa in May 2015;***
  - ✓ ***The Continental Weather Watch Centre was achieved with the Continental Multi-Hazards Advisory Centre inaugurated in November 2022, at ACMAD providing contributions to continental watches and disaster situation reports to the situation room operations at the African Union Commission Headquarter in Addis Ababa***

- Institution of excellence for the Applications of meteorology for sustainable development with capacity building, methods, tools and products development, contribution to global weather and climate programs, database , research and innovation as functions

ACMAD is a member of the NoE (Africa Network of Excellence for DRR)

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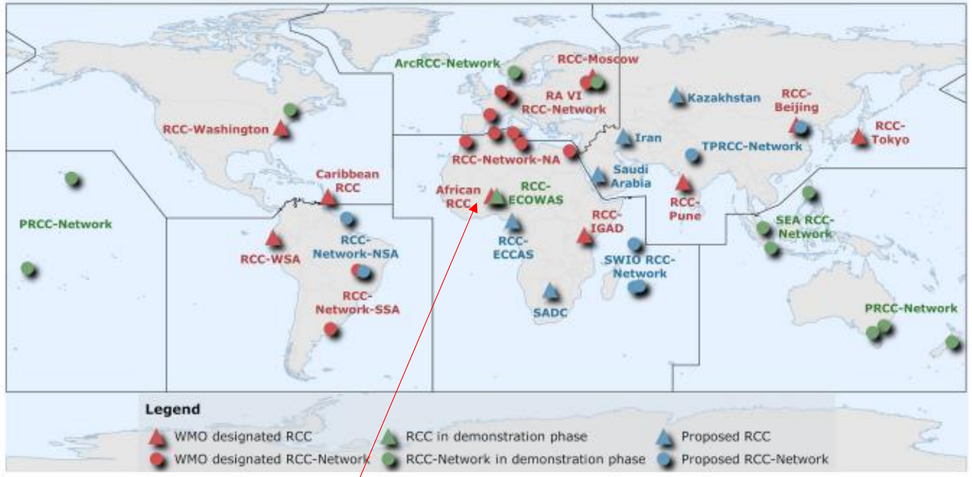
WMO RCC Status Worldwide



WMO OMM

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Continental Multi-Hazards Advisory Centre

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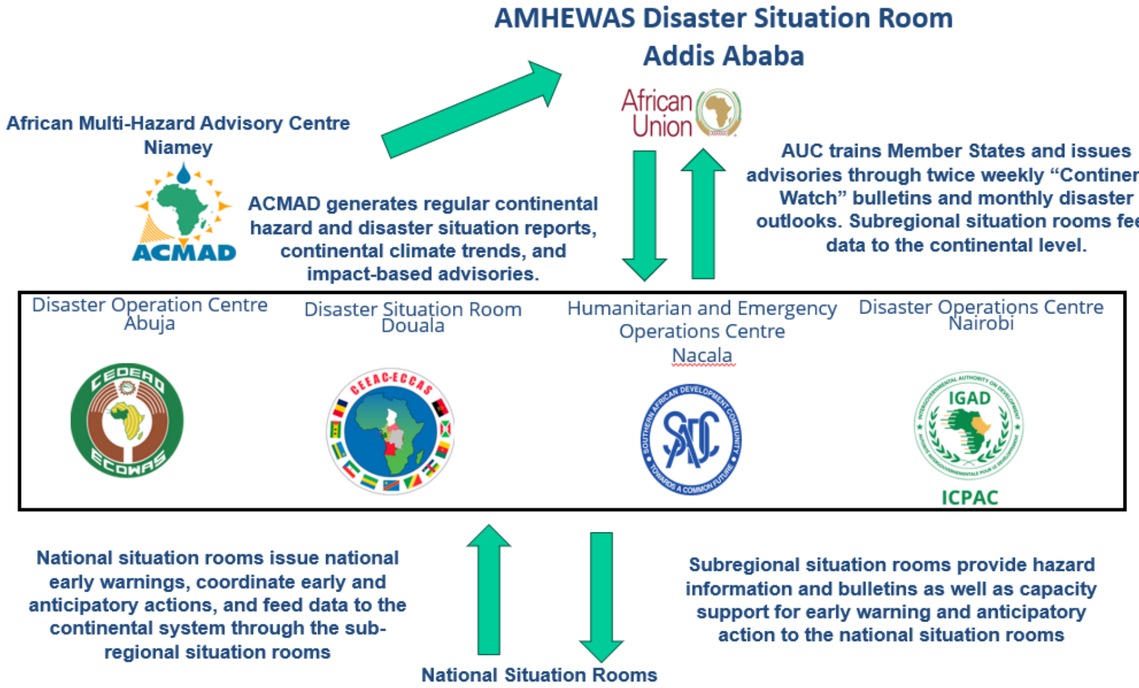
Stakeholder Involvement

- ACMAD adopted a cascading communication chain to facilitate the movement of information from its source to the final users;
- Information moves from the global forecast centres on the international scale and national meteorological services on the country scale to regional organisations such as IFRC, OCHA, national civil protection agencies, DRM, UNHCR, WHO and UNDRR as well as AUC Situation Room.

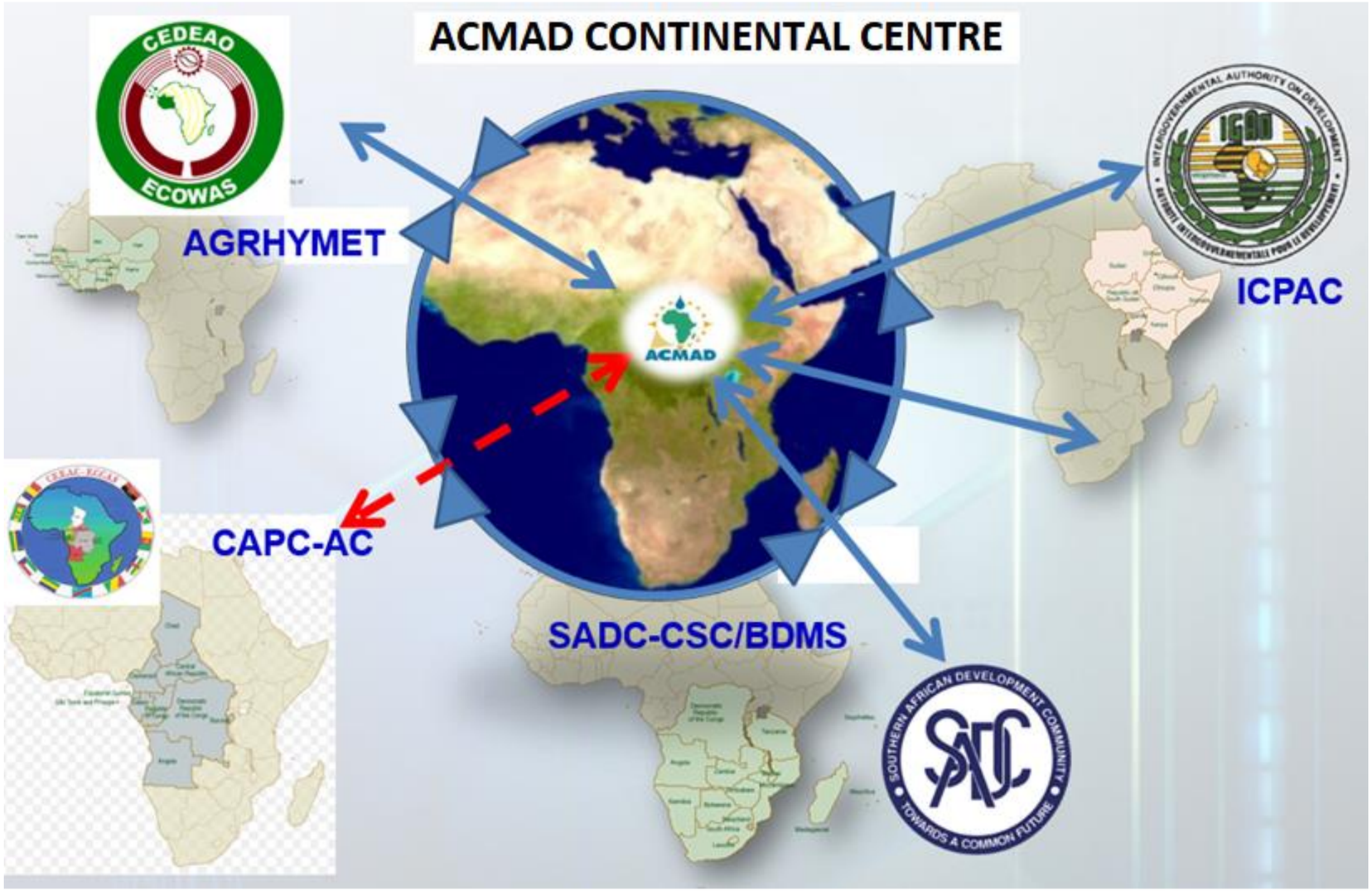
Information finally reaches other national and community level stakeholders.



ACMAD Support the AMHEWAS program. The ACMAD Sit Room is now operational as part of the African multi-hazard early warning system for rapid action and provides twice-weekly Continental Watch, information on extreme rainfall, high winds and cyclone tracks, as well as collaborating with the AUC SitRoom and Sit Room ICPAC in the production of Situation Reports.

The centre also contributes to the organisation of ad-hoc briefings for anticipatory action.

ACMAD CONTINENTAL PARTNESHIP



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Background

The delivery of climate information services in Africa has come of age.

Climate services evolve around the timely transfer of meteorological data and forecast products to users in several socio-economic sectors.

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Matters Arising

There has been increasing growth of population and economy, as well as urbanization in the continent.

This has consequently resulted in an increase in the activities of different climate-sensitive sectors, such as agriculture and food security, construction, energy, health, water resources and transport.

Though, these changes are largely driving the uptake of climate information services in Africa, there are, however, two major challenges that have been preventing the appropriate uptake of climate information services in the continent.

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Major Challenges (1)

Currently and operationally, weather forecasts in Africa are limited to two days in advance. Outlooks cover up to 5 days at most.

Medium-range (7 to 15 days) weather and or climate forecasts are therefore not covered, thereby making short-range (1 to 5 days) weather forecasts operationally predominant.

While these short-range forecasts are useful for reactive decisions, they are less effective for long-term planning and action toward disaster risk reduction particularly in key areas such as health, food security, environment, and water resources.

Major Challenges (2)

Collaborations between the continent's meteorological and hydrological agencies and key stakeholders (i.e., forecast end-users) is weak.

Jointly developed user-tailored impact-based forecasts are almost not existing.

The end-users contribute in no way to the forecaster's operational algorithms.

The outcome of the poor relationship is the end-users' inability to interpret and consume the services offered by the forecasters.

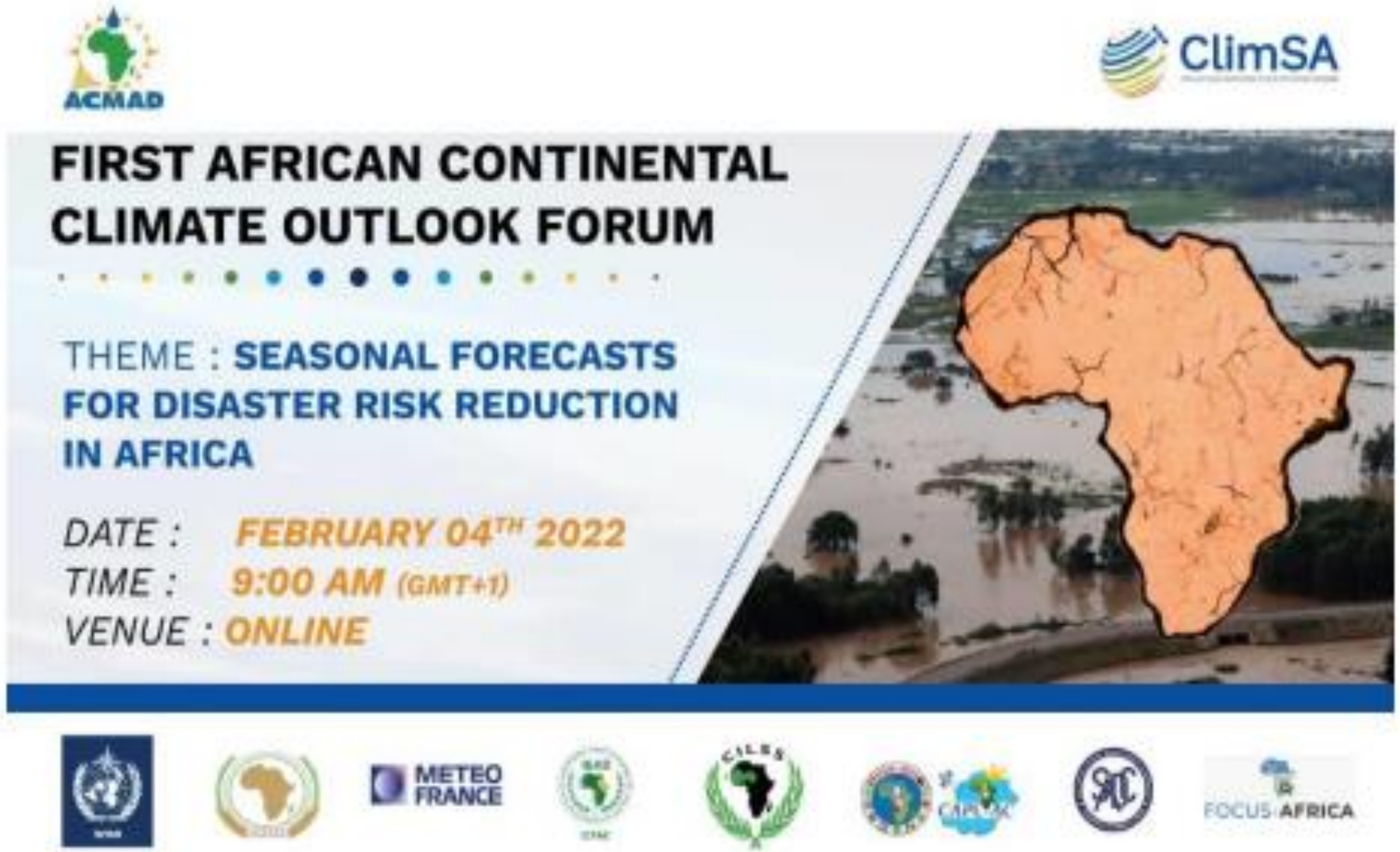
Provisional Solutions

Timely and reliable, real-time sub-seasonal-to-seasonal (S2S) and seasonal climate forecast algorithms that will extend the short-range forecast timescales beyond that of medium-range timescales become necessary for operational purposes.

At the same time, scientists and forecasters need to develop a platform that opens and utilizes communication channels with forecast end-users.

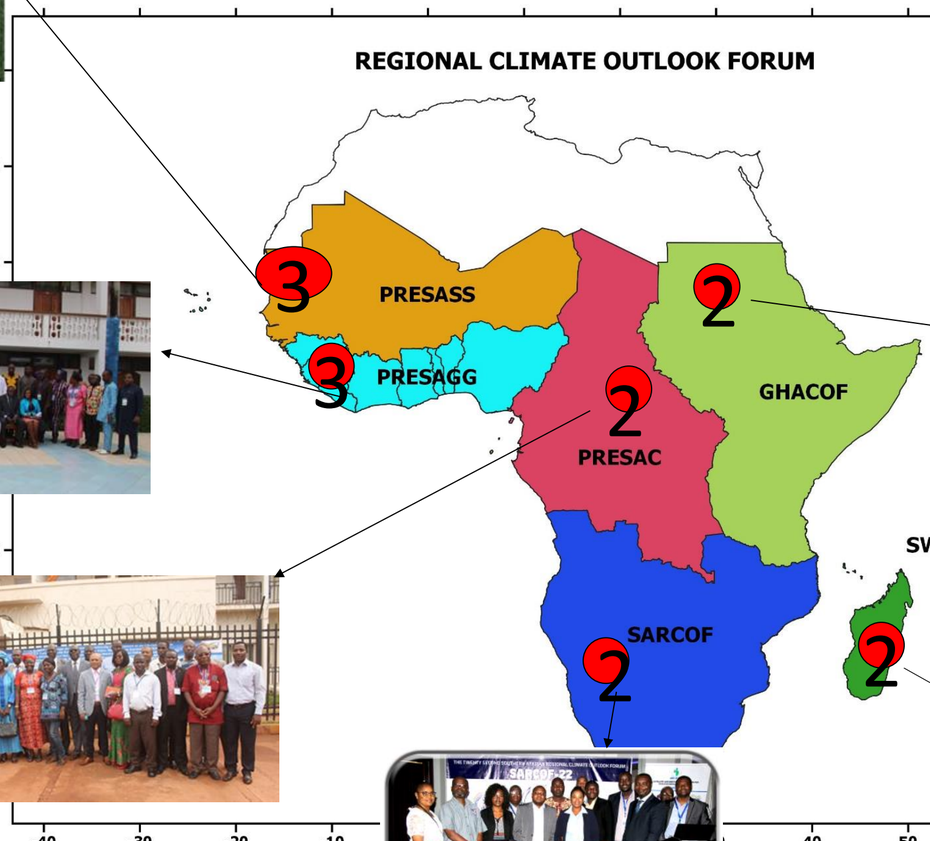
Therefore, institutionalization of continental climate oulook (ACCOFs) and regional climate oulook (RCOFs) fora at 6 regional levels within the continent, with supervisions from ACMAD.

African Continental Climate Outlook Forum



Institutionalization of Climate Outlook Fora in the Continent

* 196 DRM & Humanitarians consulted,
* DRR's needs for climatological information collected for 6 regions,
* Best practices on preparation & response to disaster shared for each 6 region.



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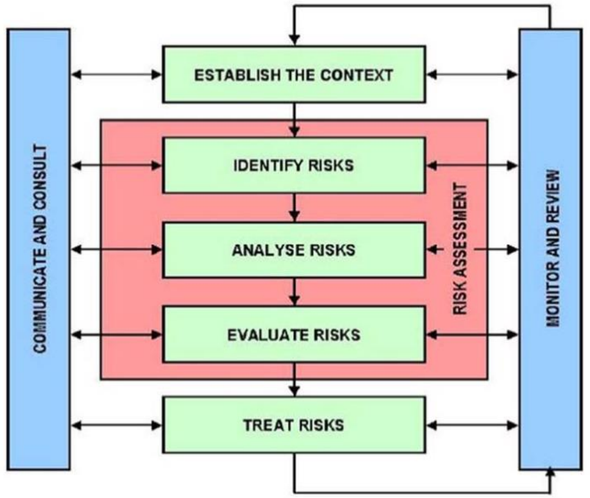
User Interface Platforms Established and Operationalization in progress

African Continental User Interface Platform

Agriculture UIP | Health UIP | Water UIP | DRR UIP

African Continental User Interface for the Agriculture Sector

- Term of reference
- Rules of procedure
- Composition of the platform
- Meetings and Workshops
- Programmes, Products and Services



User Interface Platform (UIP) at ACMAD

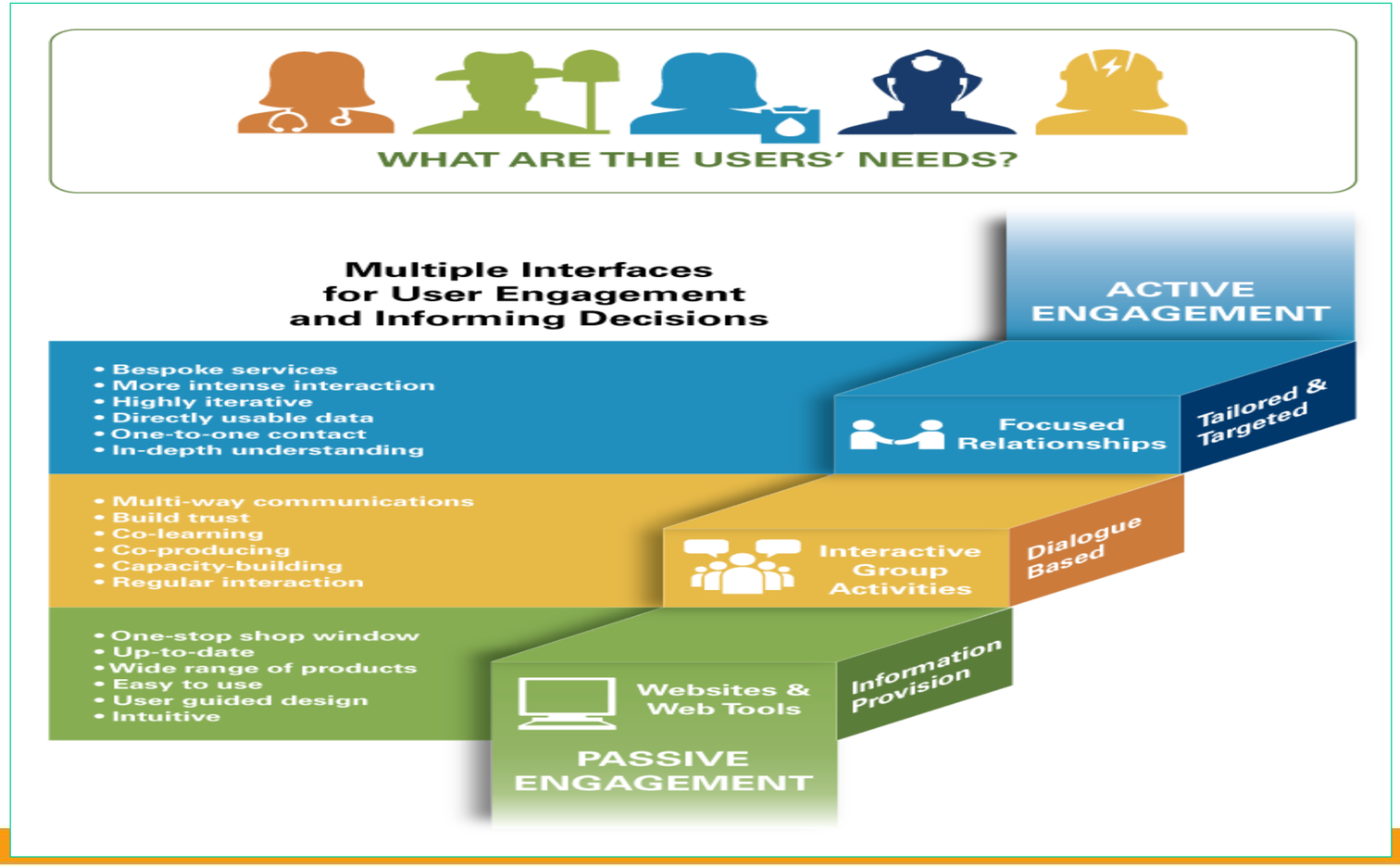
UIPs provide knowledge management frameworks, engage users and strengthen partnerships with specific user sectors

-intermediation

- Internalization

-Externalization

-Cognition



UIP AGRICULTURE

-AGRICULTURE SECTOR

Risk causes:

Floods, drought, High and low temperature, spells, disruptions of start and end of season, strong winds and thunderstorms, hailstorms

Products and services

Seasonal total precipitation and temperature outlooks

Start and end of season, dry and wet spells monitoring and outlooks

Advices for land preparation, sowing, fertilizer spray, weed control and management, harvesting, crop conservation, optimal crop varieties for agro climatic zones

Warnings and Alerts for pests and diseases

Activities

- Analysis of climate information needs along the agriculture value chain, share bespoke impact based climate monitoring and forecasting information, advices
- Climate risk assessment along the value chain for each commodity
- Prepare advices for farmers, herders, fishermen and other stakeholders of the value chain
- Estimation of food production and advices for agriculture products conservation
- Estimation of demand and supply in agriculture commodity markets
- Management of agriculture commodity conservation and market prices
- Update, tailor and share bespoke climate information among agriculture stakeholders, monitoring and evaluation of activities

Rules of procedures

Chair Elected from the PAFO members: Secretariat: ACMAD, frequency of meetings: twice a year ahead of major agriculture seasons and ad hoc

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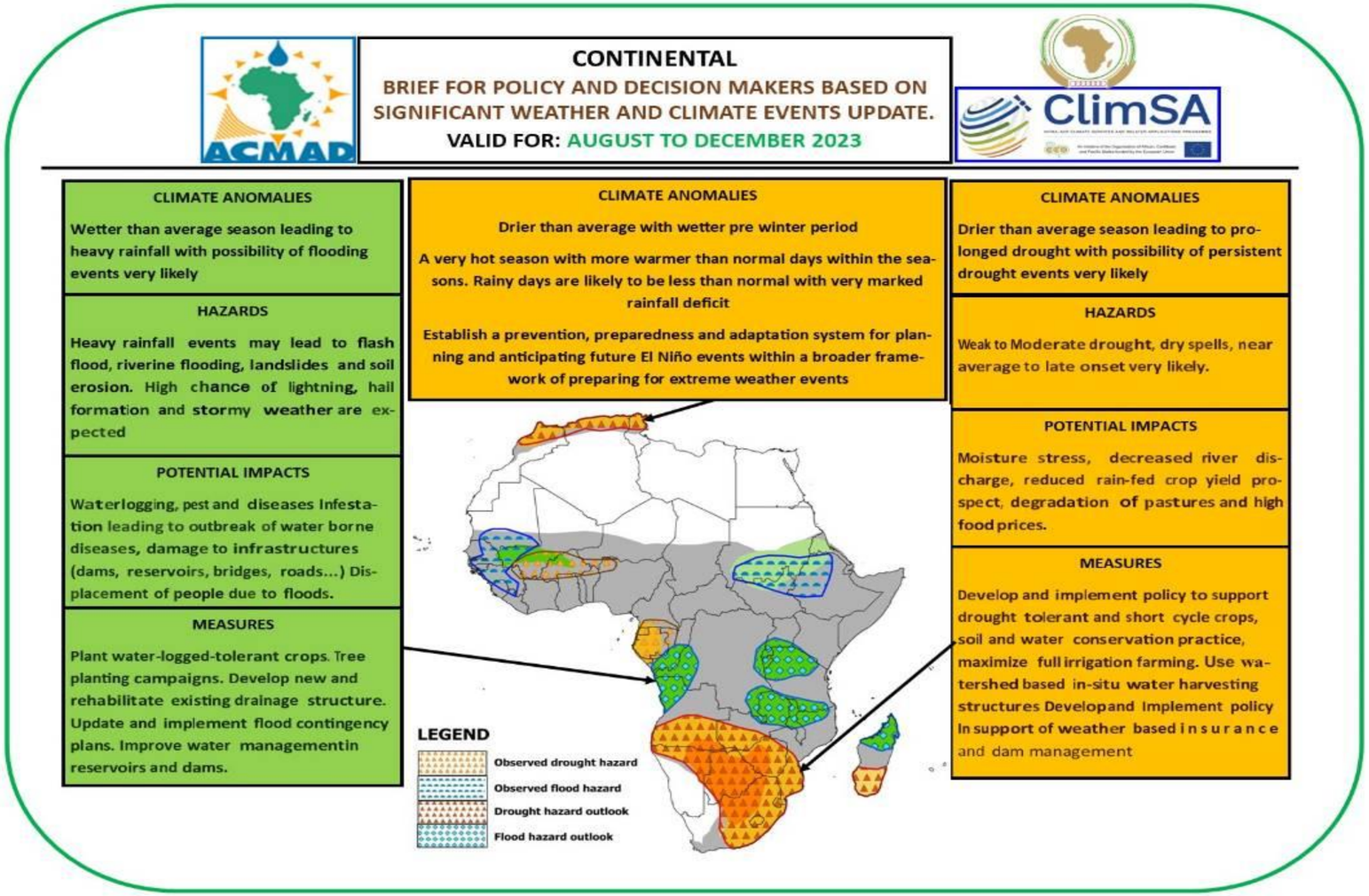
Continental and Regional support Services at ACMAD

BRIEF FOR POLICY AND DECISION MAKERS

Impact outlook Update



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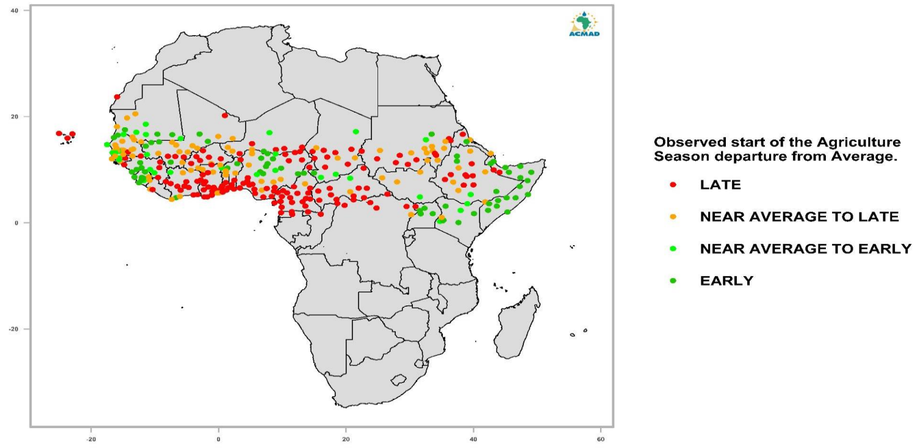
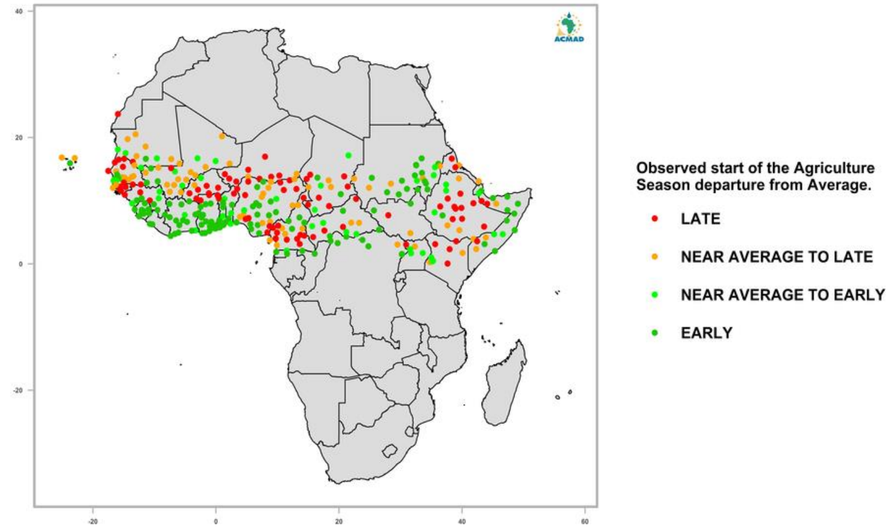
Possible starts of the Agriculture season

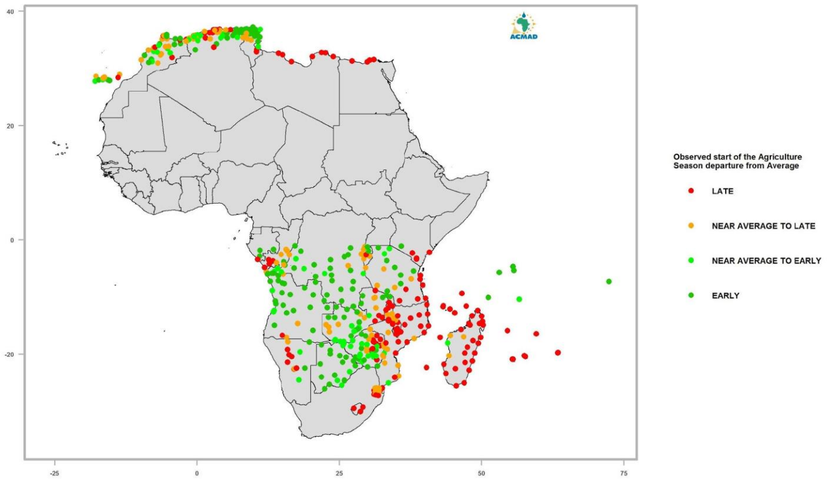
START OF THE AGRICULTURE SEASON FROM JANUARY TO JULY IN 2020 OVER SUB-SAHARAN AFRICA.



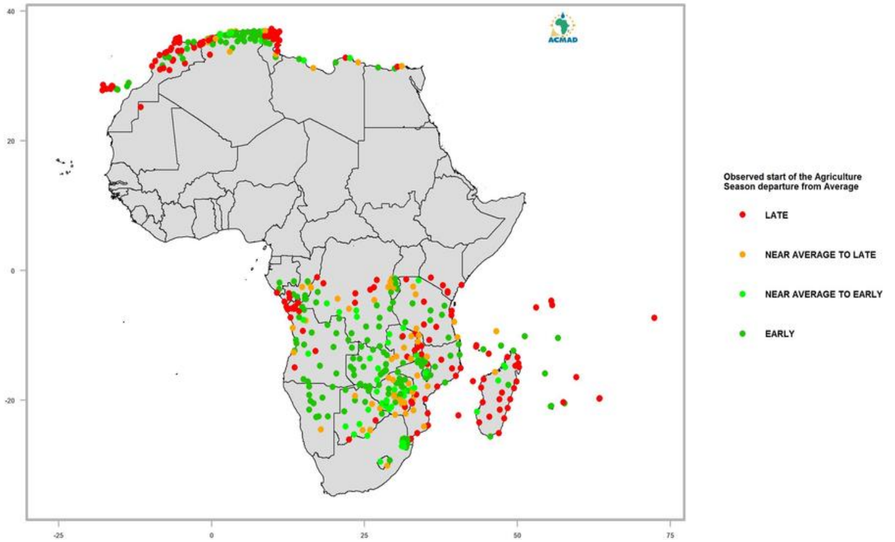
START OF THE AGRICULTURE SEASON FROM JANUARY TO JULY IN 2021 OVER SUB-SAHARAN AFRICA.



START OF THE AGRICULTURE SEASON FROM JULY TO DECEMBRER IN 2020 OVER SOUTHERN AND NORTHERN AFRICA.



START OF THE AGRICULTURE SEASON FROM JULY TO DECEMBRER IN 2021 OVER SOUTHERN AND NORTHERN AFRICA.



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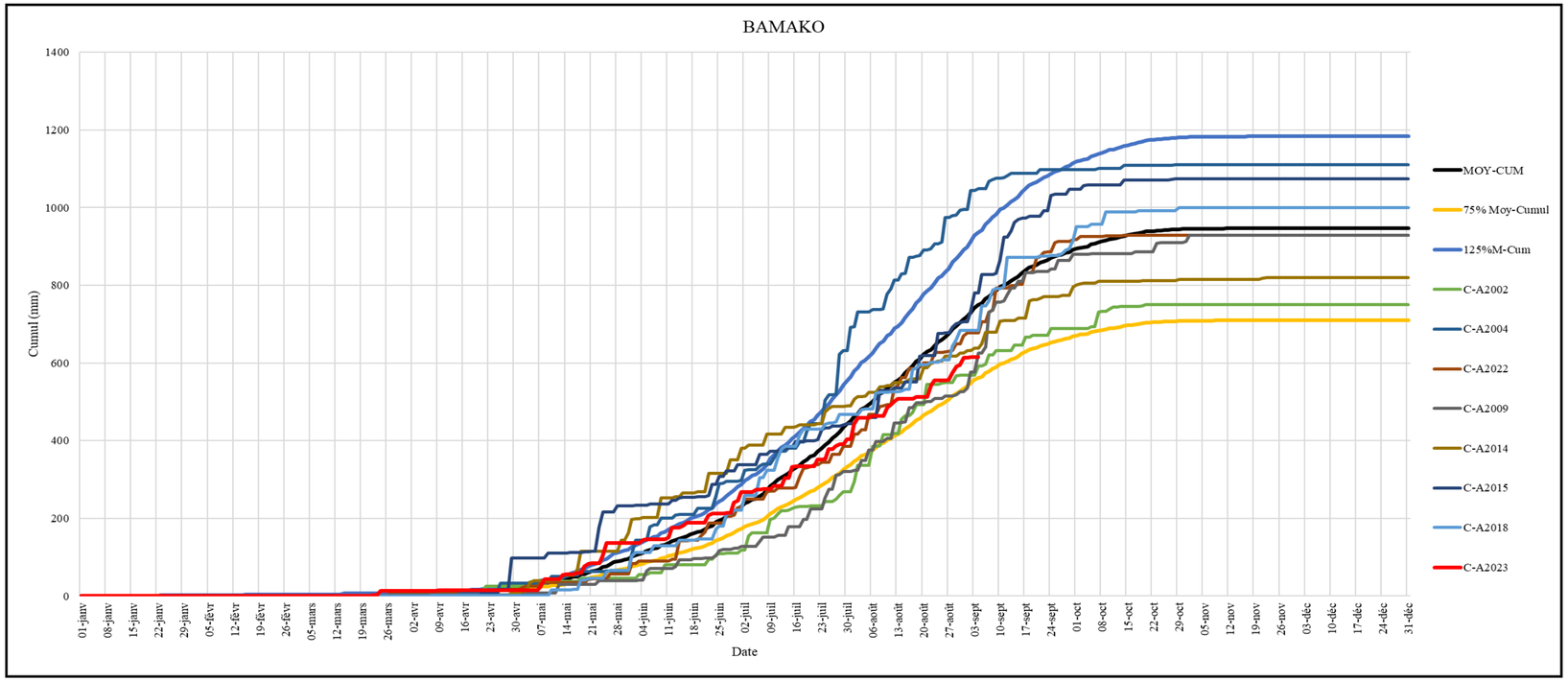
Acceleration of establishment and operationalization of UIPs from continental to local scales



Update seasonal forecast at local level – Bamako expected to be near to below average with dry spell in July-august 2023

To improve interpretation and use of regional products, ad hoc briefings and dialogues are essential and should be promoted between regional centers, NMHS and stakeholders of the agriculture , water , Health and DRR sectors .

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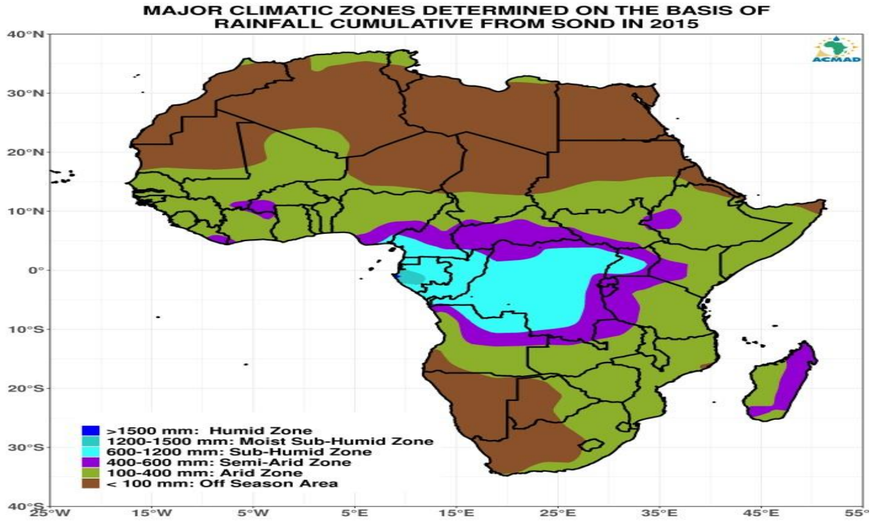
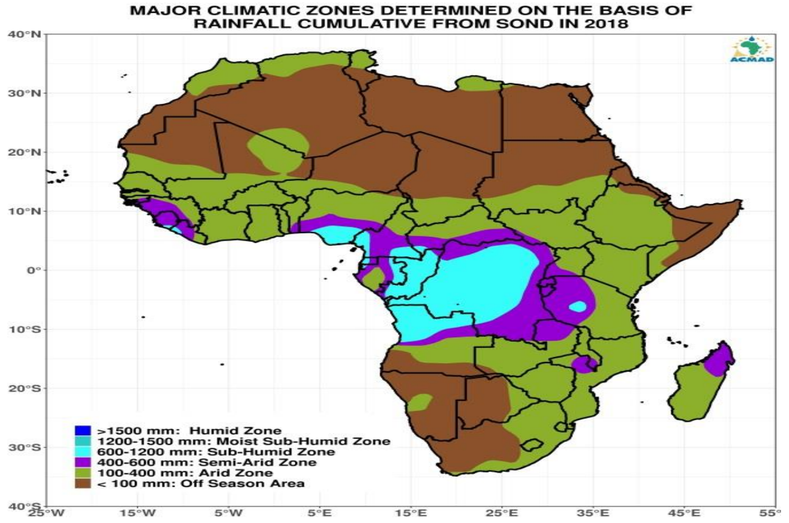
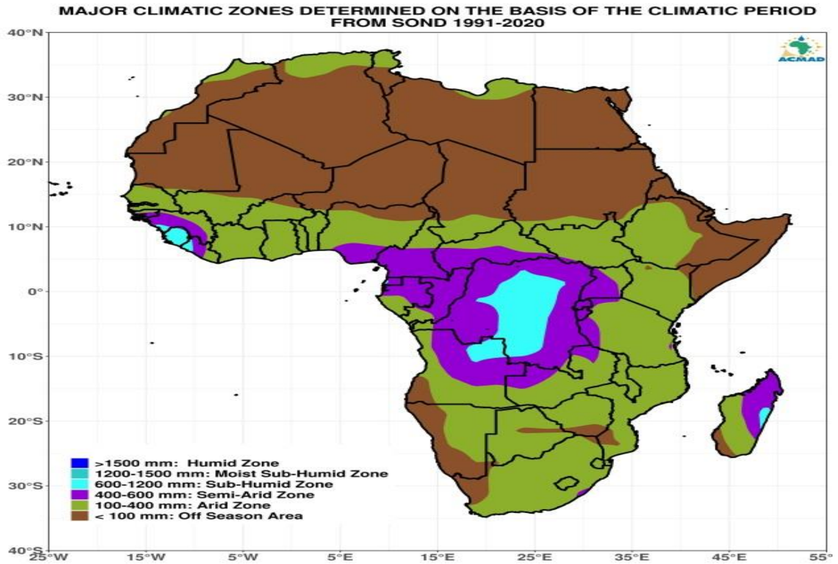
Actionable indicator: Extents of African land masses likely to be hit by drought in El Nino years for the SOND season







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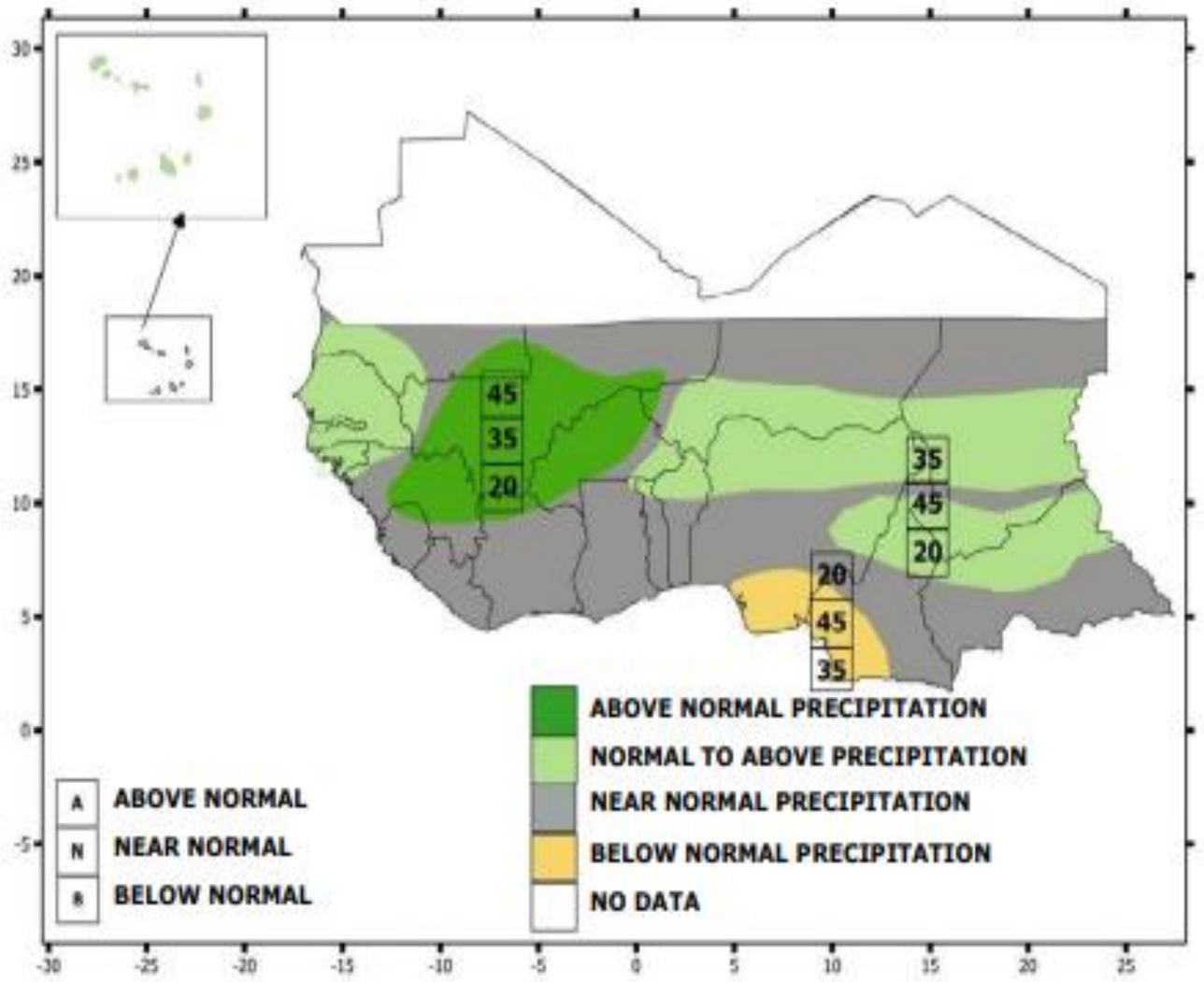
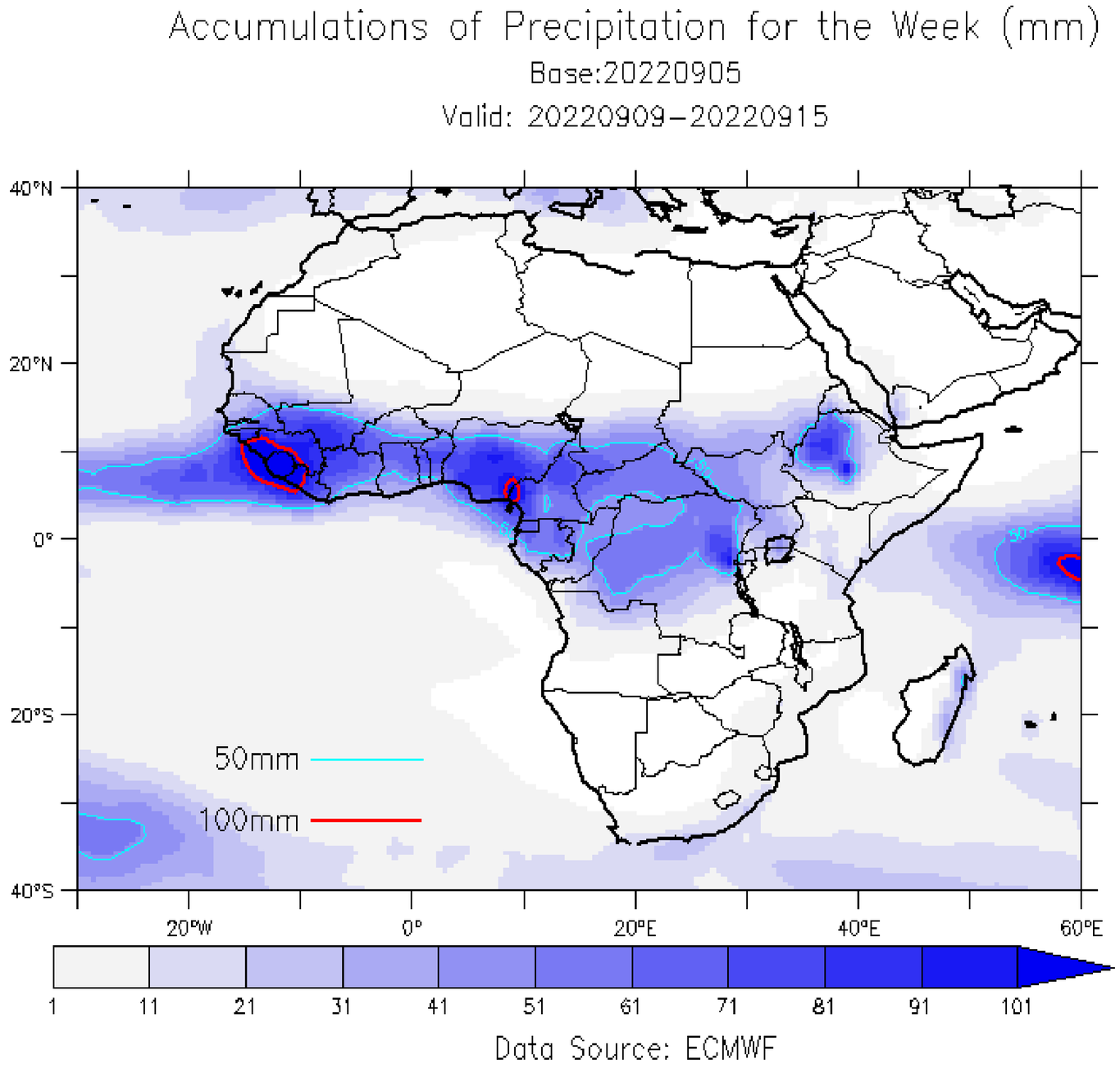
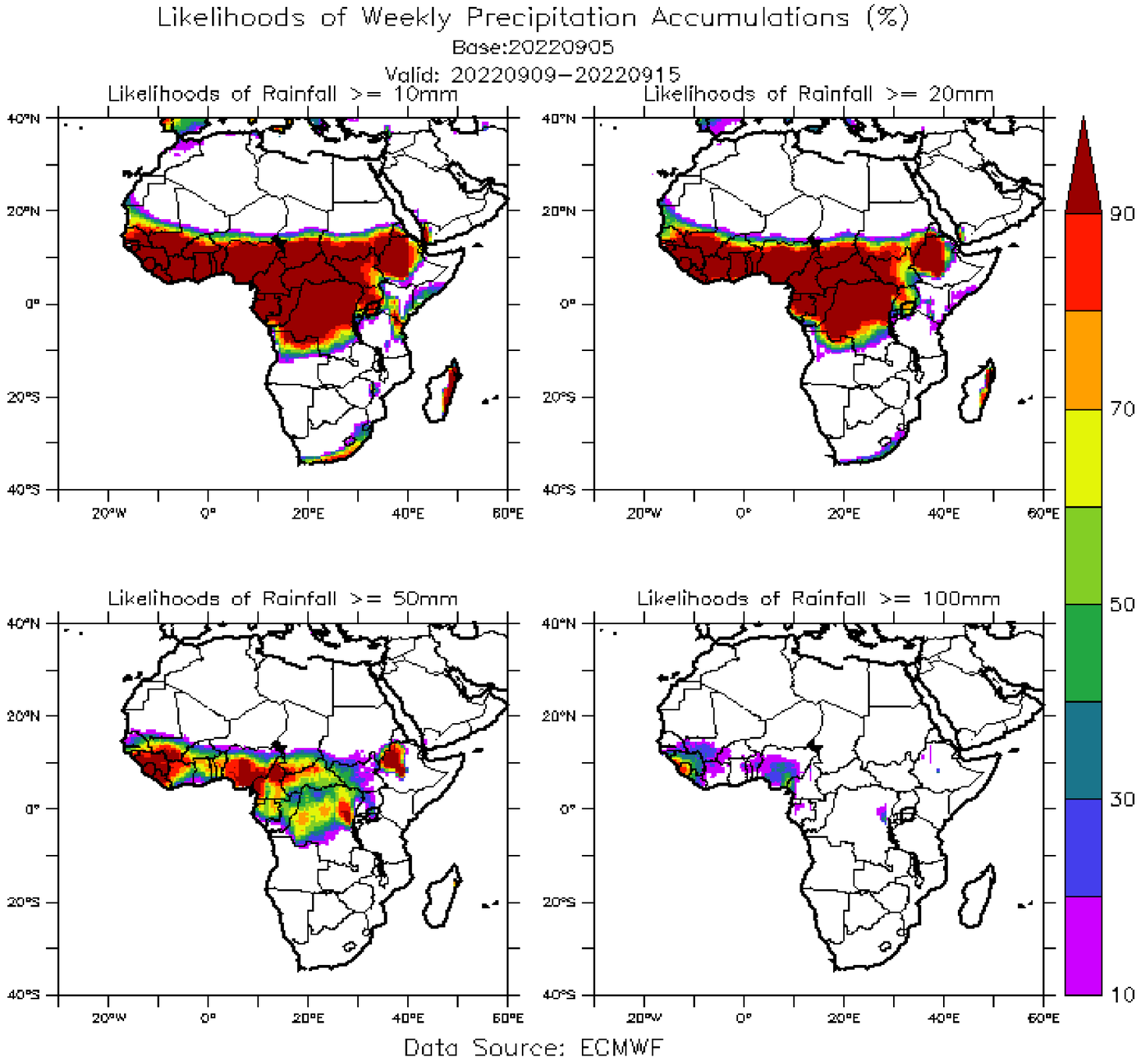
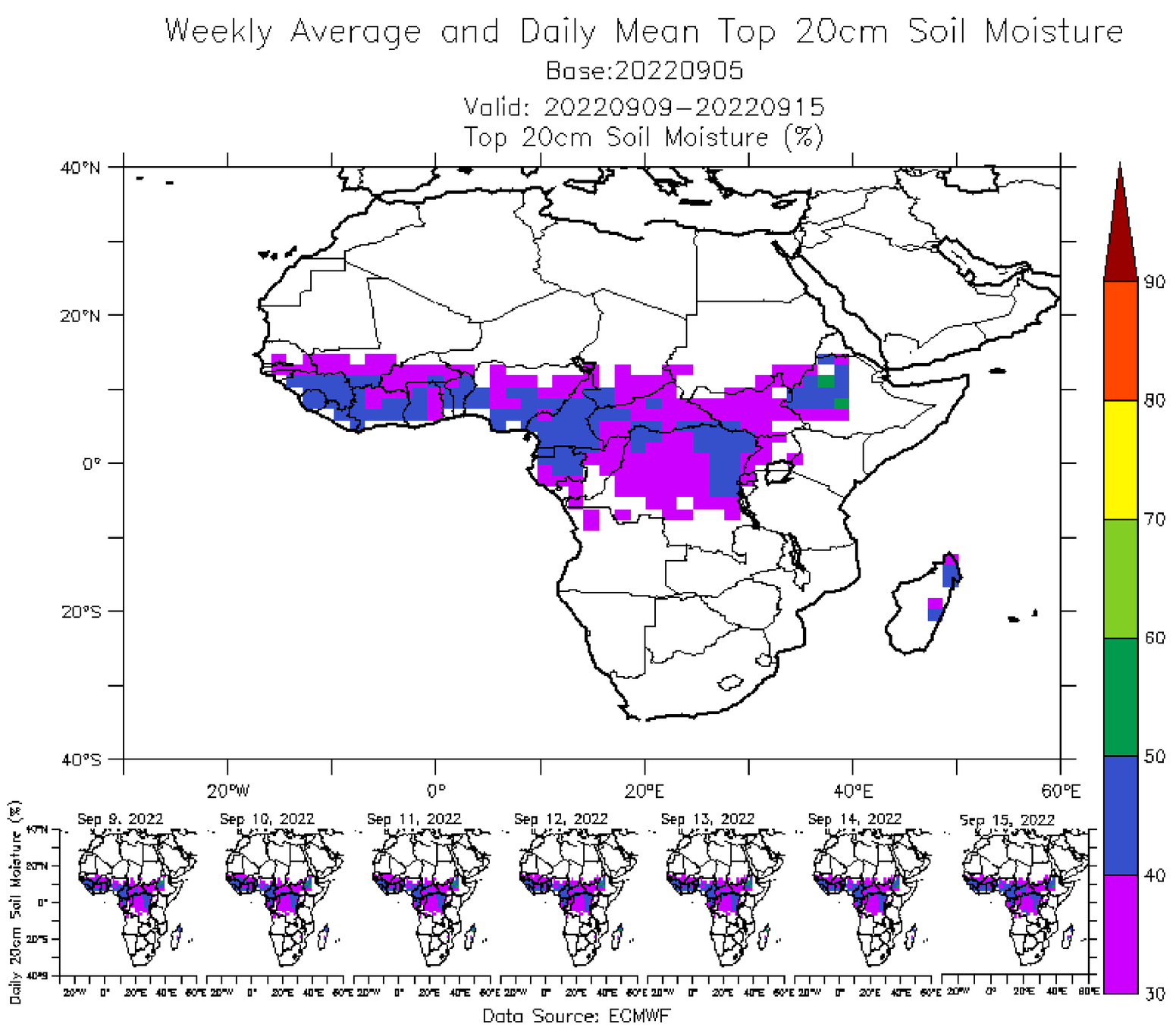
Seasonal precipitation forecast for the Sudano-Sahelian region valid for July-August-September 2023

Elaborated June 7, 2023

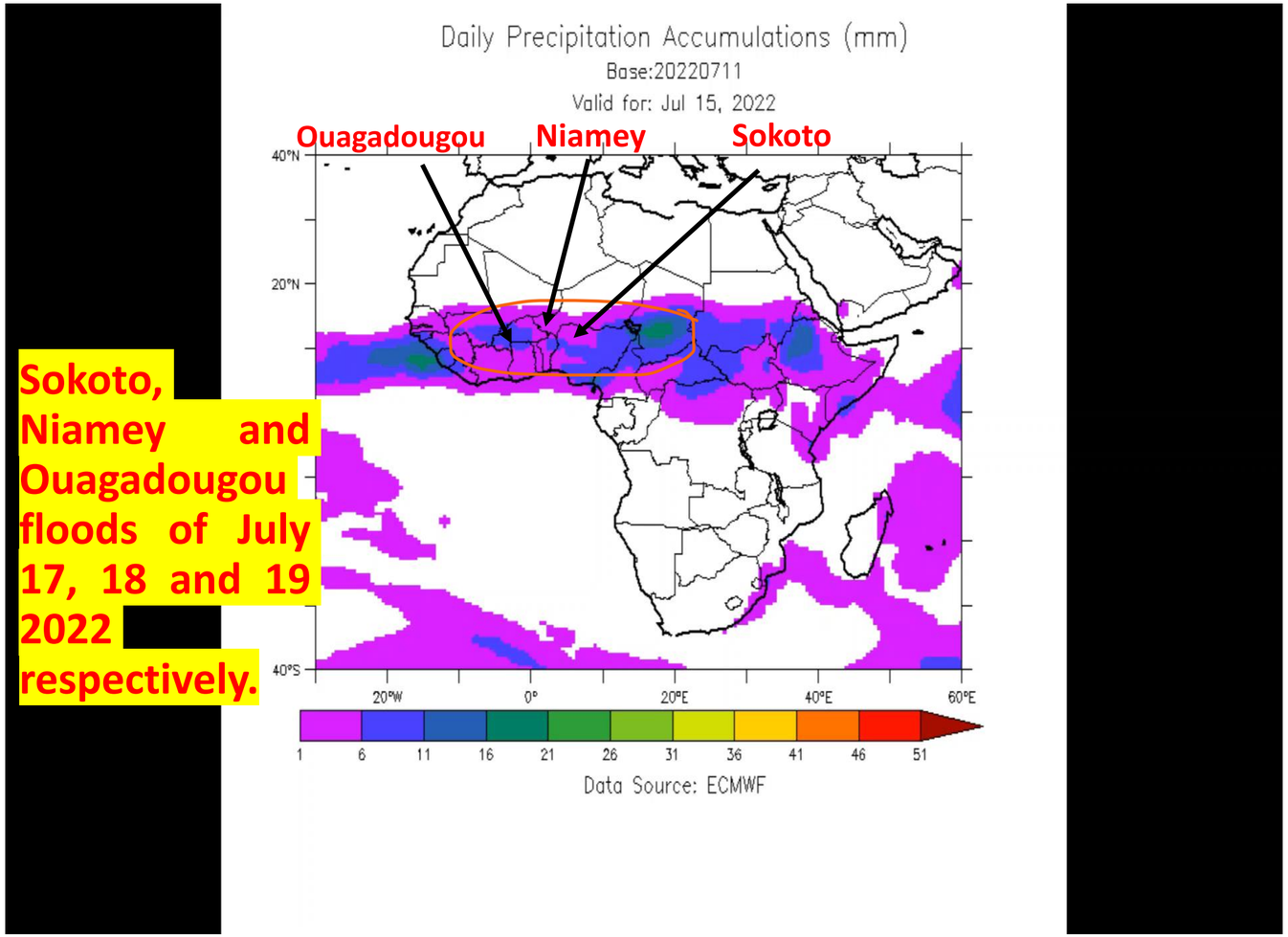



Accumulations of Precipitation for the Week (mm)
Base:20220905
Valid: 20220909–20220915
40°N
20°N
0°
20°S
40°S
20°W
0°
20°E
40°E
60°E
50mm
100mm
1
11
21
31
41
51
61
71
81
91
101
Data Source: ECMWF


Likelihoods of Weekly Precipitation Accumulations (%)
Base:20220905
Valid: 20220909–20220915
Likelihoods of Rainfall >= 10mm
Likelihoods of Rainfall >= 20mm
Likelihoods of Rainfall >= 50mm
Likelihoods of Rainfall >= 100mm
40°N
20°N
0°
20°S
40°S
20°W
0°
20°E
40°E
60°E
90
70
50
30
10
Data Source: ECMWF

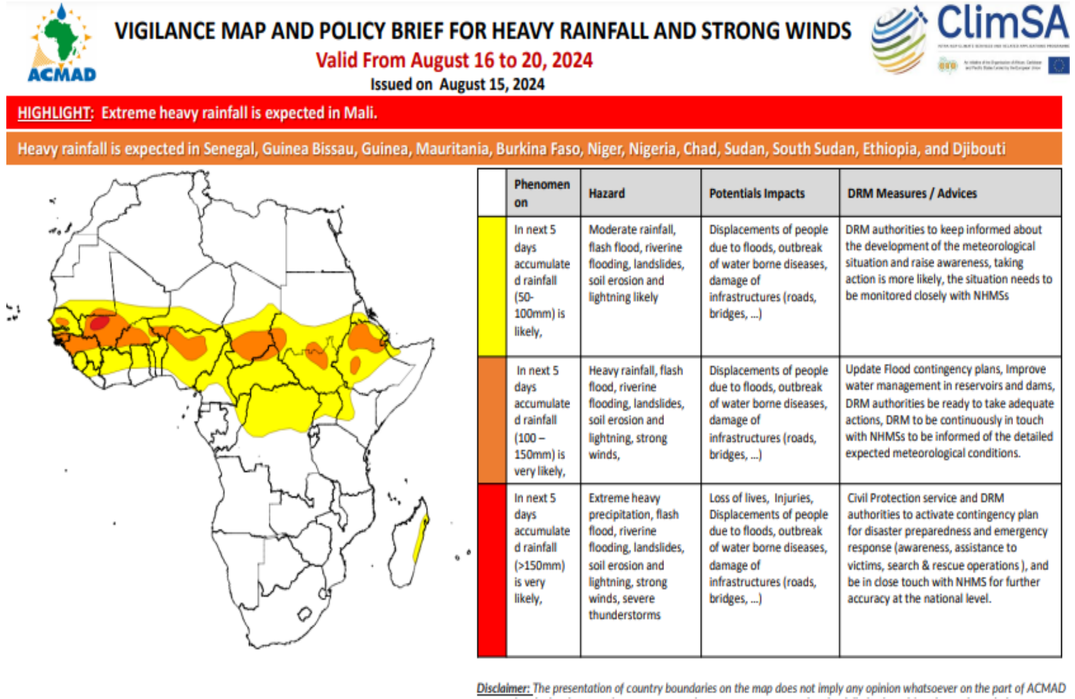

Weekly Average and Daily Mean Top 20cm Soil Moisture
Base:20220905
Valid: 20220909–20220915
Top 20cm Soil Moisture (%)
40°N
20°N
0°
20°S
40°S
20°W
0°
20°E
40°E
60°E
90
80
70
60
50
40
30
Daily 20cm Soil Moisture (%)
Sep 9, 2022
Sep 10, 2022
Sep 11, 2022
Sep 12, 2022
Sep 13, 2022
Sep 14, 2022
Sep 15, 2022
Data Source: ECMWF

03



Sokoto, Niamey and Ouagadougou floods of July 17, 18 and 19 2022 respectively.

Recent Early Warning for Flood over Sahel Region



VIGILANCE MAP AND POLICY BRIEF FOR HEAVY RAINFALL AND STRONG WINDS

Valid From August 16 to 20, 2024

Issued on August 15, 2024

HIGHLIGHT: Extreme heavy rainfall is expected in Mali.

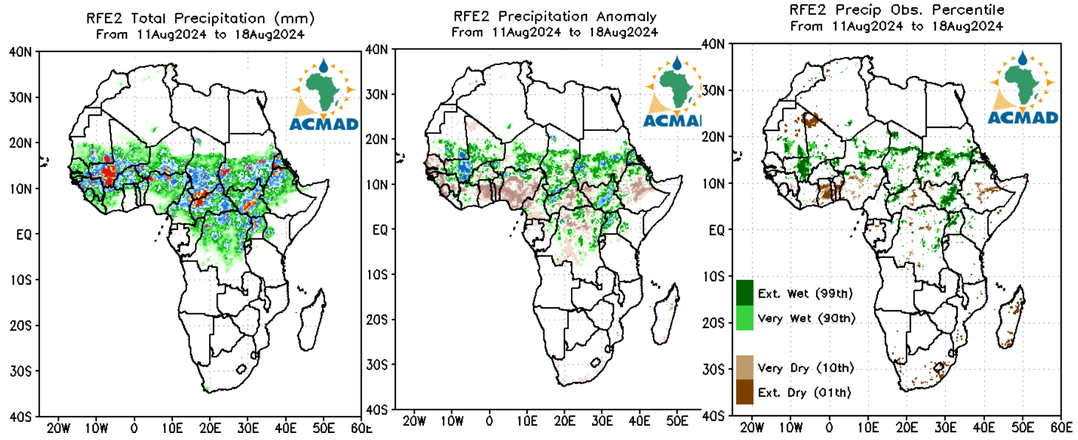
Heavy rainfall is expected in Senegal, Guinea Bissau, Guinea, Mauritania, Burkina Faso, Niger, Nigeria, Chad, Sudan, South Sudan, Ethiopia, and Djibouti

	Phenomenon	Hazard	Potentials Impacts	DRM Measures / Advices
	In next 5 days accumulated rainfall (50-100mm) is likely,	Moderate rainfall, flash flood, riverine flooding, landslides, soil erosion and lightning likely	Displacements of people due to floods, outbreak of water borne diseases, damage of infrastructures (roads, bridges, ...)	DRM authorities to keep informed about the development of the meteorological situation and raise awareness, taking action is more likely, the situation needs to be monitored closely with NHMSs
	In next 5 days accumulated rainfall (100 – 150mm) is very likely,	Heavy rainfall, flash flood, riverine flooding, landslides, soil erosion and lightning, strong winds,	Displacements of people due to floods, outbreak of water borne diseases, damage of infrastructures (roads, bridges, ...)	Update Flood contingency plans, Improve water management in reservoirs and dams, DRM authorities be ready to take adequate actions, DRM to be continuously in touch with NHMSs to be informed of the detailed expected meteorological conditions.
	In next 5 days accumulated rainfall (>150mm) is very likely,	Extreme heavy precipitation, flash flood, riverine flooding, landslides, soil erosion and lightning, strong winds, severe thunderstorms	Loss of lives, Injuries, Displacements of people due to floods, outbreak of water borne diseases, damage of infrastructures (roads, bridges, ...)	Civil Protection service and DRM authorities to activate contingency plan for disaster preparedness and emergency response (awareness, assistance to victims, search & rescue operations), and be in close touch with NHMS for further accuracy at the national level.

Disclaimer: The presentation of country boundaries on the map does not imply any opinion whatsoever on the part of ACMAD

The August 12 Vigilance map shows a high probability of 100 mm of rain in southern Mali and southwestern Niger on August 16, 2024.

By 16 October 2024, the floods had affected 1,438,627 people (195,697 households) and caused 391 deaths across Niger. Damage included collapse of 152,232 houses, destruction of 2,477 classrooms and loss of 25,728 livestock. (*source: OCHA)*



Estimated Percentile category (a) and Satellite estimated rainfall in mm (b) over Africa for the period August 11-18, 2024.

Impacts of flooding from August 12 to 14, 2024 in Tillaberi, Niger

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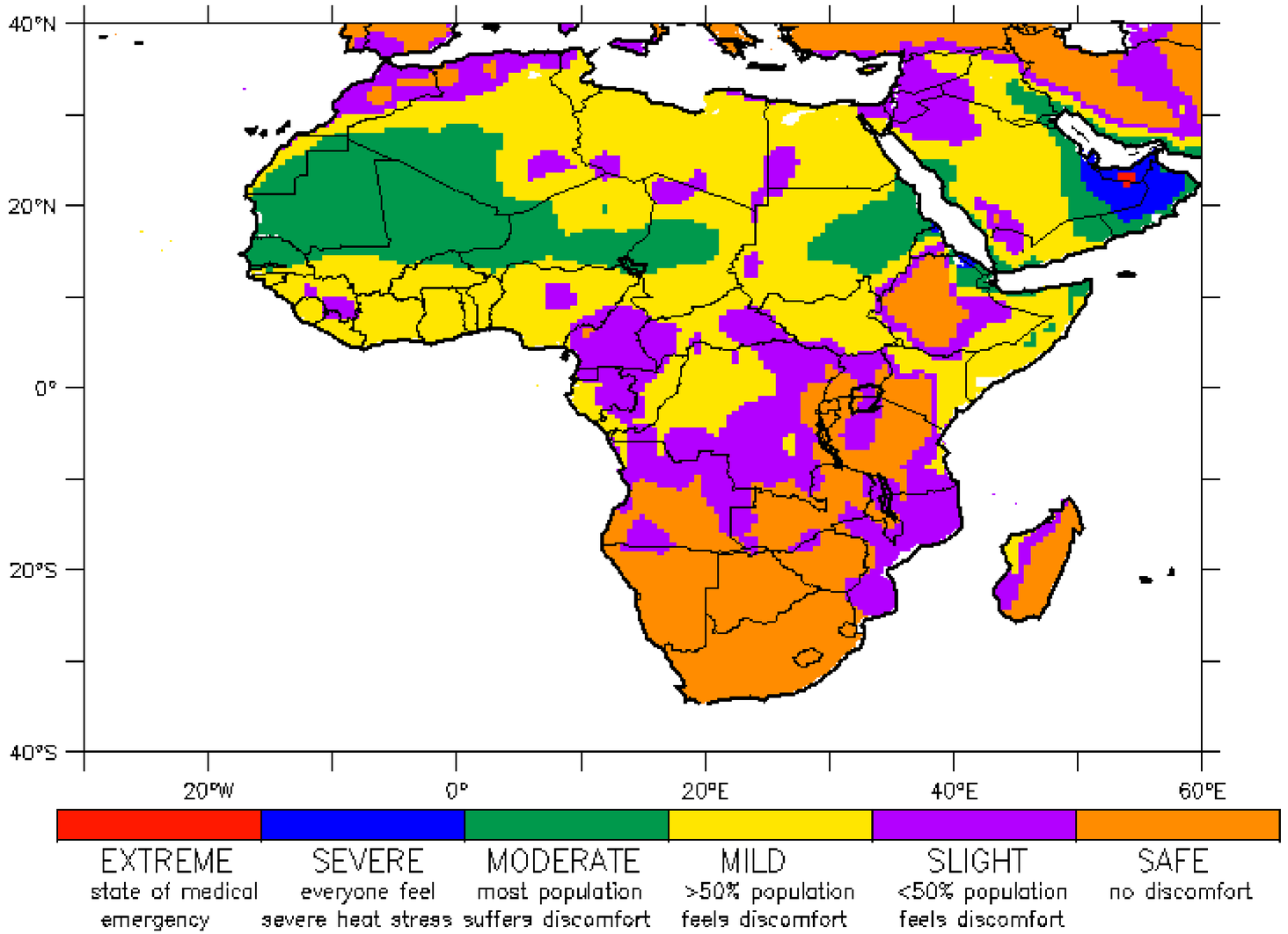
Discomfort Index for the Week

Base:20220905

Valid: 20220909–20220915



Data Source: ECMWF

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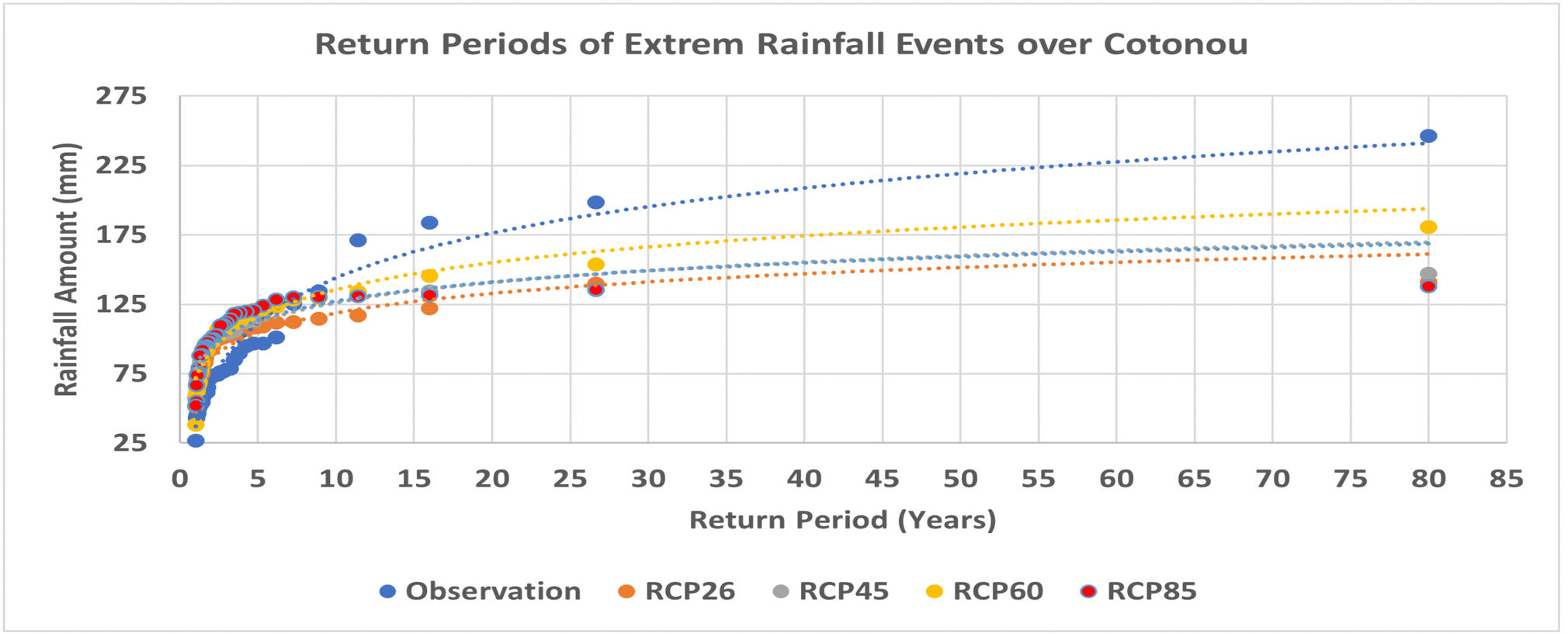
EXTREME EVENTS RETURN PERIODS (for future planning)



Infrastructures expected to last more than 20 years in Cotonou should be able to withstand a 175mm/day rainstorm.

Likelihood of fall in precipitation amounts in the near-future is not a good omen for agricultural activities

Improvement in the Forecast Products From the Stakeholders' Perspectives

Continuous interactions with several stakeholders indicate that improvement in the co-produced forecast products, from the stakeholders' points of view, are of four standpoints.

1. Graphics of presentation of the forecast products;
2. Understanding and simplicity of language of presentation;
3. Local / point specific (instead of spatial) presentation of forecast products on daily timescale; and
4. The inclusion of specific tailored forecast products.

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Achievements

Two things have been achieved here:

1. **Short-range forecast timescales have been extended beyond the medium range forecast timescales,**
2. **Collaboration and communication channels have been sustainably opened between the forecast producers and the forecast users.**

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Summary…….

- Socio-economic planning and productions in health, food security, agriculture, environment, water resources, etc. have become more effective than before as weather forecasts and outlooks become more reliably extended.

- Users now contribute effectively to the forecasters' operational algorithms, thereby finding it easier to interpret and consume the services offered by the forecasters.

- The first achievement helps in mitigating the risks of sub-seasonal climate variability on socioeconomic activities in Africa.

- The second achievement helps to enhance the development of user-tailored impact-based forecasts; increase users' trusts in the forecasts; and, seamlessly help in the evaluation of the performance of the forecasts.

Overall, smooth delivery of climate information service has been substantially enhanced.

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Thank You For Your Attention