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

Enhancing the capacity of NMHSs lor effective and efficient delivery of weather, and climate Services in Africa by transforming WMCs products provide through the SGDPFS

www.acmad.ne

WMCs products for preparation of Regional and National weather & climate information: current status and perspectives with a pilot SGDPFS project

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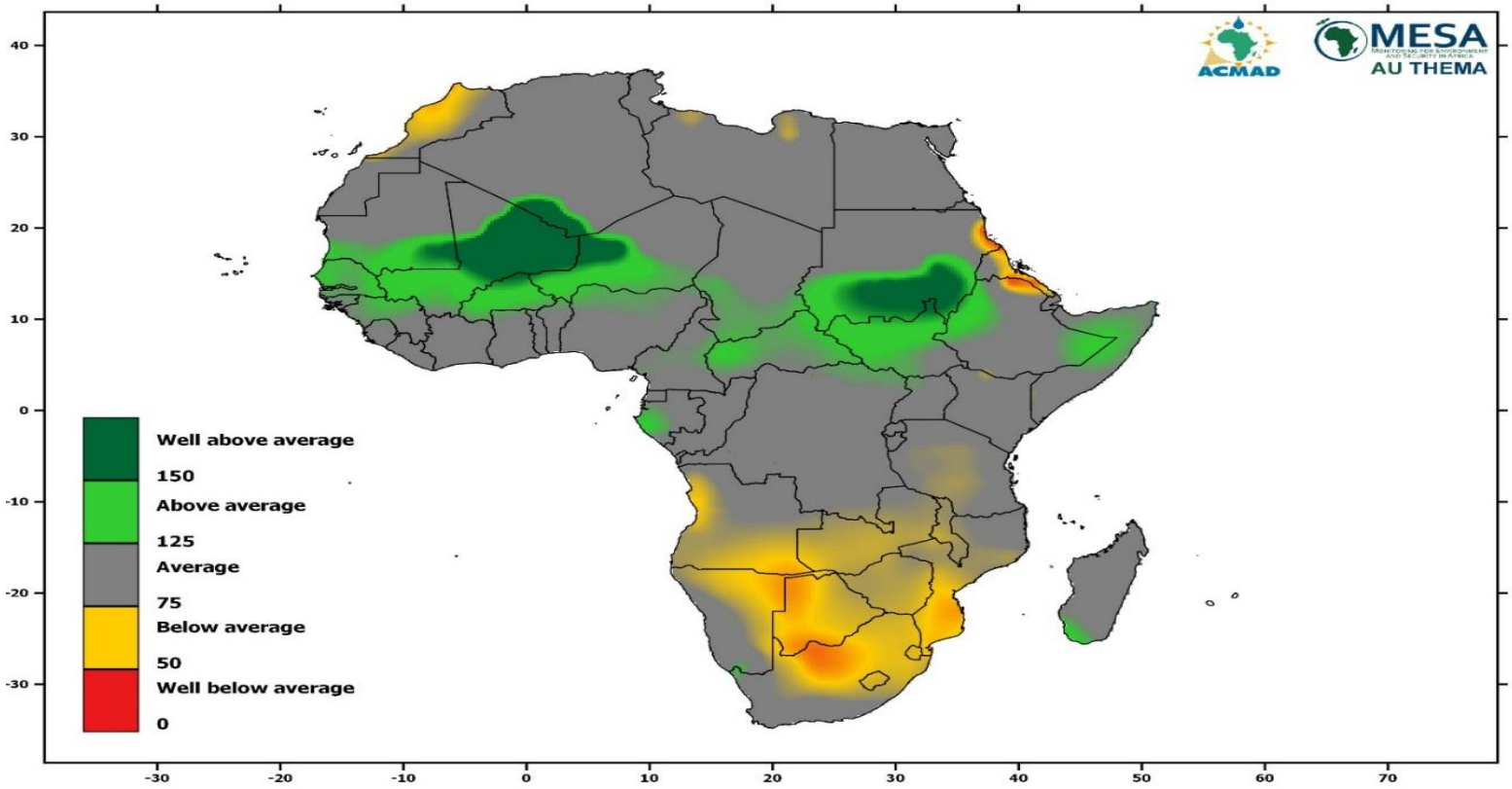
http://www.acmad.net/new/siteacma/mandates.php

OUTLINE

- ***CONTEXT***
- ***PROCESSING GLOBAL PRODUCTS TO GENERATE REGIONAL/NATIONAL INFORMATION***
- ***HELPING DEVELOPING NMHS***
- ***CONCEPT FOR A PILOT SGDPFS***



African annual precipitation in percent of average for 2015

Commodity (e.g Corn) reserve could be set up with excess production over the Sahel, ECOWAS and ECCAS RECs in October-November 2015 to reduce inflation on commodity markets in Southern Africa from December 2015 into 2016

A continental Free trade area would accelerate movement of commodities desperately needed to reduce droughts, floods and other events impacts

Examples of firefighting : 2015/16 Drought in Southern Africa

The Southern African Development Community (SADC) declared a regional drought emergency and launched a regional humanitarian appeal in July 2016

The Government of Mozambique activated the institutional Red alert due to drought on April 12, 2016

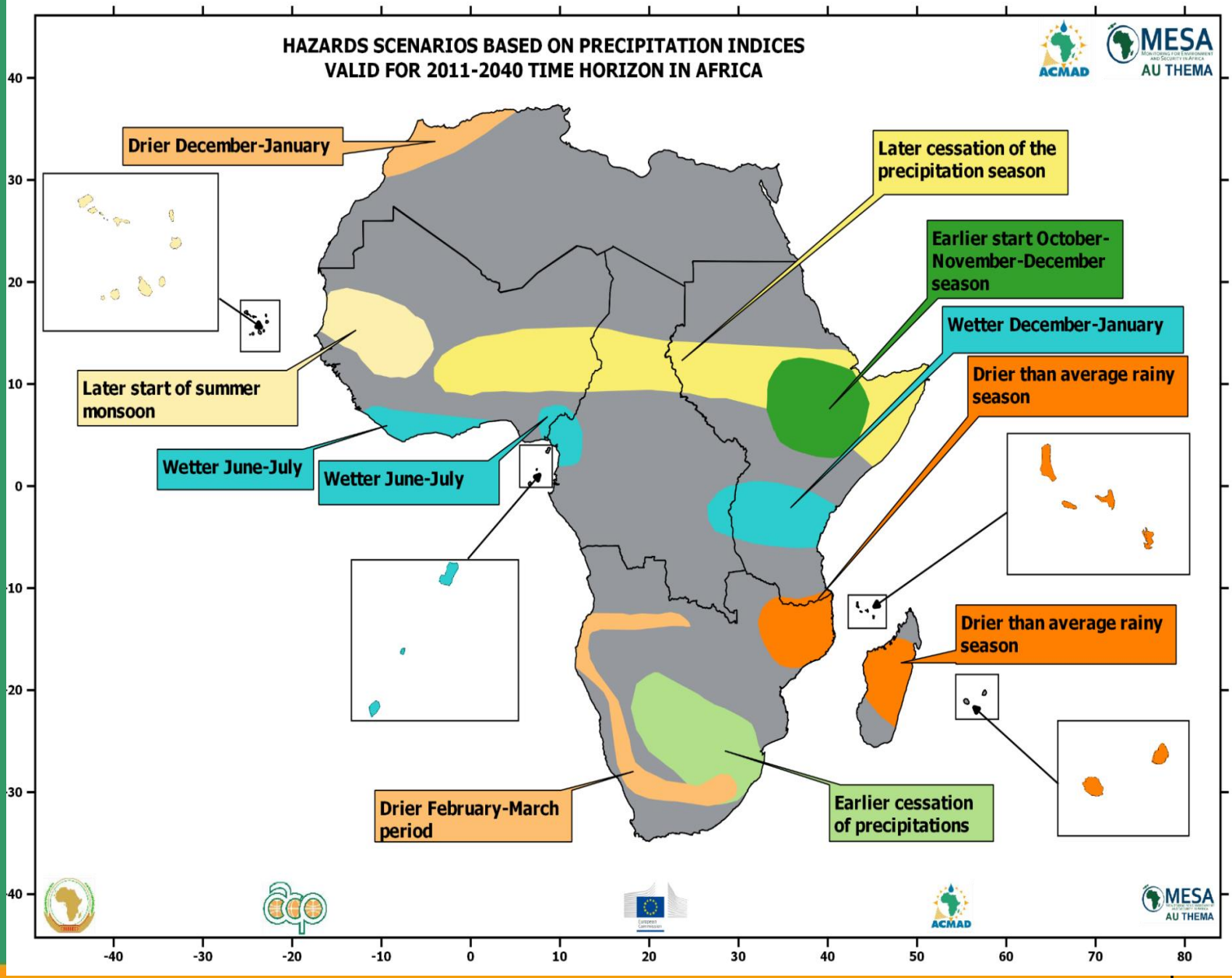
The Government of Madagascar declared a state of drought emergency for southern Madagascar on March 22, 2016

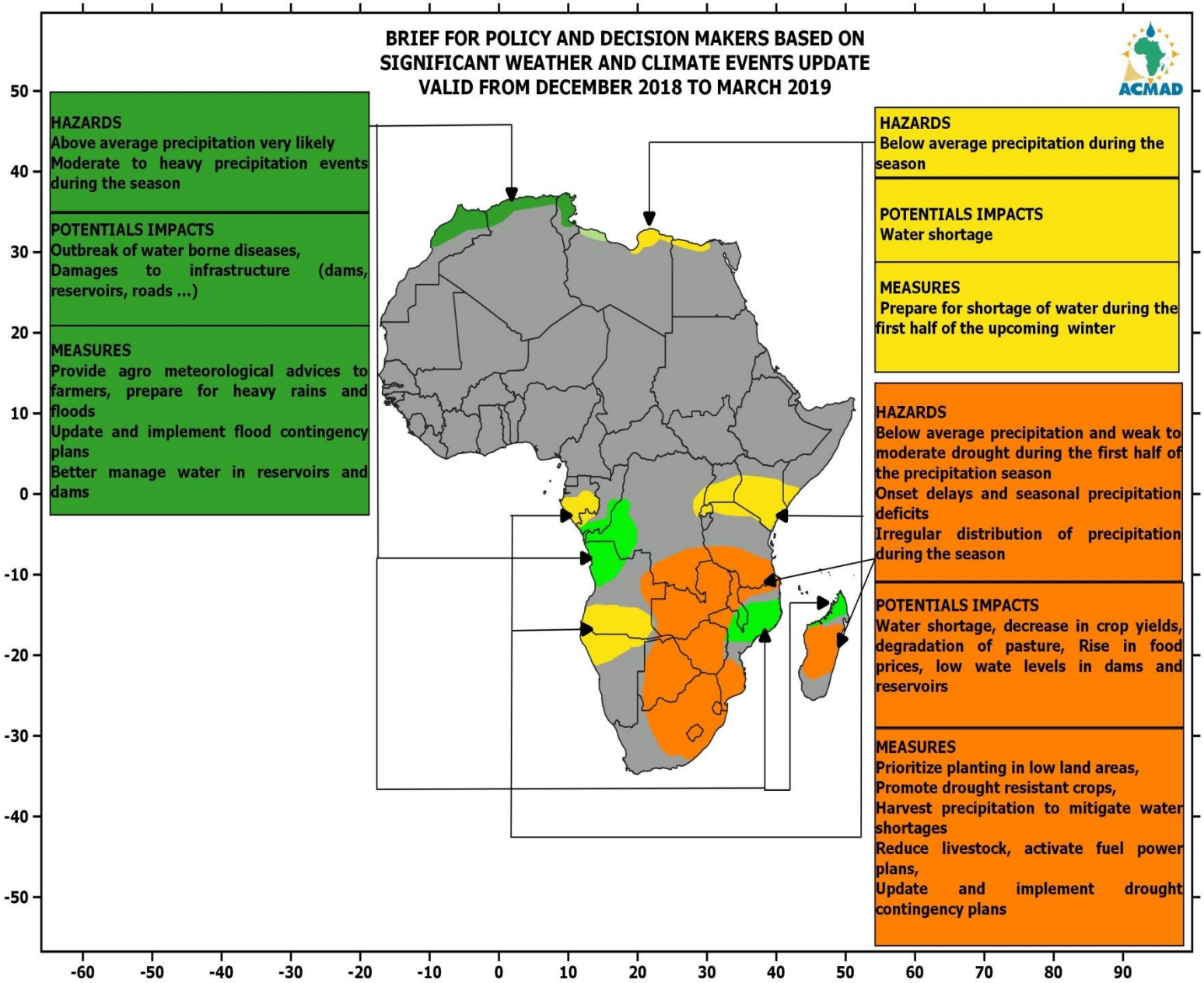
The Government of Zimbabwe, declared a State of Drought Disaster following the impact of El Niño induced erratic rainfall on *February 04, 2016*

Malawian government declared a state of disaster as a severe drought has caused a sharp decline in crop production across the country on January 11 2016.

On 22 December 2015, the Government of Lesotho declared a state of drought emergency and appealed for assistance from the international community.

HAZARDS SCENARIOS FOR DISASTER RESILIENCE STRATEGY




BRIEF FOR POLICY AND DECISION MAKERS BASED ON SIGNIFICANT WEATHER AND CLIMATE EVENTS UPDATE VALID FROM DECEMBER 2018 TO MARCH 2019
ACMAD
HAZARDS
Above average precipitation very likely
Moderate to heavy precipitation events during the season
POTENTIALS IMPACTS
Outbreak of water borne diseases,
Damages to infrastructure (dams, reservoirs, roads ...)
MEASURES
Provide agro meteorological advices to farmers, prepare for heavy rains and floods
Update and implement flood contingency plans
Better manage water in reservoirs and dams
HAZARDS
Below average precipitation during the season
POTENTIALS IMPACTS
Water shortage
MEASURES
Prepare for shortage of water during the first half of the upcoming winter
HAZARDS
Below average precipitation and weak to moderate drought during the first half of the precipitation season
Onset delays and seasonal precipitation deficits
Irregular distribution of precipitation during the season
POTENTIALS IMPACTS
Water shortage, decrease in crop yields, degradation of pasture, Rise in food prices, low wate levels in dams and reservoirs
MEASURES
Prioritize planting in low land areas,
Promote drought resistant crops,
Harvest precipitation to mitigate water shortages
Reduce livestock, activate fuel power plans,
Update and implement drought contingency plans
50
40
30
20
10
0
-10
-20
-30
-40
-50
-60
-50
-40
-30
-20
-10
0
10
20
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40
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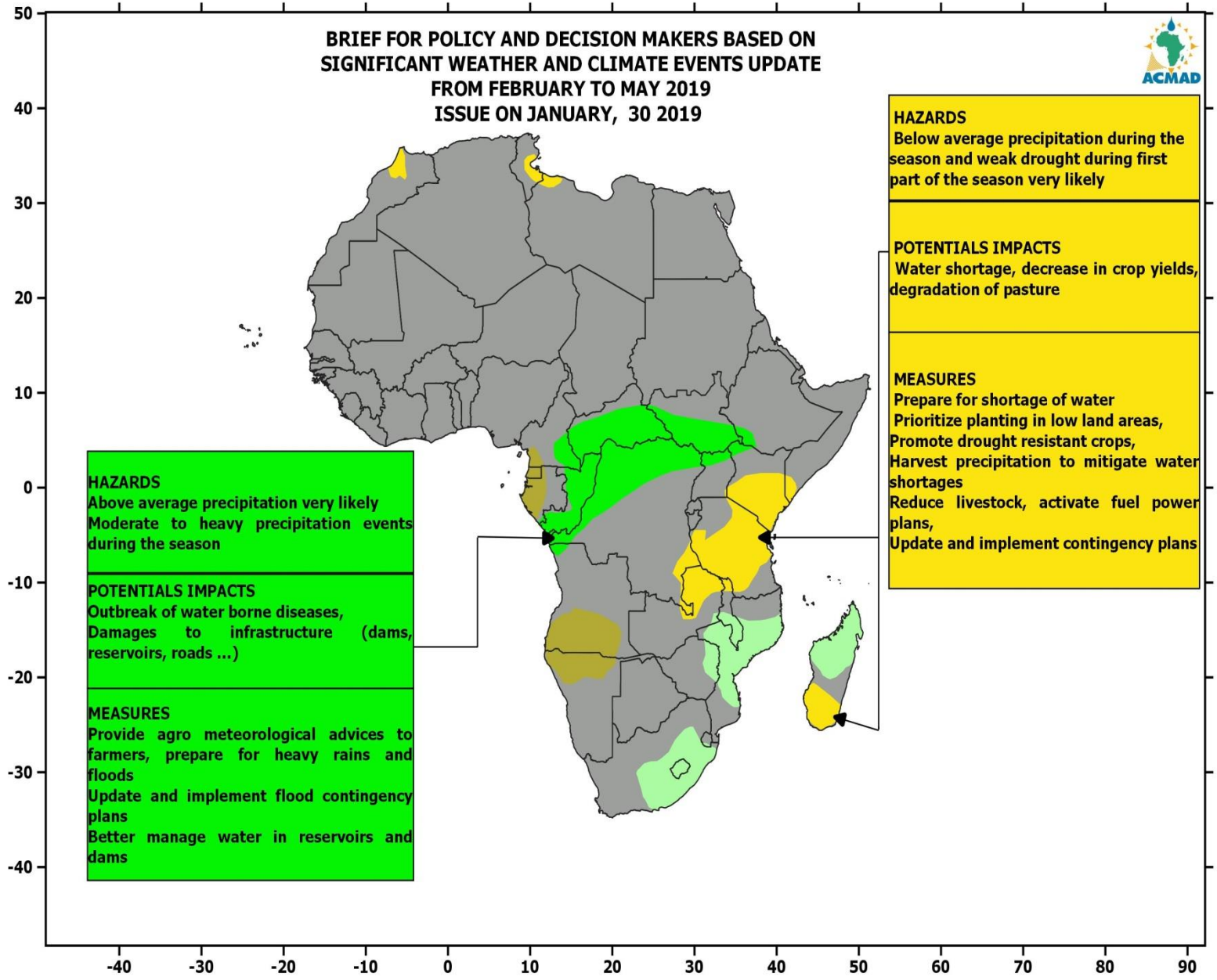
60
70
80
90

http://acmad.net/rcc/bulletin/POLICY_BRIEF_FMA_MAM_2019.jpeg



OCCURRENCE PROBABILITY OF EXTREME WEEKLY PRECIPITATIONS

From March 12, 2019 to March 18, 2019

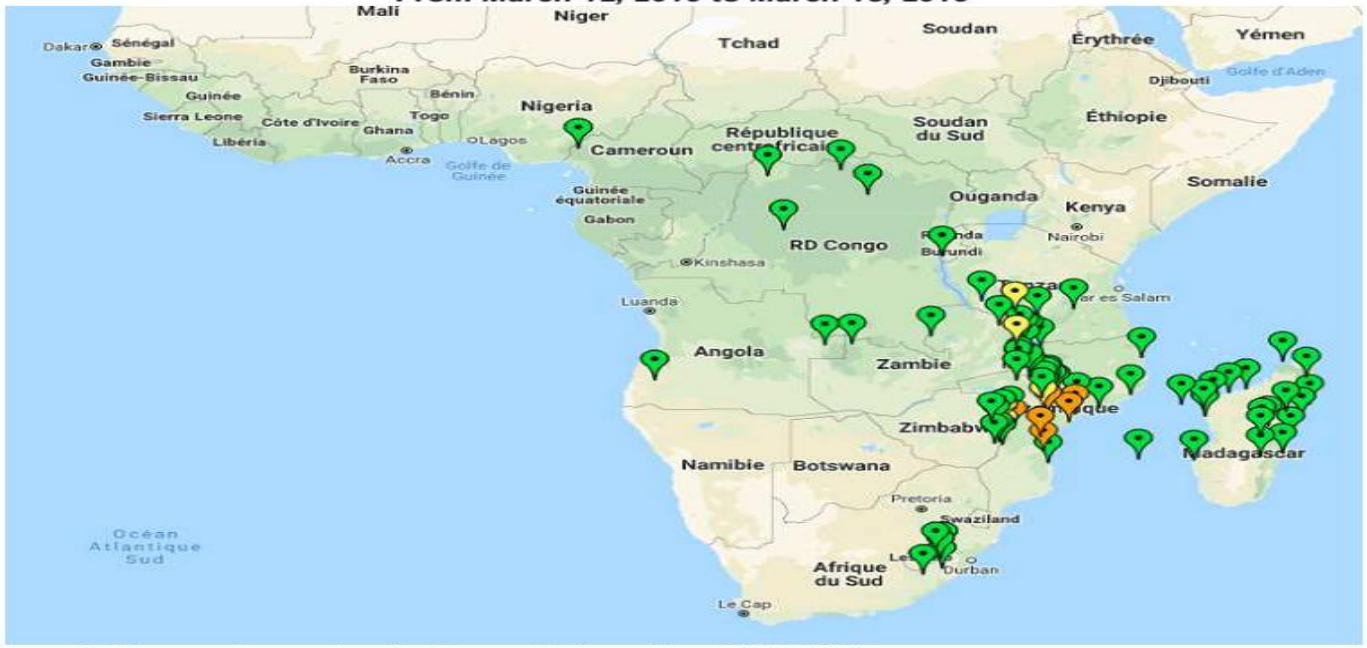


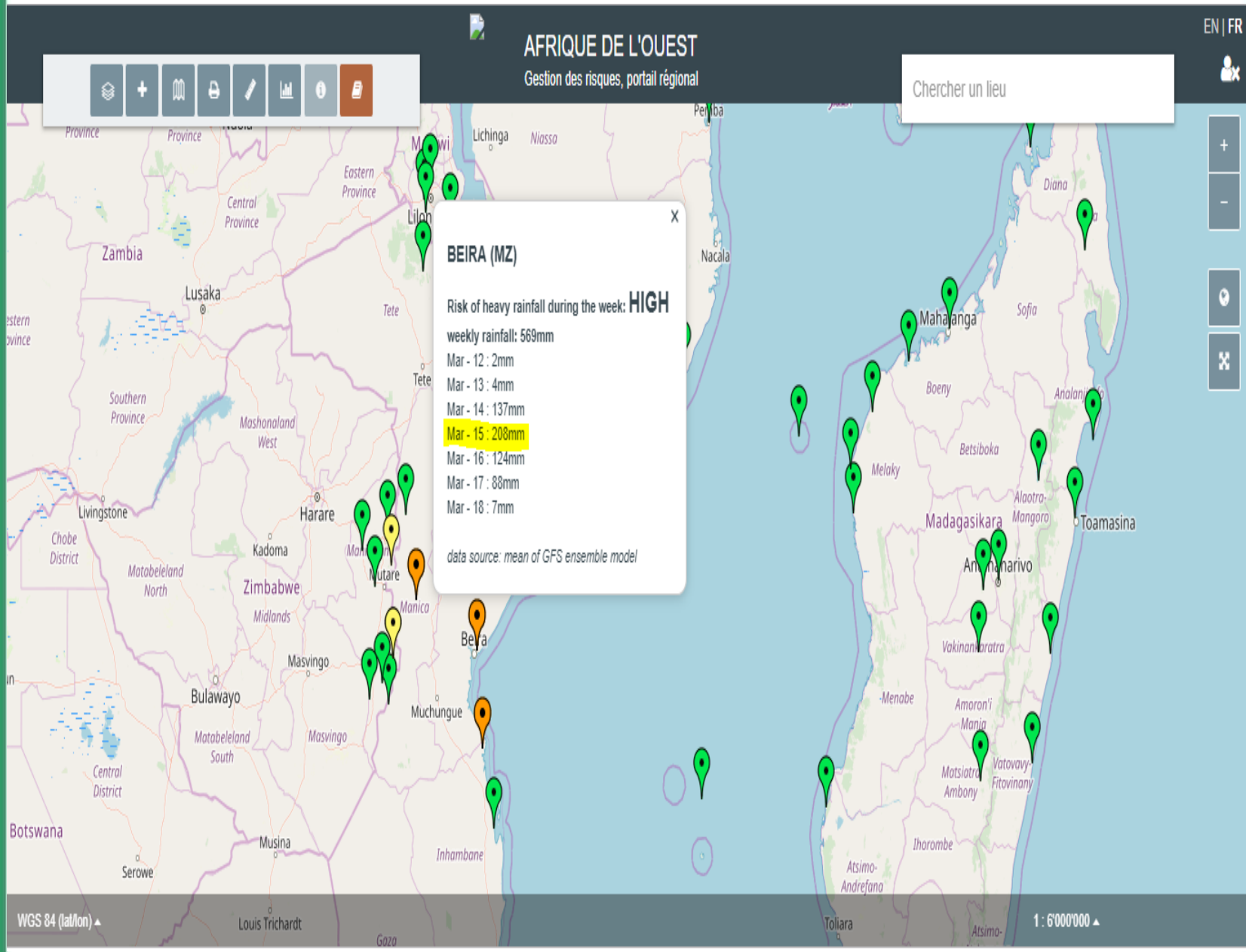
Figure 2: Heavy rain warning for the week, issued on: 20190312

Data Source: Mean of GFS ensemble model

Details: http://41.203.146.53:8080/thredds/fileServer/FIT/RISK.html

Table 1: The symbols, their meanings and the actions expected to be taken by Disaster Risk reduction personnel according to the level of risk.

Symbol	Implication	Advisories/ Actions
	-7 days rainfall is expected to be less than 100mm. - There is Low risk of heavy rainfall	Disaster Risk Management Authorities: - Keep informed; - Monitor the next 7days forecast.
	-7days rainfall is expected to be more than 150mm. -Be aware of the existing risk of heavy rainfall; -There is a potential flash flood in the coming days.	DRR Management Authorities : - Taking action is more likely; - The situation needs to be monitored closely with National Meteorological Service.
	-7days rainfall is expected to be more than 250mm. -There is High risk of flash flood due to the high ground saturation and continued heavy rains.	DRR Management Authorities : - Prepare to be ready to take action; - Meet with National Meteorological Service to identify vulnerable area.

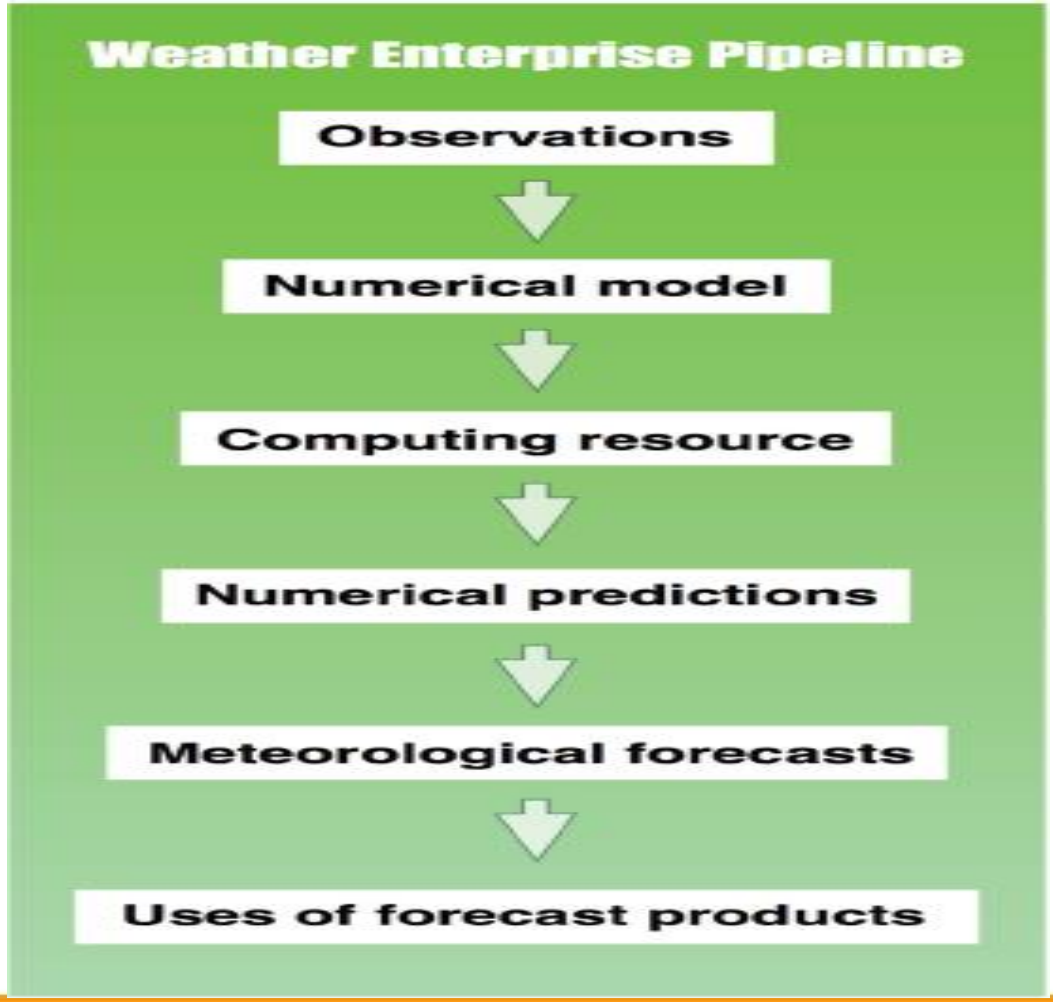

AFRIQUE DE L'OUEST
Gestion des risques, portail régional
EN | FR
Chercher un lieu
BEIRA (MZ)
Risk of heavy rainfall during the week: HIGH
weekly rainfall: 569mm
Mar - 12 : 2mm
Mar - 13 : 4mm
Mar - 14 : 137mm
Mar - 15 : 208mm
Mar - 16 : 124mm
Mar - 17 : 88mm
Mar - 18 : 7mm
data source: mean of GFS ensemble model
Zambia
Lusaka
Zimbabwe
Harare
Bulawayo
Masvingo
Beira
Nacala
Mahajanga
Toamasina
Madagasikara
Antananarivo
Botswana
Serowe
Musina
Louis Trichardt
Toliara
WGS 84 (lat/lon)
1 : 6'000'000

OUR PURPOSE!!! MOVE MORE AFRICAN NMHSs to higher levels

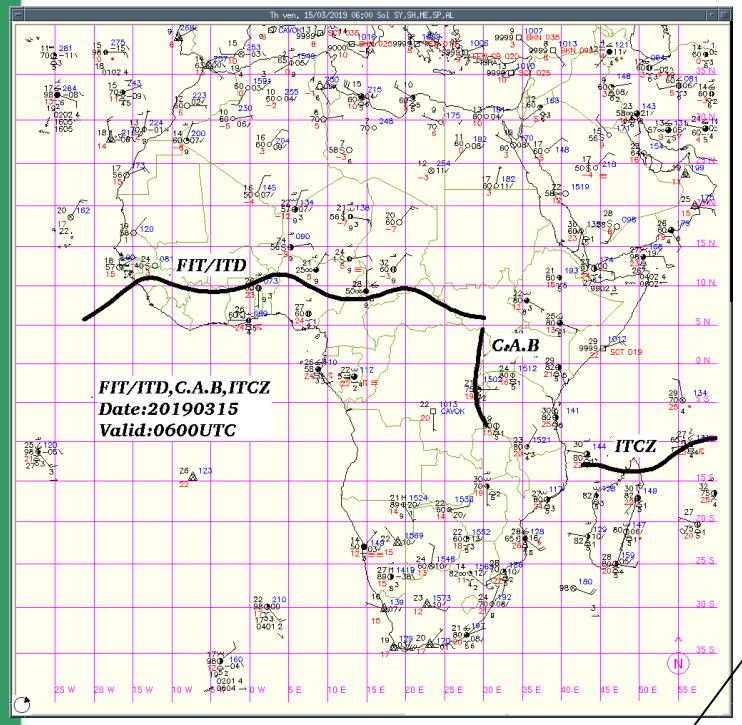
Level of Service	Weather Services	Climate Services
Category 1 - Basic	➢ Weather observations ➢ Weather Data Management ➢ Interaction with weather data and product users	➢ Climate observations ➢ Climate Data Management ➢ Interaction with climate data and product users
Category 2 - Essential	➢ Medium-range (synoptic scale) forecasts and warnings ➢ Established links with media and DRR communities	➢ Seasonal Climate outlooks ➢ Climate monitoring
Category 3 – Full	➢ Specialized weather products for wide range of sectors ➢ Well integrated into DRR communities and mature links with media	➢ Specialized climate products ➢ Decadal climate prediction ➢ Long-term climate projections
Category 4 - Advanced	➢ Customized weather products ➢ Weather application tools.	➢ Customized climate products ➢ Climate application tools

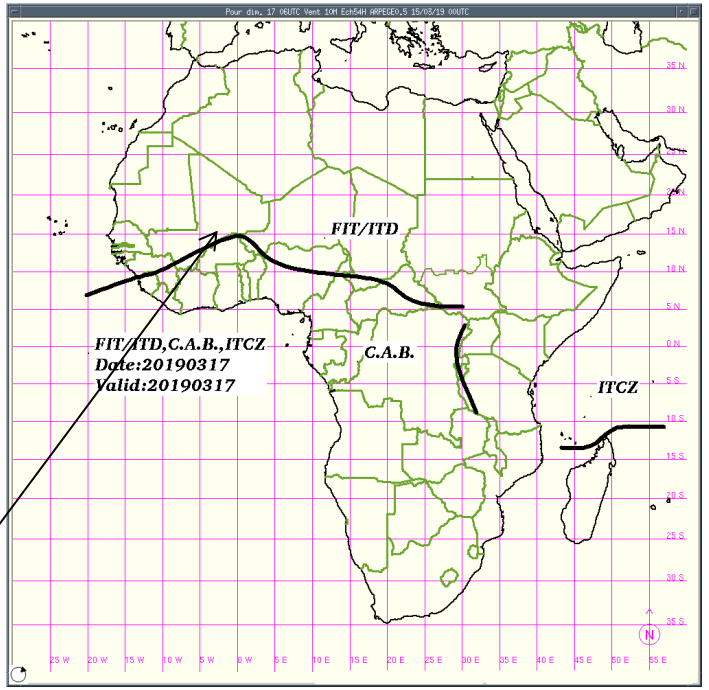
Effective partnerships are essential for strengthening the value chain

analyze past events , monitor the current conditions, and **forecast future weather&climate are key functions leading to services for disaster resilience. WMCs Global products are essential to perform these functions in LDCs**



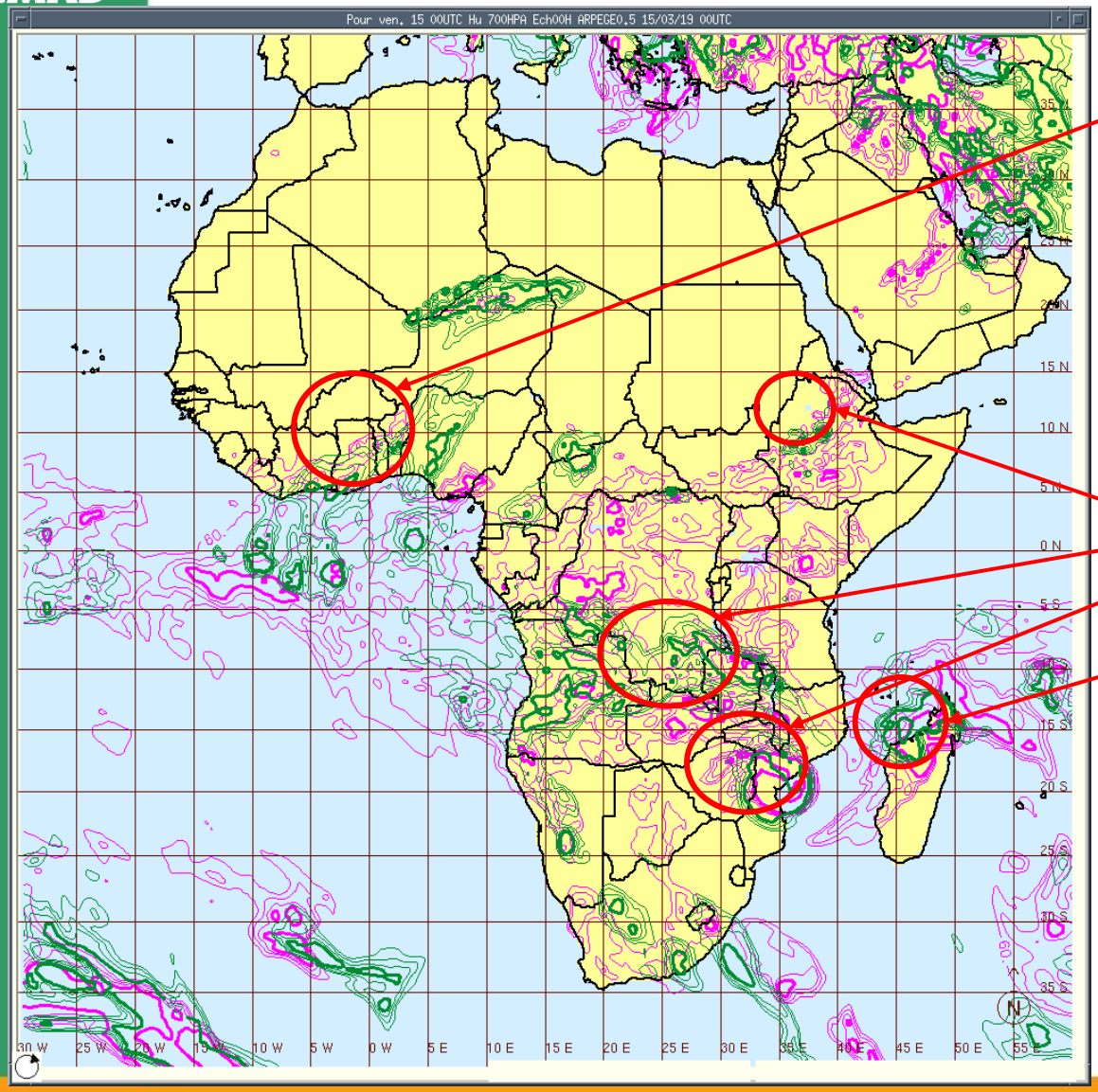
HOW ACMAD PROCESS GLOBAL DATA TO SERVE NMHSs?





Monsoon Burst over southern Sahel

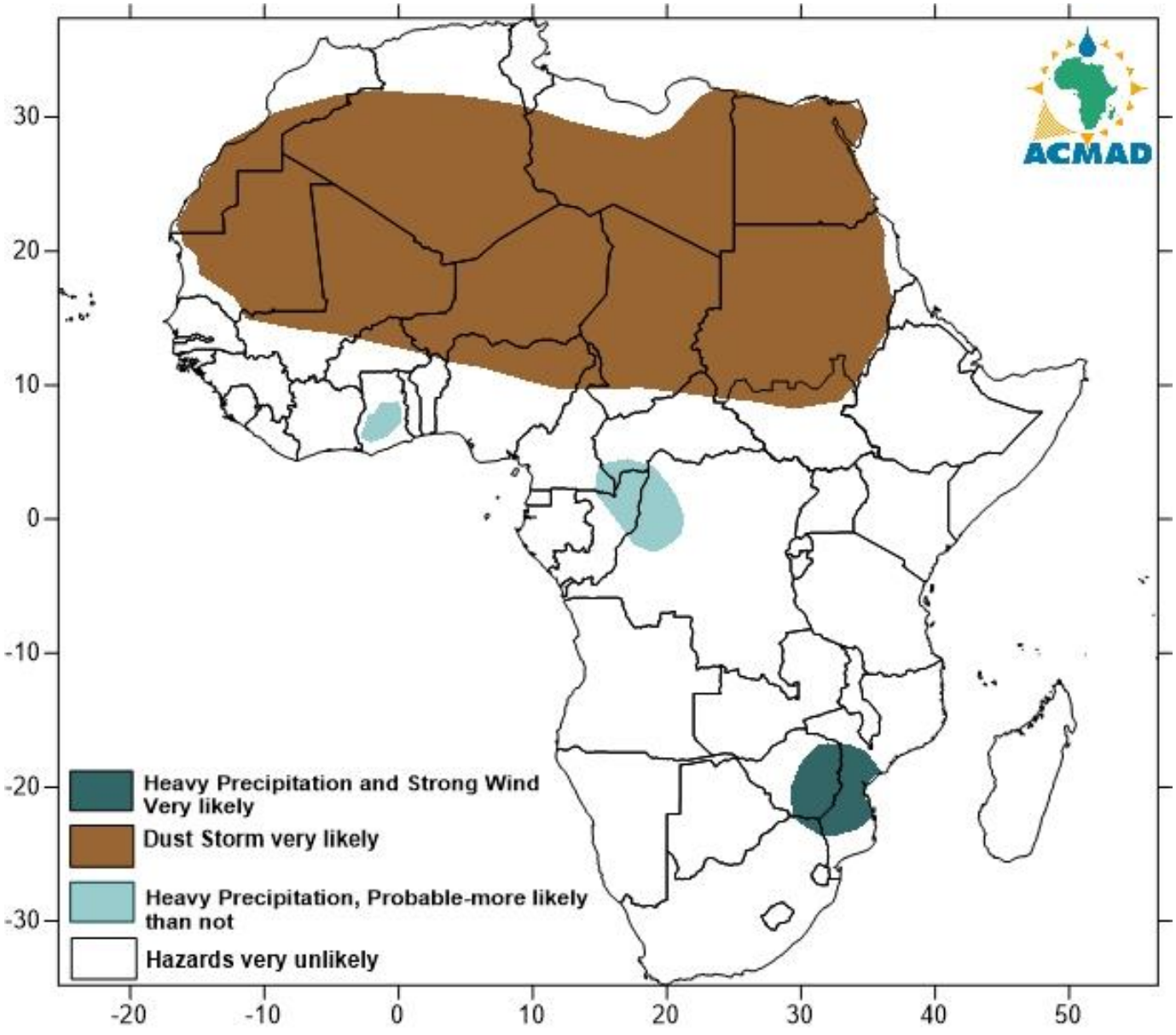
The Relative Humidity (RH) at 700hPa and 500hPa Levels



Gradual northward influx of moisture

Areas where at 700hPa (Violet color) and 500hPa (Green color) levels the atmospheric moisture is greater than or equal to 90%

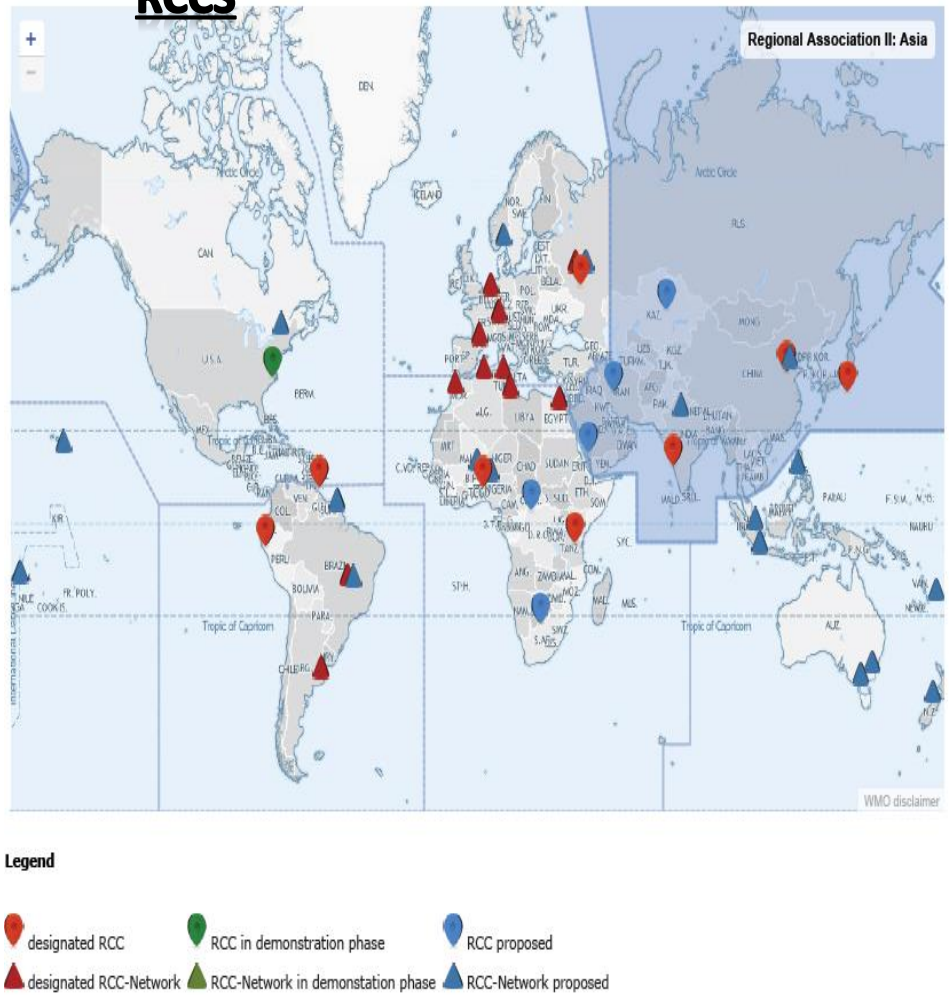
Hazards Forecast: Day +1



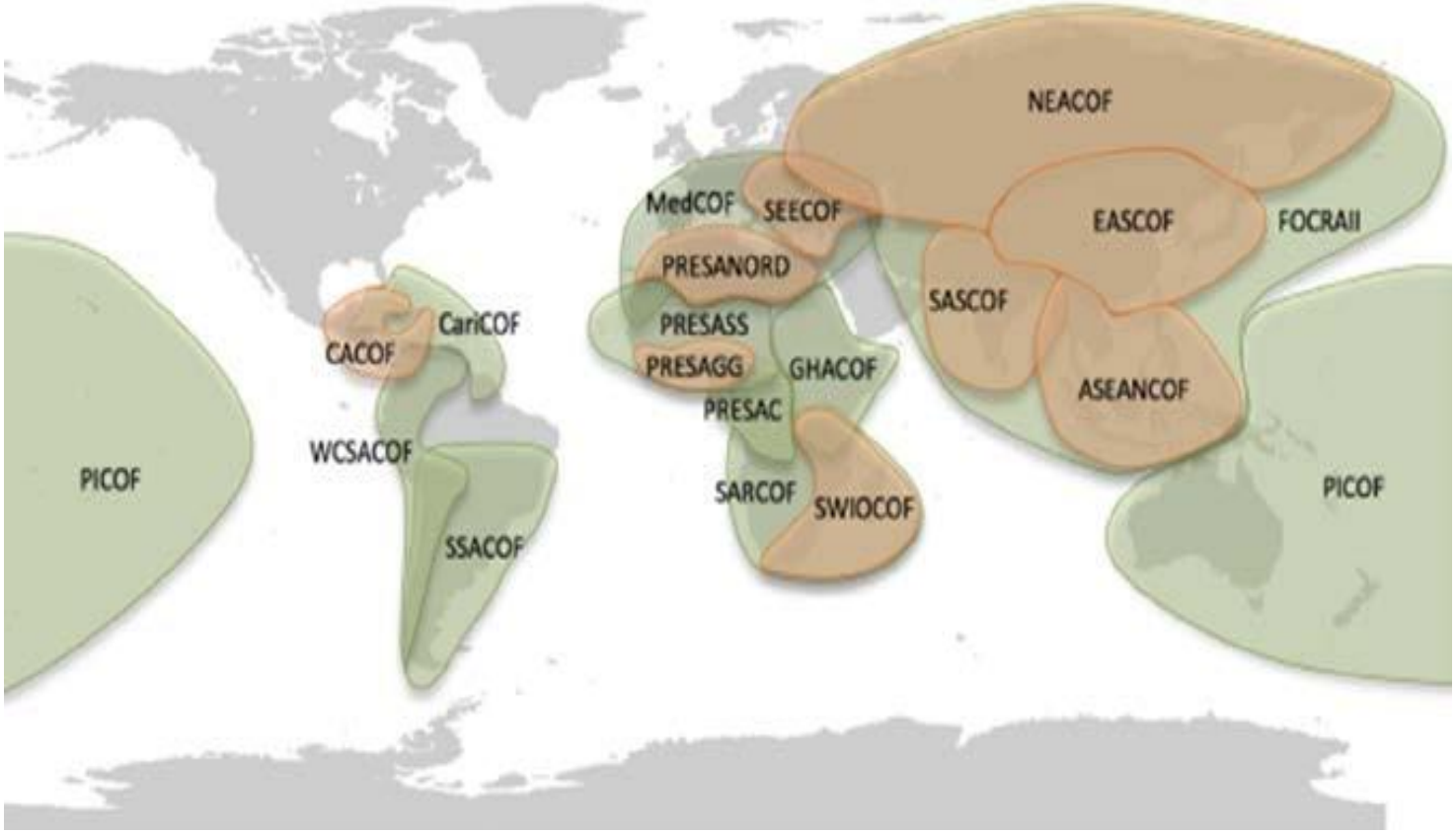
STATUS OF RCCS IN AFRICA

WMO/GPCSS PROVIDE ESSENTIAL GLOABL BASIC PRODUCTS FOR RCCS

- **RCCs provide regional climate products in support of regional and national climate activities**
- **Mandatory Functions:**
  - Long Range Forecasting
  - Climate Monitoring
  - Data Services,
  - Training
  - ***Coordination of RCCs (Additional Role for ACMAD)***
- **Highly Recommended Functions:**
  - Climate prediction and projection
  - Non-operational data services
  - Coordination functions
  - Training and capacity building
  - Research and development
- Two modes of Implementation: fully self-contained RCCs or distributed-function RCC-Networks



STATUS OF RCOFs IN AFRICA
21 YEARS OF RCOFs OPERATIONS
7 RCOFs OUT OF 19 IN AFRICA

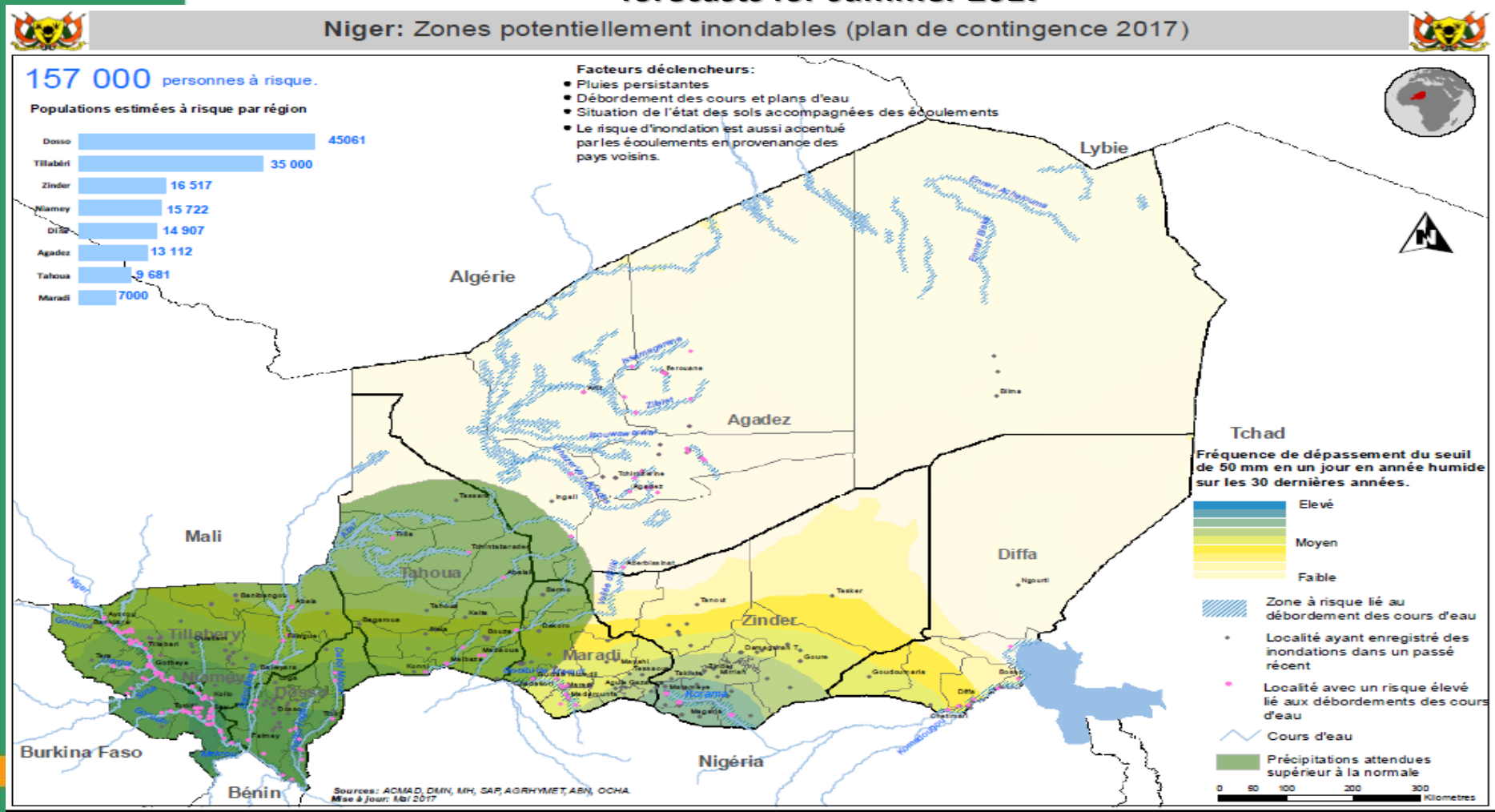


SERVICES TO MEET THE NEEDS

At planning level

Seasonal Forecasts are required to Update contingency plans , activate early warning mechanisms – *Data sources: WMO/GPCs, Global Climate Monitoring Centers*

Potentially flooded zones in the contingency plan update in Niger based on seasonal forecasts for summer 2017

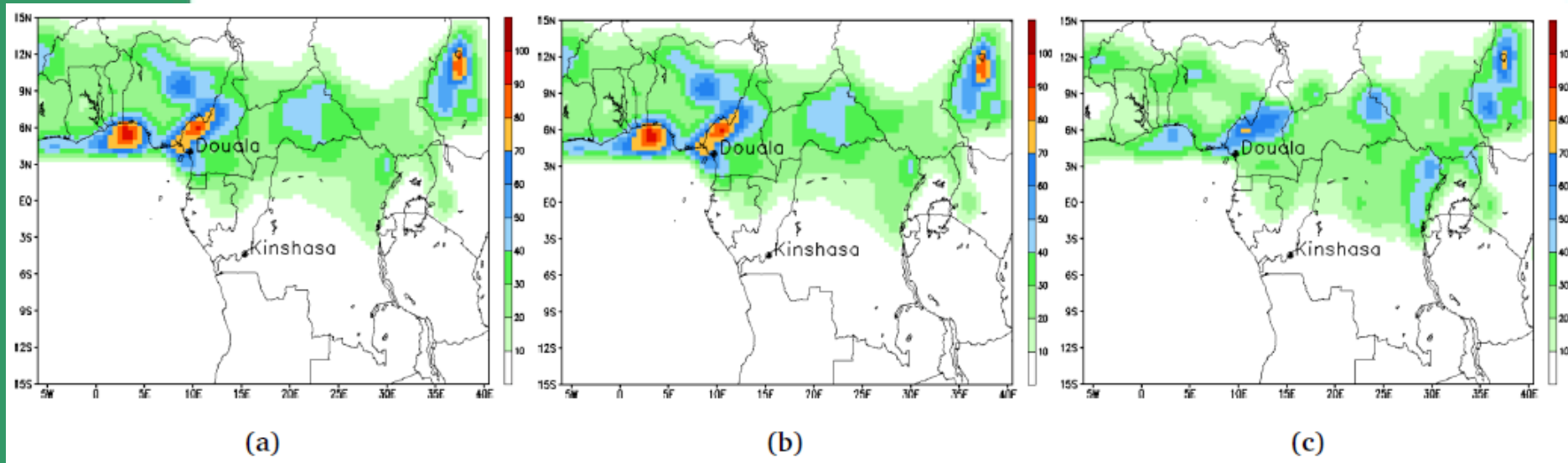


SERVICES TO MEET THE NEEDS

At planning level

Sub-seasonal forecasts to advice disaster managers or civil protection Services a few weeks ahead

on 18-20 June 2015 . The accumulated rainfall exceeding 170 mm, with the maximum value (83 mm) recorded on June 19 in this city Douala. Less predictability on week 1, location error and need for impact forecasts and risk warning . Data Source: Global S2S database



NCEP/CFS v2 ensemble precipitation (mm) forecast for the week June 15-21, 2015. a) 3 weeks ahead, b) 2 weeks ahead and c) one week ahead

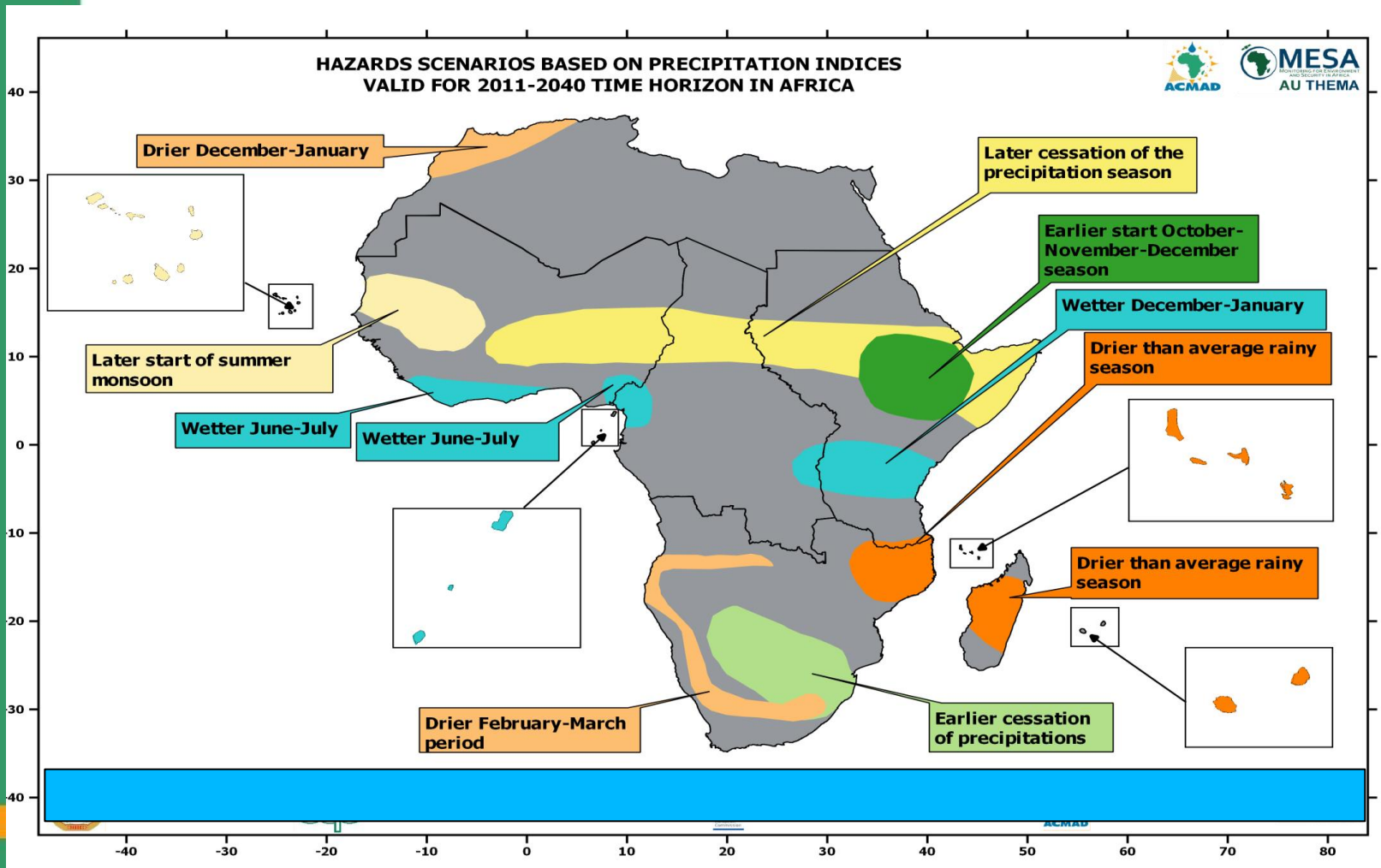
SERVICES TO MEET THE NEEDS

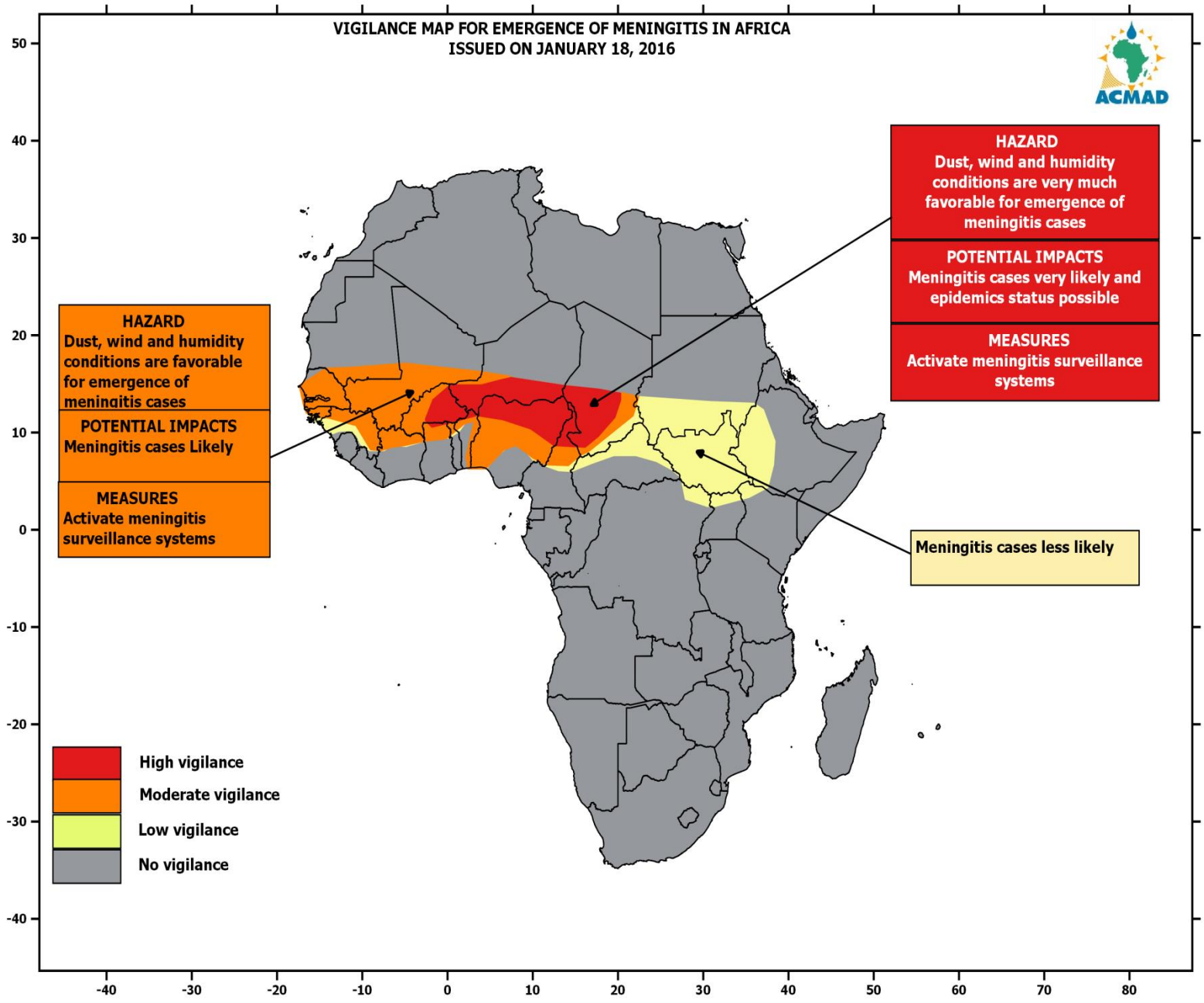
Data source: CMIP and CORDEX-Africa

Expected hazards scenarios for Africa are essential to better **define strategic objectives and action plan** for prevention and preparation

Strategic objective of AUC and ECOWAS:

reduce losses and damages due to floods along the Gulf of Guinea in June and July




VIGILANCE MAP FOR EMERGENCE OF MENINGITIS IN AFRICA
ISSUED ON JANUARY 18, 2016
ACMAD
HAZARD
Dust, wind and humidity conditions are very much favorable for emergence of meningitis cases
POTENTIAL IMPACTS
Meningitis cases very likely and epidemics status possible
MEASURES
Activate meningitis surveillance systems
HAZARD
Dust, wind and humidity conditions are favorable for emergence of meningitis cases
POTENTIAL IMPACTS
Meningitis cases Likely
MEASURES
Activate meningitis surveillance systems
Meningitis cases less likely
High vigilance
Moderate vigilance
Low vigilance
No vigilance
50
40
30
20
10
0
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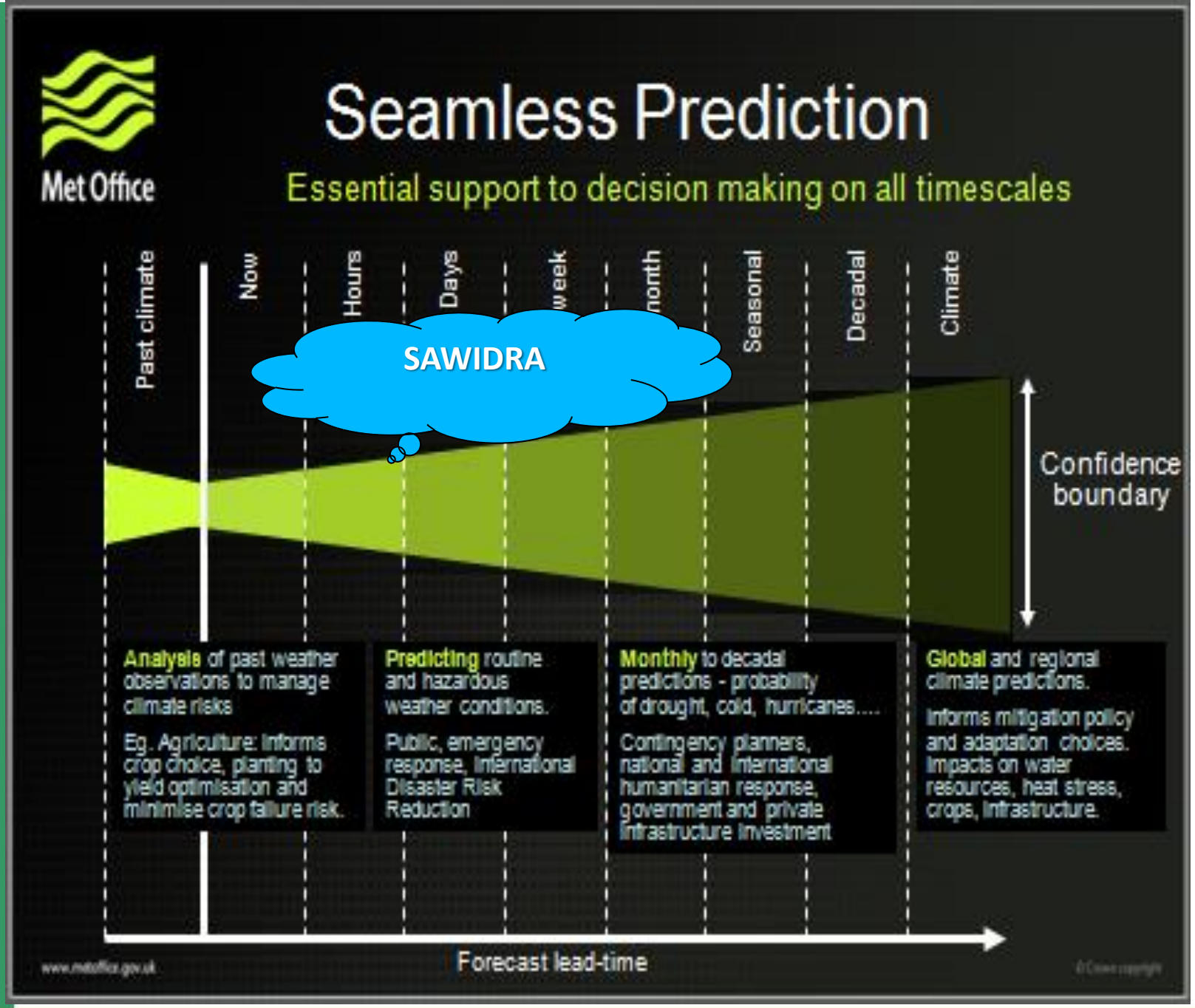
Seamless Prediction
Essential support to decision making on all timescales
Met Office
Past climate
Now
Hours
Days
Seasonal
Decadal
Climate
SAWIDRA
Confidence boundary
Analysis of past weather observations to manage climate risks
Eg. Agriculture: informs crop choice, planting to yield optimisation and minimise crop failure risk.
Predicting routine and hazardous weather conditions.
Public, emergency response, International Disaster Risk Reduction
Monthly to decadal predictions - probability of drought, cold, hurricanes....
Contingency planners, national and international humanitarian response, government and private infrastructure investment
Global and regional climate predictions.
Informs mitigation policy and adaptation choices. Impacts on water resources, heat stress, crops, infrastructure.
Forecast lead-time

CONCEPT OF PILOT PROJECT DEMONSTRATING THE RELEVANCE OF SEAMLESS GDPFS

- It is well know that users need integrated services for decisions to **strengthen resilience and increase adaptive capacity to Climate Change**
-Methods, tools and products for understanding the past and future with analysis, now casting, forecasting and projection are required to satisfy the range of needs identified

- WMCs Centres provide global Products to be tailored by RSMCs/RCCs and NMCs/NCCs to support service delivery

Purpose of the pilot

Transform WMCs Products to support Developing nations NMHSs trough:

- **Intermediation**
-- **Internalization**
-- **Externalization**
-- **Cognition**
-- **quality measurements**

CONCEPT OF PILOT PROJECT DEMONSTRATING THE RELEVANCE OF SEAMLESS GDPFS

Main Activities of the pilot

- Document historical performance of WMCs products over Africa
-- verify WMC products
-- develop regionally tailored products
-- prepare **technical notes** to guide forecasts briefings at National level
-- deliver bulletins , pilot **advisories** and **watches**
-- support NMHS to deliver impact based forecasts and risk based warnings as part **of twining exercise** with WMCs-ACMAD-pilot NMHS
-- store data and products for post events studies
-- support SWFDP and MHEWS with forecasts of regional scales features driving severe or high impact ***meso to local scale*** weather or climate
-- organize on the job training and workshops
- Organize joint forecasts discussions involving WMCs-ACMAD-pilot NMHSs with emphasis on potential emergency situations

-**Target users: NMHSs, RSMCs, RCCs, DRM Agencies, Humanitarian institutions, AUC and RECs**

-**Final Beneficiaries are vulnerable people**

The future requires the use of global probabilistic forecasts with information on uncertainty and predictability of severe events (weather and climate)

- Major steps of SGDPFS demonstration
- Climate advisory/watch and contingency planning
- Sub seasonal advisory/watch and preparation
- Medium/Short Range Forecasts/warning and early response
- Nowcasting // go-actions of response and recovery
- Forecasts, Advisories, watches and warning are services dedicated for Disaster resilience

- **Climate watch& Contingency planning**

- One to two months before a high impact event , the seasonal forecasting systems render very likely set of climate hazards, their potential impacts and suggested measures for for contingency planning or update.

- *Coordination meetings are organized by DRM stakeholders* including humanitarian actors to *develop/update contingency plans*

- **Sub seasonal Watch//preparation**

- **One to two weeks before the event**, the monthly/medium Range forecasting systems show a potential high impact event with a relatively high probability

- A message requesting more vigilance and strengthening of preparation is given to stakeholders who enter the final preparation phase and take early measures such as *arranging duty rosters*.

Medium to Short Range forecasts // Pre-warning//response

- two to five days before the event, the daily forecasting systems show a potential severe weather event with a relatively high probability
- A first pre-warning is given to user sectors, which enter the “response” action phase and take measure like prepositioning of resources including equipments and personnel.

- **Nowcasting/go-action**
  - The nowcasting system provides the accurate picture (location, intensity, extent) of the high impact event
  - Final decisions can be made and operational activities concentrated on the most affected regions are put in place.

CONCLUSIONS

- Products from operational satellites, in situ observations, analysis and forecasting systems under the leadership of the WMO and partner programmes like COPERNICUS are major *opportunities*

- operational predictability for extreme events (Drought, floods, heat/cold waves, heavy rains and strong winds…) across Africa is essential for science based information for disaster resilience.

- What is the intrinsic predictability of operational forecasting system? A major research question with clear operational implications

ACMAD LONG TERM GOALS

-- **Fill gaps and weaknesses targeting NMHSs , RSMCs and RCCs in Africa**

-- **Improve quality of services for resilience and adaptation**

-- **Strengthen research, access and exchange of data**

--**Improve ACMAD governance and management systems**

THANK YOU

MERCI