

**Report on:**

**WORKSHOP ON REVIEWING AND EXPLORING PRODUCTS**

**SUPPORTING IMPROVEMENTS ON THE ANNUAL STATE OF CLIMATE**

**REPORT IN AFRICA**

**11 TO 13 JULY 2023**

**ACCRA, GHANA**

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MISSION	WORKSHOP ON REVIEWING AND EXPLORING PRODUCTS SUPPORTING IMPROVEMENTS ON THE ANNUAL STATE OF CLIMATE REPORT FOR AFRICA

**1. BACKGROUND**

Climate change poses significant risks to people’s health, peace, prosperity, infrastructure, and economic activities across many sectors in Africa. While the whole world is exposed to climate threats, Africa is likely to be the most affected. In this context, better monitoring and understanding of climate threats and related damage costs are needed to gauge priority areas for action and delineate options that are more useful to take forward in resilient development



initiatives. Provision of climate services and advice to development planners is therefore required.

The State of Climate (SoC) report for Africa is becoming a flagship climate service supporting resilience and adaptation policy, plan, and practice. The SoC products are generated under the leadership of the African Union Commission(AUC), the World Meteorological Organization (WMO) and technical support of the African Centre of Meteorological Applications for Development (ACMAD) and other Regional Climate Centres in Africa supporting African negotiators and planners on climate-related matters.

Over the past few years, SoC reports have been published and feedback collected to support improvements. A Workshop to explore additional products to support better SoC reports was organized by ACMAD under the leadership of the World Meteorological Organization and the African Union Commission with the support of the EU-funded ClimSA programme.

## **2. OBJECTIVES**

The workshop aims were to review current products and explore improvements in the future content of the SoC reports. From the interaction with stakeholders, the following specific areas for improvement have to be considered:

- More Essential Climate Variables (ECVs) and fit-for-purpose actionable indicators use for better climate risk assessments.
- Projected trends added to observed trends currently provided to support long-term design and planning for adaptation and resilient development.
- Assessment of costs and benefits of climate information for adaptation and resilience actions implementation for sustainable development.
- Attribution of high-impact events to climate change for awareness raising on climate change impacts and urgency for climate action.
- Frameworks and partnerships for future SoC reports to better meet the growing expectations of stakeholders.

From these orientations, the objectives of the workshop were defined as the following:

- 1) Share and review products available in Africa's State of Climate report and identify additional ECVs and actionable indicators for future SoC.



- 2) Introduce projected trends and extreme information for long-term resilient development planning.
- 3) Assess the attribution of high-impact events in Africa to climate change.
- 4) Extend partnerships and networks for the preparation of future SoC reports.

### 3. OUTCOMES

- ▶ 1. SoC products were reviewed, and additional products were identified.
- ▶ 2. Attribution case studies ToRs to be undertaken for future SoC reports were made available
- ▶ 3. Partnerships and networks with NMHSs and regional centres were established.

#### **Day One: Tuesday, 11 July 2023**

The workshop started with ceremonies with opening speeches delivered as follows:

##### **1. The Ghana Meteorological Services Board Chairperson – Mr George Isaac Amoo**

The chairperson welcomed the participants to Ghana and narrated the importance of climate change and extreme weather in his official opening address, details of which are contained in his annexed speech to this report.

##### **2. Acting Director General of Ghana Meteorological Services – Mr Eric Esuman**

The Acting Director General welcomed the participants and introduced how the workshop was conceptualized by WMO and ACMAD and how it ended up being hosted in Ghana. He also expressed his gratitude to have hosted the workshop. He thereafter introduced the mission and vision of GMet and its numerous operational services for the country's different sectors.

##### **3. African Union Commission – Dr Ulrich J. Diasso**

He welcomed the participants of the workshop and more specifically the ones coming from Focus countries of the ClimSA programme which supported the workshop. He further emphasized the importance of the workshop for the continent and the involvement of experts from Member States in the contribution to the state of climate report for Africa.



#### **4. African Centre for Meteorological Applications and Development – Dr Andre Kanga -The DG**

In his address, the DG of ACMAD emphasized the importance of the collection of information on damage and losses due to extreme climate events as it informs the state of climate report with regards to the effects climate change has on the continent. He indicated that this information is very vital for the African Group of Negotiators to have facts on how climate is affecting the continent, so as to support their efforts during the negotiations at the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC). He then further thanked all those who managed to participate physically and promised to participate in the sessions virtually. He also thanked NORCAP for the support they give to ACMAD and in the organization of the workshop and the climate change agenda. He also thanked Dr Bamba Sylla who will assist in improving the understanding of the attribution section of the State of Climate Report in Africa.

#### **5. World Meteorological Organization (WMO) - Dr Ernest Afesimana**

In his address, he thanked the Ghana government and the Ghana Met in particular for graciously agreeing to host the workshop. He further thanked the participants from RCCs and Member States. He further specifically thanked the presence of Prof. Bamba Sylla. He then gave the importance of the workshop and asked the participants to work on their talk in Africa in the next three days of the workshop. He further mentioned the linkages between the Early Warning for All initiative and the State of Climate report for Africa in this time when extreme are increasing in frequency and severity.

As it was printed in the agenda, the opening ceremonies were followed by an overview of the Intra-ACP Climate Services and Related Applications Programme (ClimSA). The ClimSA was presented by Dr DIASSO Ulrich Jacques, the Team Leader of Technical Assistance at ClimSA/UA. Dr DIASSO outlined the ClimSA program and emphasized the objectives and tasks of the technical assistance team. He also presented a technical assistance team which consists of a team leader/climate services expert and an infrastructure expert; they will be assisted by short-term experts according to the capacity needs of the project. The expected results, immediate actions, and expected deliverables were also presented. For further details about the overview of the ClimSA project, [please click here](#).



**The overview of ClimSA was followed by:**

### **Session 1: Review of current SoC products**

The review of current SoC products was delivered by Dr Ernest Afesimana, he started by explaining the genesis of the SoC and highlighted again how it supports the policy and decision-makers efforts during the negotiations at the Conference of the Parties of the United Nations Framework Convention on Climate Change (UNFCCC) it contributes. Mainly he explained how it is designed, and how inputs from the contributors are collected and consolidated to constitute the first SoC draft. This draft is sent to the WMO head office in Geneva for review and publication. He briefly explained the products in the SoC. The content of the SoC report falls under the seven headings which are: Global climate context; Regional climate; Major drivers of climate variability affecting the region; Extreme and high-impact events; Major drivers of climate variability affecting the region; Extreme and high-impact events and Strategic perspectives (see fig xxx) These headings can also be into two main sections. Section I comprises the Physical science and section II contains the Risks and climate policy.

The physical Science contains the global climate context encompassing the global mean temperature as well as annual near-surface air temperature regional mean, anomalies, anomalies uncertainty and trends- in Africa. Also, it contains other regional climate information which encompasses absolute and relative precipitations.

Section two of the SoC is made of Climate-related risks and socio-economic impacts, Loss & damage in the different socioeconomic sectors, and Climate policy and Strategic perspective.

The second part of this presentation looks in more detail at the Temperature and precipitation and related indices, Sea Surface Temperature, indices and related drivers of climate variability\_/ Sea level rise and indices.

The third part of the presentation explained the work and process behind collecting and compiling Climate Extremes and Impacts and climate data sources (Global, Regional and National).

# STATE OF THE CLIMATE IN AFRICA 2021

(Place holder for appropriate picture or graph for Africa)

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Figure 1 The contents of the SoC in Africa Report 2021

Each presentation was subsequently followed by discussions. The outcomes of the discussions were summarised as the recommendations which were consolidated and summarised by Dr Pierre, Mr Sunshine and Mrs Wendlasida.

The activities on day one were concluded with a summary of Day 1 and an introduction to Day 2 on updates and possible improvements on tools and product delivery by Dr. Romeo Sosthene Nkurunziza.

## Day Two: Wednesday, 12 July 2023

### Session 2: Products improvement

The activities on day 2 focused on product improvements. In this session, six presentations were made. The first item presented was the Essential Climate Variables and observed trends by ACMAD Dr Pierre and the following points were discussed.

Essential Climate Variable – Overview, the major ECVs used in the SoC Report, Observed Trends and Actionable Indicators for the Major ECVs in 2022

Dr. Pierre indicated that to coordinate and facilitate the development and improvement of global climate observations, the Global Climate Observing System (GCOS) was established, in 1992, jointly by WMO, the Intergovernmental Oceanographic Commission (IOC) of



UNESCO, the United Nations Environment Programme (UNEP) and the International Science Council (ISC). GCOS has identified a set of 57 Essential Climate Variables (ECVs) that together provide the information necessary to understand, model and predict the trajectory of the climate as well as plan mitigation and adaptation strategies.

What the ECVs are all About, their purpose and how they are selected have been explained. As indicated above, 57 ECVs have been identified. In addition, the major ECVs used in the SoC Report – Observed Trends and their respective sources were also presented. Moreover, The Majors ECVs in 2022 - Actionable Indicators were also presented. Below is one example of actionable indicators presented:

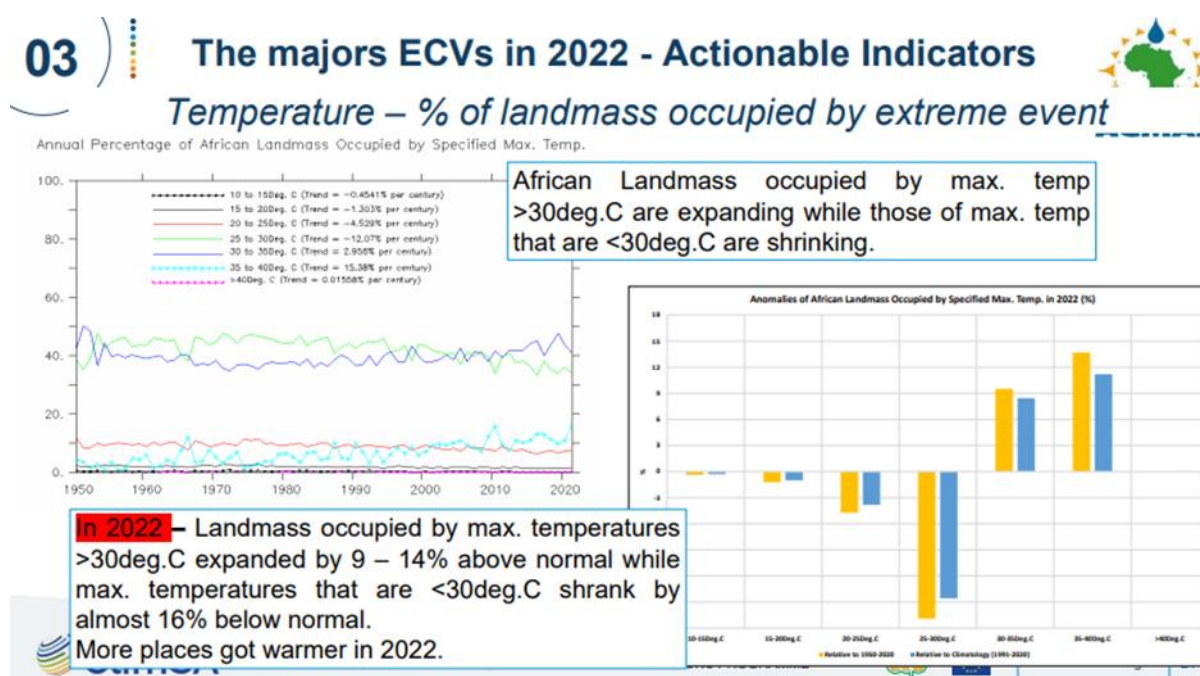
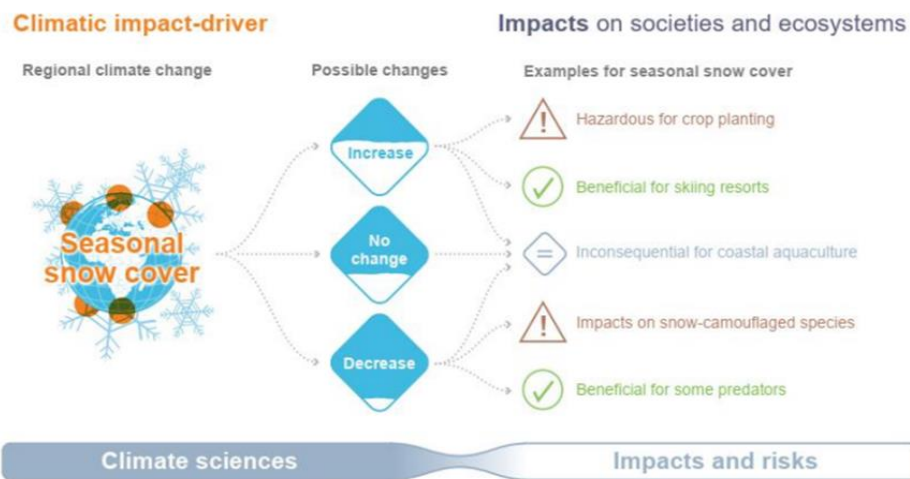


Figure 1: Majors ECVs in 2022 - Actionable Indicators

For more information on these Essential Climate Variables and observed trends, please click [here](#)

The 2nd delivered presentations were on the Climate change projections trends and extremes and Climate change attribution case studies and products by AIMS – Dr. Bamba. In this presentation, the following items were discussed: Climate Change Information in this item, Climate change information vs. adaptation, and Climate change Information in the IPCC Risk Assessment Framework were explained. He indicated that a bunch of climate change information indices have been developed, most of which are based on a tolerance threshold

exceedance. Climatic Impact Drivers (CID) were presented (see figure below): CID was explained as a climate condition that directly affects elements of society or ecosystems.



IPCC WG1 2021

Figure 2: Climatic Impact Drivers

He mentioned that CIDs and their changes can lead to positive, negative or inconsequential outcomes (or a mixture); and each CID is relevant for one or many sectors/assets (see figure below).

Sector	Asset	Climatic impact-driver																																	
		Heat and Cold		Wet and Dry			Wind		Snow and Ice			Coastal		Open Ocean		Other																			
		Mean air temperature	Extreme heat	Frost	Mean precipitation	River flood	Heavy precipitation and glacial flood	Landslide	Acidity	Hydrological drought	Agricultural and ecological drought	Fire weather	Mean wind speed	Severe wind storm	Sand and dust storm	Topical cyclone	Snow, glacier and ice sheet	Pernafrost	Lake, river and sea ice	Heavy snowfall and ice storm	Hail	Snow avalanche	Relative sea level	Coastal flood	Coastal erosion	Mean ocean temperature	Marine heatwave	Ocean acidity	Ocean salinity	Dissolved oxygen	Air pollution weather	Air pollution: O <sub>3</sub> at surface	Reduction at surface		
Food, Fibre and Other Ecosystem Products (WGII Chapter 5)	Crop systems																																		
	Livestock and pasture systems																																		
	Forestry systems																																		
	Fisheries and aquaculture systems																																		
Cities, Settlements and Key Infrastructure (WGII Chapter 6)	Cities																																		
	Land and water transportation																																		
	Energy infrastructure																																		
Health, Well-being and Communities (WGII Chapter 7)	Built environment																																		
	Labour productivity																																		
	Morbidity																																		
Poverty, Livelihoods and Sustainable Development (WGII Chapter 8)	Mortality																																		
	Recreation and tourism <sup>a</sup>																																		
	Housing stock <sup>b</sup>																																		
	Farmland <sup>c</sup>																																		
	Livestock mortality <sup>d</sup>																																		
	Indigenous traditions																																		

IPCC WG1, 2021

Figure 3: Climate Impacts Drivers and associated, sectors and assets.

The available Tools-Climate Models were explained. These models include Global Climate Models such as CMIP5&6 and Earth System Models (ESMs). These models are used to study





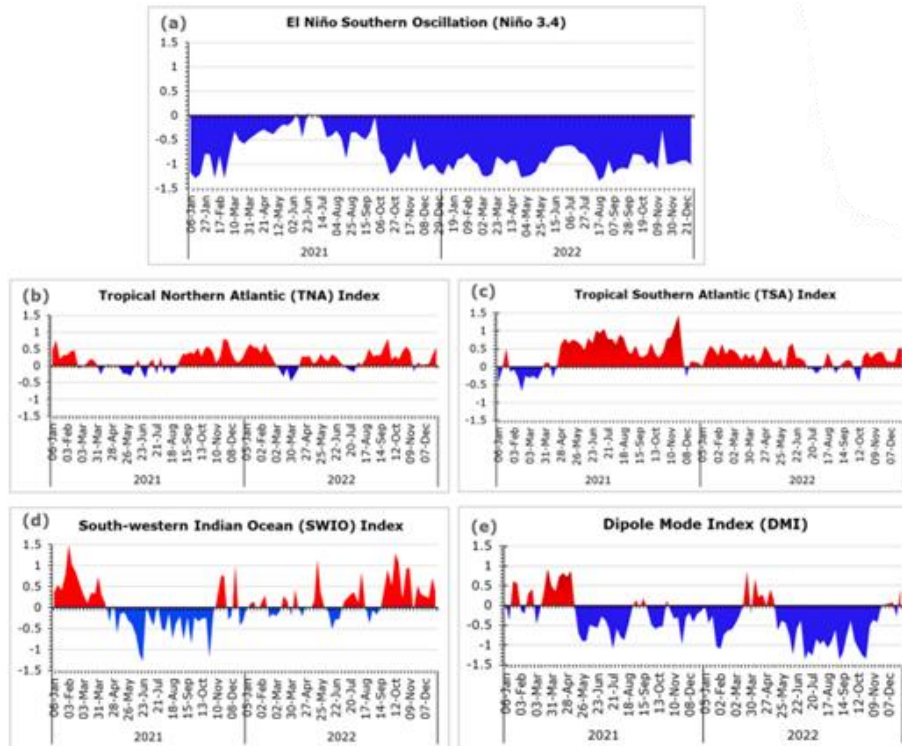
climate change: Historical, Scenario MIP, and High-Resolution MIP. He indicated that more than 30 GCMs/ESMs have made available daily data with respect to the scenarios -Shared Socioeconomic Pathways(SSPs) SSP1-2.6; SSP2-4.5; SSP5-8.5. In addition to the GCMs, regional climate models exist. And among others is CORDEX: which are RCMs downscaled from CMIP5, (soon CMIP6) and used to study climate change as in the GCMs but at a regional scale.

It has been noted that human influence has warmed the climate at a rate that is unprecedented in at least the last 2000 years; and climate change is already affecting every inhabited region across the globe, with human influence contributing to many observed changes in weather and climate extremes.

Looking ahead, multiple climatic impact drivers are projected to change in all regions of the world, especially in Africa. It is to be noted that there are gaps in projecting how the future will unfold and possible solutions to filling the gaps have been explored in the presentations. For more information please [click here](#)

The fourth presentation was on the dynamics of drivers of observed climate variability under a changing climate (i.e., ENSO and African Rainfall relationships) by ACMAD-Dr Romeo

This presentation focused on the major drivers of interannual climate variability in Africa. This concerns the State of the Ocean Climate in the Pacific, Atlantic and Indian Oceans. This presentation stressed that to understand the weather development in Africa insight is required on the status of the Sea Surface Temperature around the globe. Up to 16 major areas in the ocean are identified as being relevant for the development of rainfall in African areas. However, it has been indicated that not all of these 16 major areas are featured in the SoC reporting. The major drivers of climate variability affecting Africa in SoC in 2022. The phases of the El Niño Southern Oscillation (ENSO) and the sea-surface temperature (SST) anomaly patterns in the tropical Atlantic Ocean and the Indian Ocean are the main drivers of the rainfall variability in Africa were considered.



**Figure 7.** Time series of climate indices for 2021 and 2022 relative to 1981–2010: (a) Niño 3.4 index [5°S–5°N; 170°W–120°W]; (b) Tropical Northern Atlantic index [5.5°N–23.5°N; 15°W–57.5°W]; (c) Tropical Southern Atlantic index [0–20°S; 10°E–30°W]; (d) South-western Indian Ocean index [32°S–25°S; 31°E–45°E]; (e) Dipole Mode Index (DMI).  
 Source: ACMAD, based on data from the State of the Ocean Climate and NOAA National Centers for Environmental Prediction (Reynolds, R. W.; Rayner, N. A.; Smith, T. M. et al. An Improved In Situ and Satellite SST Analysis for Climate. *Journal of Climate* **2002**, 15 (13), 1609–1625. <https://doi.org/10.1175/1520->

*Figure 5 The major drivers of climate variability affecting Africa in SoC in 2022*

For more information on this presentation, please click [here](#).

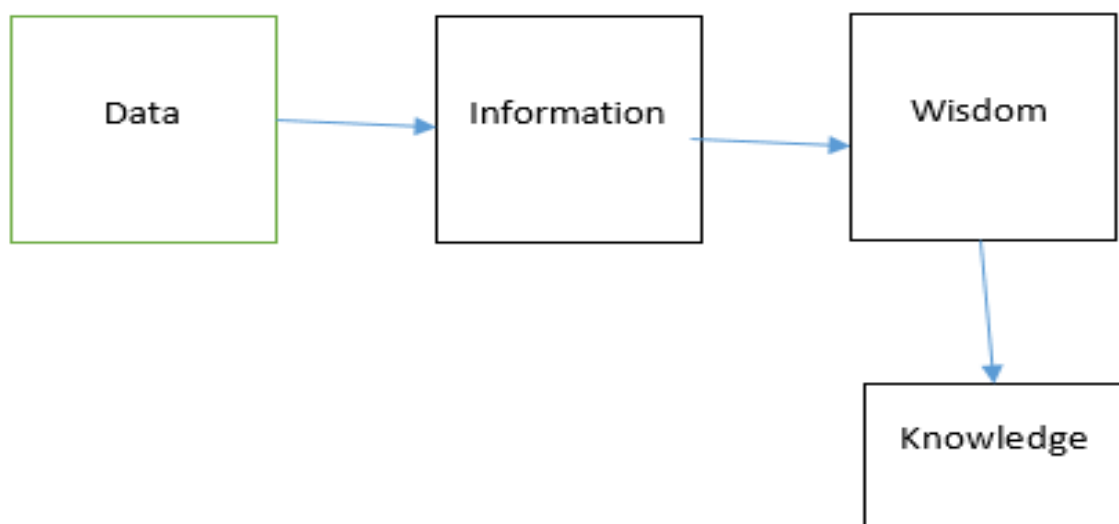
In this presentation slot, an expert-Frederic Owino- from Seychelles was given the opportunity to present SoC for Seychelles

The presentations focused on the Climate of Seychelles, Climate issues and Global Efforts to combat climate change.

It has been indicated that the climate of Seychelles is strongly influenced by the ocean, especially through changes in monsoonal winds, ocean currents and sea surface temperature patterns, hence a tropical maritime climate. There are two distinct seasonal patterns associated with the wind regime, the south-east monsoon which blows from May to September associated with the dry season and the north-west monsoon from November to March associated with the wet season and the Tropical Cyclone (TC) Season.

In this presentation, climate issues were given based on the Key messages from COP27. In this venue, it has been indicated that it is unequivocal that human beings are responsible for causing

climate change and Climate issues are well known in the scientific world, the question is, “How do you convey Climate change information to the stakeholders and Authorities? The answer to this question was given as follows: data is transformed into information that will give knowledge and wisdom to the stakeholders and authority (s) Figure(6):



*Figure 4: Dissemination of climate information*

For the global efforts to combat climate change, it has been indicated that there are various efforts in place as part of Climate Change interventions among others, Adaptation, Mitigation, Climate policies, and Climate Projections.

### **Key Messages of the SoC WMO-Dr Ernest**

The key messages of the State of Climate were given by Dr Ernest. In this presentation, he indicated that the African mean near-surface temperature anomaly was 0.16 degrees C above the long-term average of 1991-2020 and 0.88 degrees C above the 1961-1990 average. The average rate of change in warming in Africa amounted to +0.3 degrees C per decade in the 1991-2022 period, compared to 0.2 degrees C per decade between 1961 and 1990. The average rainfall was generally below normal in most areas in Africa, though extreme rainfall events occurred in some regions, leading to disastrous flooding.

The Horn of Africa faced its worst drought in 40 years, with Ethiopia, Kenya and Somalia particularly hard hit. The triple-dip Lanina, in combination with the negative phase of the Indican Ocean Dipole, was a substantial contributor to the ongoing dry conditions in the region.



**Day Three: Thursday, 13 July 2023**

**Session III: Loss and Damage & Early Warning for All towards COP28**

**Loss & Damage /EW4All initiative-WMO Mr Zablon**

This session consisted of one presentation on the Early Warning for All (EW4All) Initiative by Mr Zablon W. Shilenje from WMO Africa. He emphasized that the effectiveness of these EWS relies on the very good access and coverage of communication services. He also presented the Challenges of Early Warning Systems in Africa. The following gaps were identified are the following: - Difficulty managing disaster risk data - Challenges related to observation and forecasting - Challenges in warning and dissemination - Challenges in preparedness and response.

**Session IV: Partnerships and Networks**

The outcome of this session and previous discussions(day1, and 2) provided a summary of the proposed improvement of SoC, a table summarising the proposed improvement and actions to be taken and recommendations were presented during the session.

**Summary of Proposed Improvement and Recommendation for the State of Climate Report**

- ✓ Distributing the SoC report template (for country/RCCs contribution)
- ✓ Has been recommended that the current SoC should include more ECVs and future climate change information.
- ✓ Include indicators such as
  - Heatwave/heat-stress levels and link this to the number of deaths and hotspots in the SoC.
  - Maps of Onset (of monsoon) and growing length of the Season
- ✓ Highlight Hot spots – which areas are more vulnerable to specific hazards.
- ✓ Indicate the different droughts over specific ecosystems.
- ✓ Consider the usage of the ETCDI indices document.
- ✓ Include countries' temperature, rain and related indices of the reporting year.
- ✓ Include countries' indices of climate variability and changes.



- ✓ Consider masking the desert areas in the precipitation anomalies map so that we do not describe arid areas.
- ✓ Introduce the gender dynamics when it comes to the impact of extreme events on the population.
- ✓ Identified damages caused by tropical cyclones as a result of climate change.
- ✓ Translate climate projections to climate information.
- ✓ Regional Centers (RCCs) should consolidate the SoC report of their respective countries to be shared with WMO/ACMAD to be integrated into the continental state of the climate.
- ✓ Draw up a measurable action plan for each result accompanied by an evaluation process which is defined by calculatable indicators.
- ✓ A full report including all the analysed data should be generated and a summary for policymakers will be the State of Climate in Africa report produced.
- ✓ The report should evolve to feature more actionable indicators well connected to extremes and impacts in the next reports and progressively improve the key messages section.
- ✓ ACMAD with the support from WMO and AUC should prepare a training programme to capacitate RCCs and NMHSs to produce these ECVs and future projections to contribute to the State of Climate report.
- ✓ Emphasis on capacity building for evaluation of extreme events
- ✓ Carry out capacity development for National Meteorological and Hydrological Services (NMHSs) in weather prediction, climate monitoring, Information technology, research and transfer of technology.
- ✓ ACMAD to address the identified gaps through research projects conducted in collaboration with research scientists.
- ✓ Create awareness and widely circulate the products/Documents to support different sectors of the economy and users of climate information/stakeholders e.g., through National and regional meetings and conferences of parties (COPs).
- ✓ Use the findings in the SoC to provide facts that can convince development partners to support climate change projects to address climate issues associated with climate and related risks and impacts.



✓ Avail the SoC report to the African Group of Climate Change Negotiators as scientific evidence to back up their negotiation at Climate change meetings.

**Table 1 Table summarising the proposed improvement and actions to be taken.**

Actions	Current	Proposed
1	SoC report template <ul style="list-style-type: none"> <li>- Physical aspect</li> <li>- Extremes events and impact</li> </ul> Policies	<ul style="list-style-type: none"> <li>- Physical aspect               <ul style="list-style-type: none"> <li>○ Address heat wave/heat stress as one critical aspect</li> <li>○ Drought, SPI/SPEI</li> </ul> </li> <li>- Extremes events and impact               <ul style="list-style-type: none"> <li>○ Address the identified hot spot.</li> <li>○ Share extreme event templates from WMO.</li> </ul> </li> <li>- Policies (from the climate change information and associated impacts)</li> </ul>
2	<ul style="list-style-type: none"> <li>- The deadline for drafting the report in April</li> </ul>	<ul style="list-style-type: none"> <li>- WMO/PR to nominate focal point for SoC report.</li> <li>- Send the new contributor template as soon as possible ()</li> <li>- Organise a capacity-building session on populating the template.</li> <li>- Organize preparatory meetings by mid of each year (virtual or physical) to build the capacity of NHMSs in delivering the SoC report.</li> <li>- by February ending all countries should send their contribution.               <ul style="list-style-type: none"> <li>○ This will allow the possibility of a write-shop to draft the report.</li> </ul> </li> <li>- Country’s contribution to be sent to WMO-Africa, cc ACMAD and their respective RCCs.</li> </ul>
3	Generation of the Products of the SoC	



## RECOMMENDATIONS

### 1. To all (WMO, AUC, ACMAD, RCCs, NHMSs, Researchers)

- ii. Improve the key message section of the SoC, by Identifying more actionable indicators well connected to extremes and impacts.
- iii. Create awareness and widely circulate the products/Documents to support different sectors of the economy and users of climate information/stakeholders e.g., through National and regional meetings and conferences of parties (COPs).
- iv. Use the findings in the SoC to provide facts that can convince development partners to support climate change projects to address climate issues associated with climate and related risks and impacts.

### 2. Member States are urged to:

- i. Consult key partners and allow them to share sector-specific information that is vital for the state of the climate national report at the national level.

### 3. RCCs are directed to:

- i. Consolidate the SoC report of their respective countries to be shared with WMO/ACMAD to be integrated into the continental state of the climate.

### 4. ACMAD, RCCs and AUC Secretariat are directed to:

- i. ACMAD to prepare a training programme to capacitate RCCs and NMHSs to produce these ECVs to contribute to the State of Climate report:
  - a. Support CAPC-AC to identify relevant climate drivers and ECV for the ECCAS region.
  - b. Support CAPC-AC to write and avail the state of climate at the ECCAS region.
  - c. Build the capacity of CAPC on data management and infrastructures.
  - d. AIMS to contribute to the capacity building for RCCs and NMHSs to produce ECV and Climatic Impact Drivers.
- ii. ACMAD to prepare a training programme to capacitate RCCs and NMHSs to produce these ECVs to contribute to the State of Climate report.
- iii. Generalize the outputs of the program to cover and benefit the North African RCC

### 5. WMO Secretariat is requested to:



- i. Reduce the time lag from 9 months for the release of the SoC report.
- ii. Verify the information collected from partners before using it on the report.
- iii. Avail the SoC report to the African Group of Climate Change Negotiators as scientific evidence to back up their negotiation at Climate change meetings.
- iv. Take into account, when building capacity, gaps in the unavailability of data on very large areas and also the quality of information.
- v. Build capacity (Technical, Financial and Technological) to generate the various products and write the SoC report.

-----End of report-----