# SADC-CLIMATE SERVICES CENTRE (CSC) PRODUCTS AND SERVICES FOR THE AGROMETEOROLOGY SECTOR

20 September 2024

**16th EUMETSAT USER FORUM**
**20 Sept 2024**
**Presenter: S.Ramessur**

# Outline

- Role of the SADC-CSC & the SHOC (interoperability)
- Products and services from CSC
- Revamping of the SARCOF
- Contribution to the SADC humanitarian appeal

# Role of the SADC-CSC

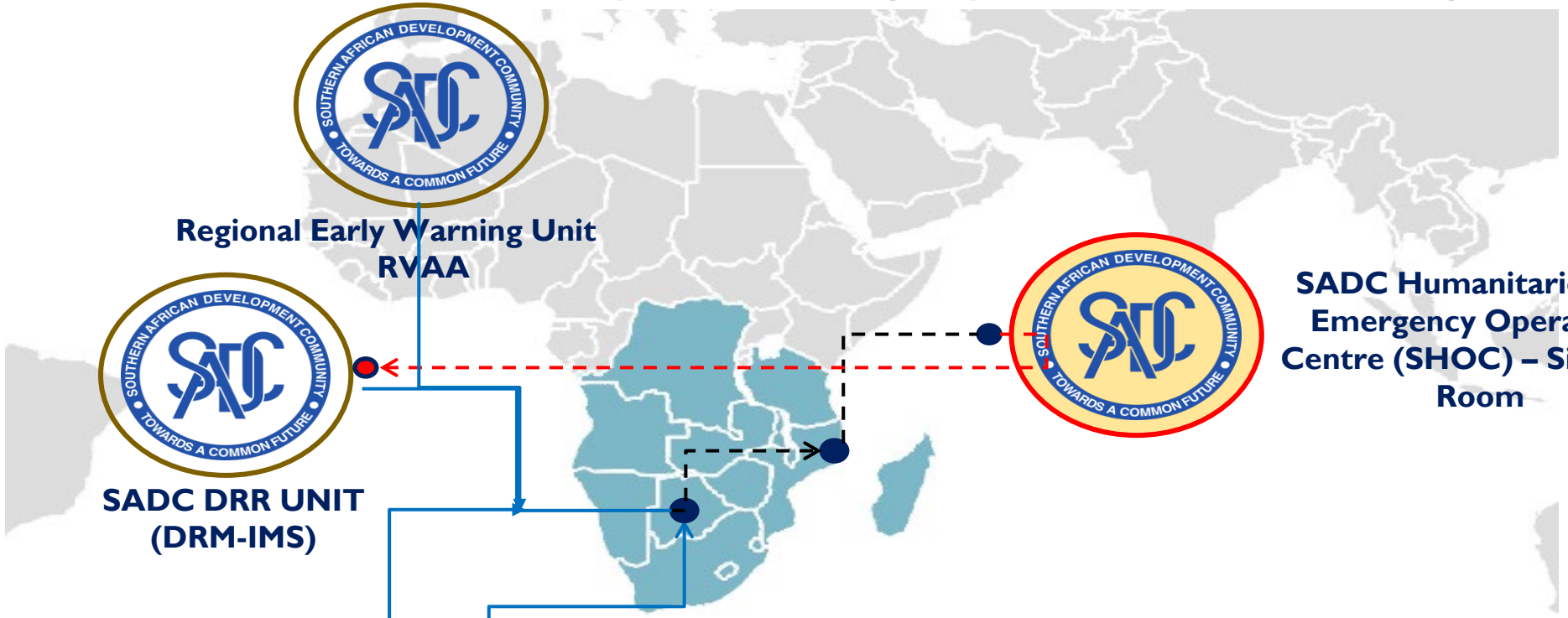
- The SADC Climate Services Centre provides operational, regional services for monitoring and predicting extremes in climate condition.
- The Centre develops and disseminates meteorological, environmental and hydro-meteorological products; contribute to improved disaster risk management in the region, and help to ensure Member States are better prepared for weather and climate disasters, conservation and protection of natural resources.
- The Climate Services Centre was established in 1990 as the Drought Monitoring Centre.
- Being a SADC programme, the Centre falls within the Infrastructure and Services (I&S) Directorate and is co- located with Botswana Meteorological Services.
- The Centre provides trainings for personnel in the National Meteorological/Hydrological Services (NMHSs). Training also covers the end- users in the various weather –sensitive economic sectors such as agriculture, health, energy, water resources management and transport in the region in application of the climate products and services

# OBJECTIVE OF THE SHOC-SADC HUMANITARIAN OPERATION CENTRE

- The objective of the SHOC is to coordinate humanitarian and emergency support to Member States affected by disasters within the Region thereby contributing to disaster risk reduction and resilience building.

- The SHOC is established as an autonomous, self-accounting organisation of SADC.

# Status of Early Warning Systems in the region



Regional Early Warning Unit
RVAA

SADC DRR UNIT
(DRM-IMS)

SADC Humanitarion and Emergency Operations Centre (SHOC) – Situation Room

Agricultural Information Management & Services (AIMS)

SADC Climate Services Centre (CSC)

## SADC-CLIMATE SERVICES CENTRE

### TROPICAL CYCLONE ADVISORY

**ISSUE NUMBER: 07** **RELEASE DATE: 11/03/2024** **VALIDITY: 15/03/2024**

**RAINFALL SEASON: 2023/24**

**Headline:** **Tropical Cyclone FILIPO is projected to make landfall over central Mozambique, affecting parts of eastern Zimbabwe, eastern South Africa and easter Eswatini before moving back into the Indian Occean and becoming an extra-tropical cyclone.**

Analysis of model outputs from the following sources: European Centre for Medium Range Weather Forecasting (ECMWF), Joint Typhoon Warning Centre (JTWC), Regional Specialized Meteorological Centre (RSMC) La Reunion, Zoom-Earth (ICON & GFS) and the SADC Climate Services Centre WRF-GFS, show that a **Tropical Cyclone FILIPO has developed over the Southwestern Indian Ocean basin and has recorded winds speeds of 65 km/h gusting to 80 km/h**. The tropical system is currently expected to affect **Mozambique** and indirectly impact **Eswatini and South Africa**.

## WARNING ZONE

The tropical cyclone forecast track shows that FILIPO (Figure 1) will make direct impact over **Mozambique**, and indirectly affect **Eswatini and South Africa** from 11 to 13 March 2024 (according to RSMC La Reunion - appendix) and thereafter move southward towards the extra tropics.

Other parts of the region likely to experience extreme precipitation during the same period include, parts of **Angola, DRC, Zambia, Malawi and Tanzania** as shown in Figure 1 below.

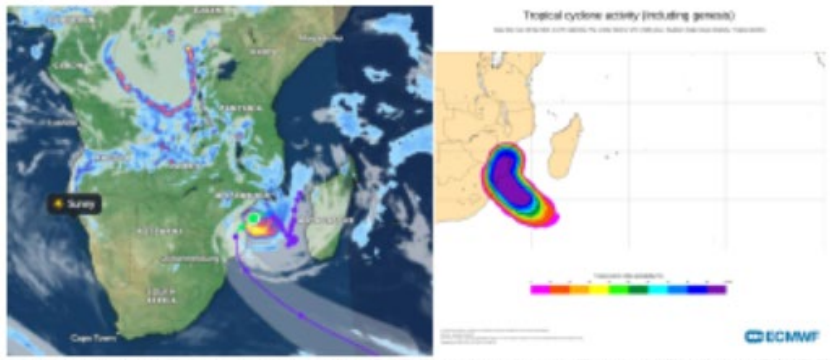


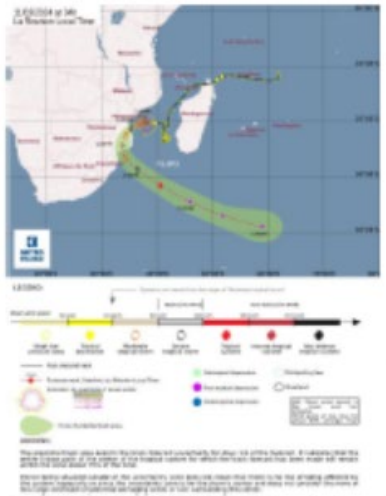

Figure 1: Heavy rainfall expected over the SADC region due to Tropical Cyclone (FILIPO) and other weather systems during the period of 11-15 March 2024 (*Source: Zoom-Earth and JTWC (tracks)*) and **ECMWF tropical cyclone activity plot**

## SADC HUMANITARIAN AND EMERGENCY OPERATIONS CENTRE (SHOC)

**TOPIC: TROPICAL CYCLONE & HEAVY RAINFALL PREPAREDNESS AND RESPONSE ADVISORY**

| | |
|---|---|
| EVENT: | TROPICAL CYCLONE FILIPO |
| ISSUE NUMBER: | 02 |
| DATE: | 10/03/2024 |
| TIME: | 07:00 PM UTC |
| VALIDITY | 15/03/2024 |
| ADVISORY LEVEL / CATEGORY | Red |
| MEMBER STATES AT RISK | Mozambique, Zimbabwe, Eswatini & South Africa |

**TROPICAL SYSTEM (TRIGGER) SUMMARY:**



Based on the Tropical Cyclone and Heavy Rainfall Advisory issued (TC Advisory Number 7) by the SADC Climate Services Centre, coupled with the information accessed from the World Meteorological Organization (WMO) Regional Specialized Meteorological Centre (RSMC) Tropical Centre, European Centre for Medium Range Weather Forecasting (ECMWF), and the Joint Typhoon Warning Centre (JTWC), for the Southwest Indian Ocean, a **Moderate Tropical Storm (FILIPO)** has developed over the Southwestern Indian Ocean basin and has recorded winds speeds of 65 km/h gusting to 80 km/h. The tropical cyclone forecast track shows that it may directly affect Mozambique, with landfall expected between Monday night and Tuesday morning, somewhere between the extreme south of Sofala and Inhambane provinces and most likely make indirect impact over eastern parts of Zimbabwe, Eswatini and South Africa, from 11 to 13 March 2024 **(according to RSMC La Reunion) and thereafter move southward towards the extra tropical cold waters.**

# Interoperability with National and Continental Multi-Hazard Early Warning Situation Room

Development of **an integrated Multi-hazard Early Warning System** – In partnership with IFRC, AU, UNDRR & CIMA

THE SITUATION ROOMS
LES SALLES DE SITUATION

myDEWETRA

Disaster Operation Centre
Centre des Opérations d'Urgence

Continental Multi-Hazard Advisory Centre

Continental Situation Room

Disaster Operation Centre

ACMAD

African Union

IGAD
ICPAC

SADC CSC
Climate Services Centre

SADC
SHOC

Tanzania
Mozambique
Malawi

# SADC Climate Services Centre

- SADC Climate Services Centre (CSC) is mandated with providing regional climate information in the SADC region
- This includes organizing the bi-annual SARCOF event and issuing Seasonal Outlook and Advisory.
- CSC is on its path to be accredited by WMO to become Regional Climate Centre- (started the demonstration phase)
- EU-funded, WMO-coordinated ClimSA project (2021-2025) implemented a number of developments under the following concepts:
  - User Interface Platform (UIP)
  - Regional Framework for Climate Services (RFCS)
  - Objective Seasonal Forecasting (OSF)

# Objective Seasonal Forecast at CSC

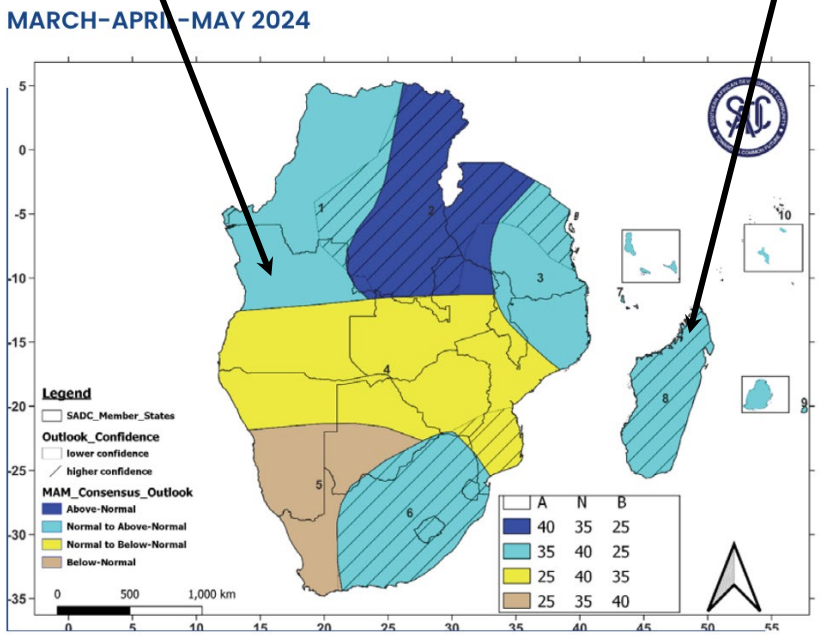
- Monthly production of a seasonal forecast based on ensemble of dynamical forecast models
- Range of products including air temperature and intra-seasonal rainfall characteristics
- Explicit articulation of forecast skill
- Onset product still in development, also tailored products such as drought and heatwaves

# Revamped SARCOF forecast

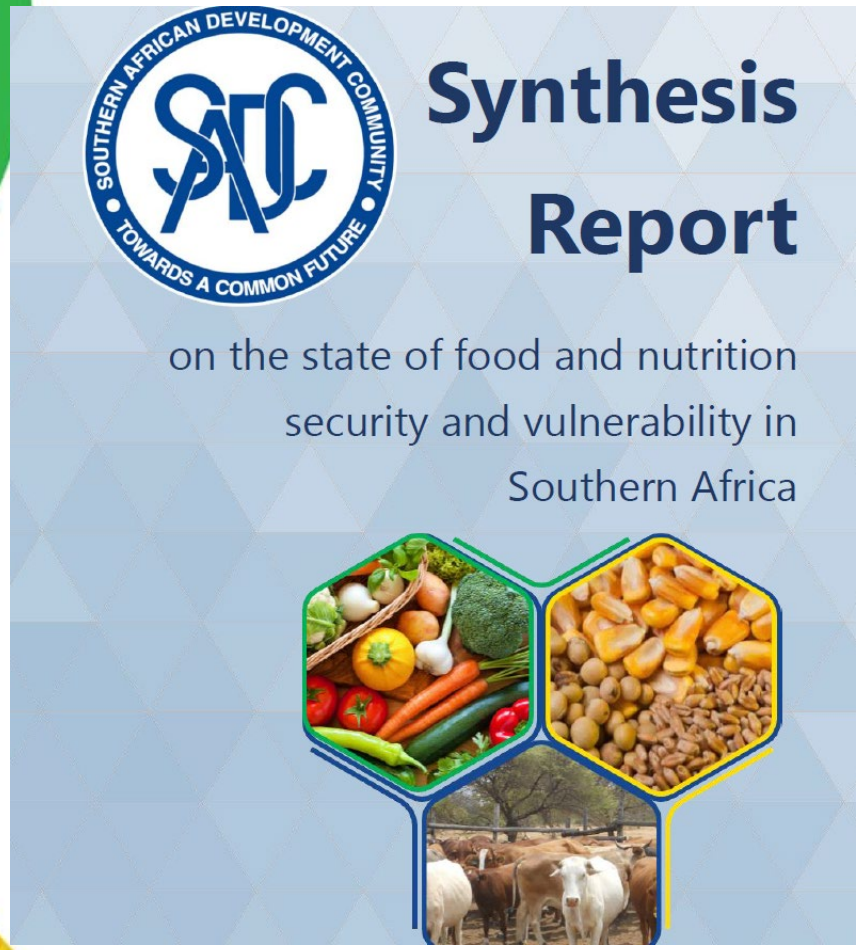
- Forecast remains the same in nature, but some aspects have been changed towards OSF principles
  - More transparent, traceable process
  - Realistic verification/evaluation of previous forecast
  - Forecast with articulated confidence (proxy for skill and uncertainty)
  - Zones follow signal
  - Richer description
- SARCOF as a regional UIP paving the way towards user feedback, co-production, sectoral tailoring etc..

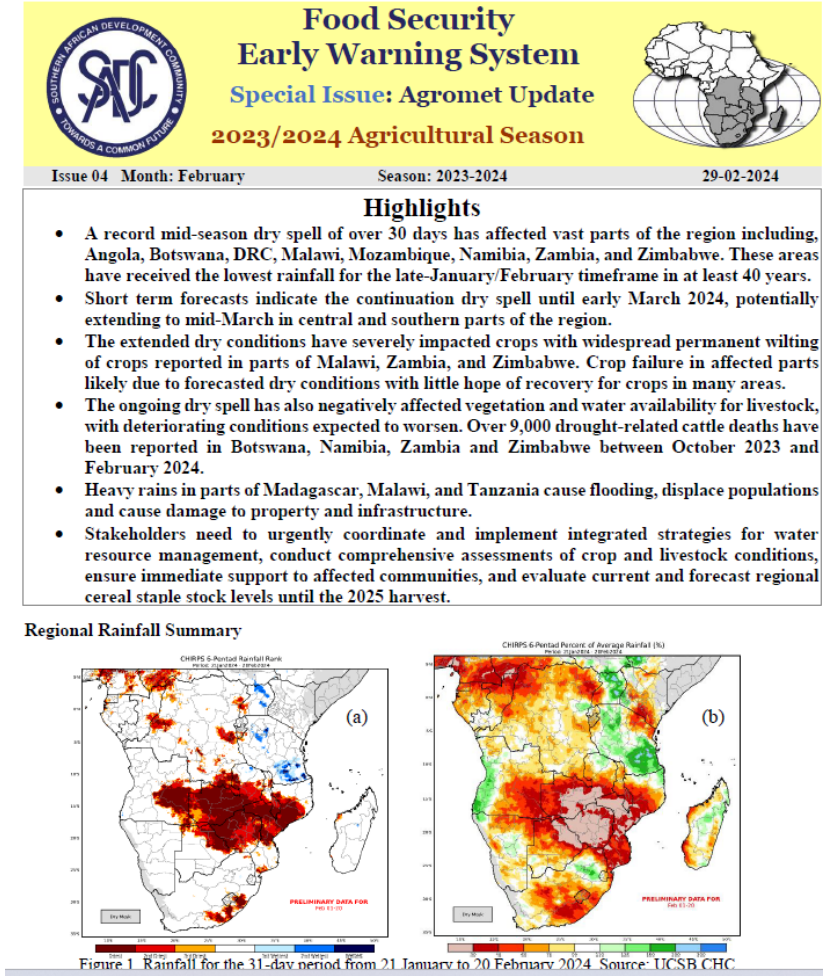
Zones are more meaningful

Articulated confidence



# Agromet services



# Agromet products and services

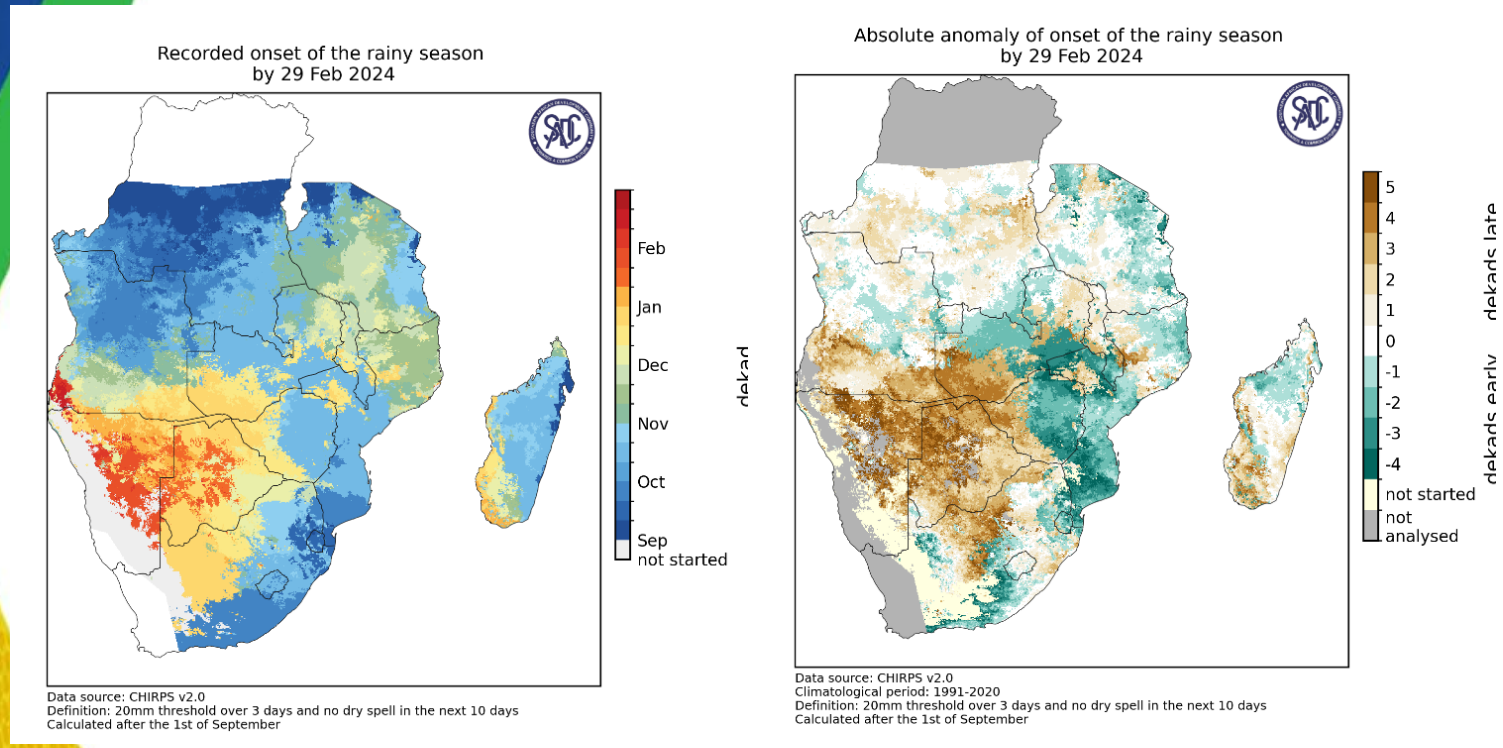
- Range of data products generated with minimal latency (3-5 days) at time scales from pentadal to seasonal
- Products include ETCCDI indices, drought and heat weave indices, but can be extended to include other tailored indices. Currently based on CHIRPS and ERA5, but can be extended to include other data sources

- SADC CSC runs an operational Numerical Weather Prediction model (WRF), for modelling various weather parameters for up to 7 days in order to detect extreme weather events.

# Agromet products and services

## Monthly climate monitoring bulletins

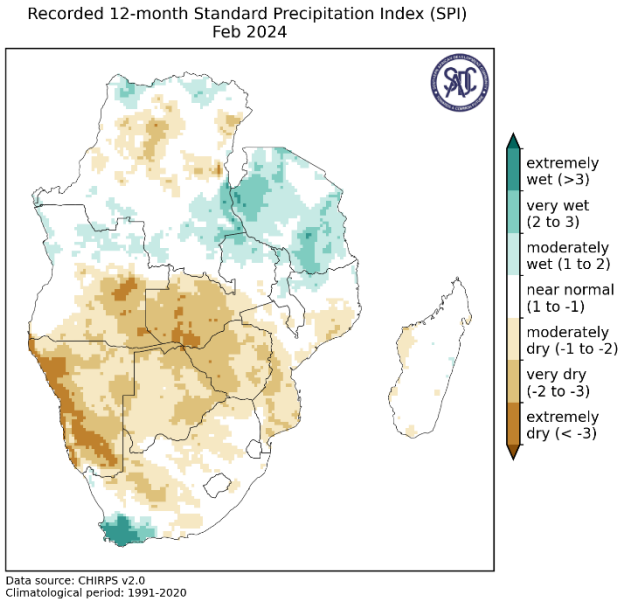
- Onset of the Rainfall Season

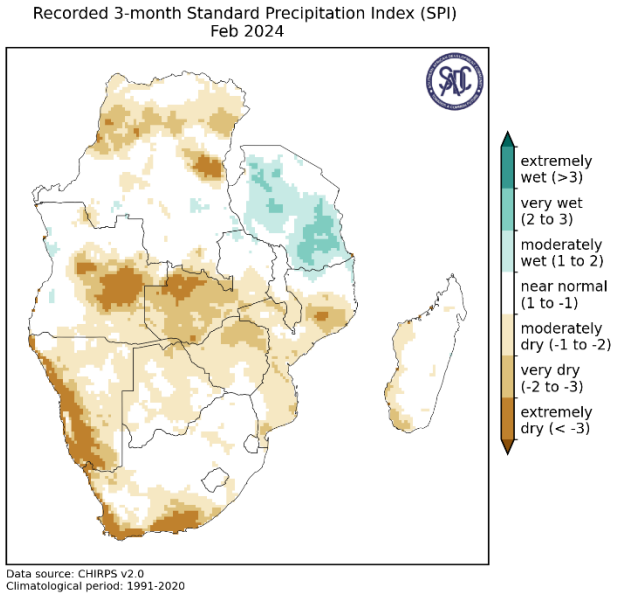



- The onset is defined here from agricultural perspective as accumulation of at least 20mm of rainfall over three days, which are not followed by a dry spell in the next 10 days (i.e. there is at least one rainfall event in the next 10 days).

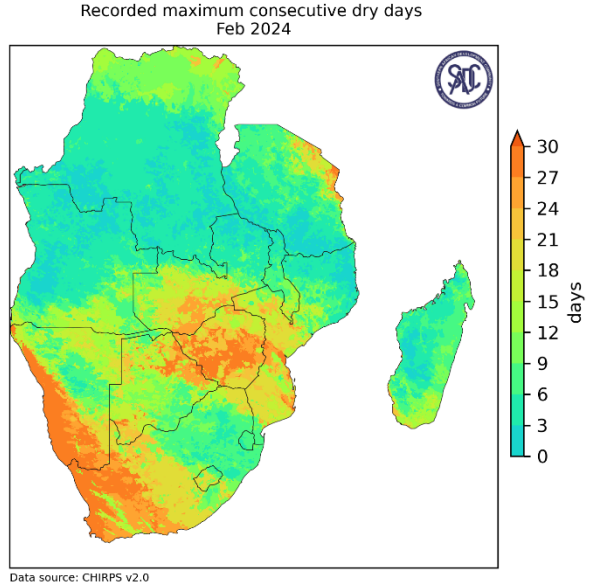
# Agromet products and services

- Drought assessment: SPI for 3-months (left) and 12-month SPI (right)

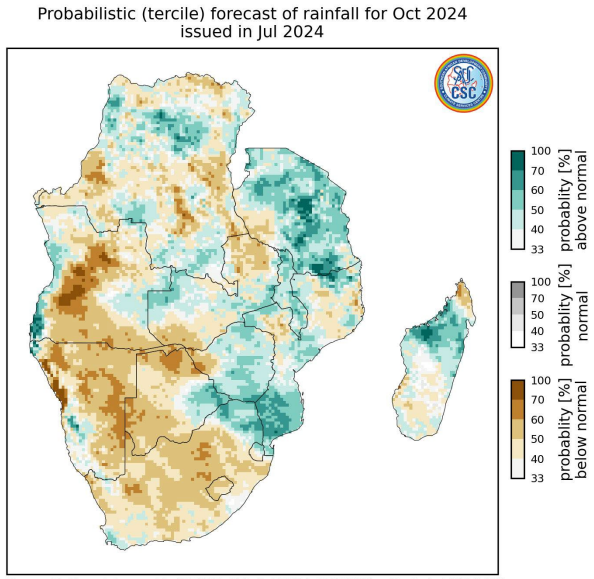


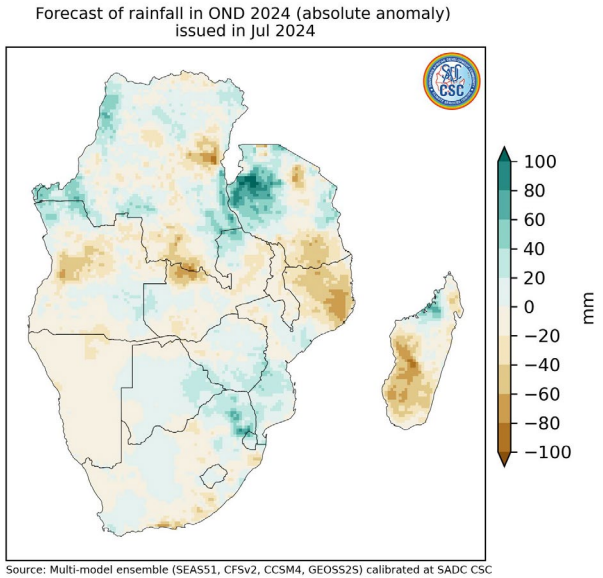

- Short term drought (dry spells)



# Forecast products



Source: Multi-model ensemble (SEAS51, CFSv2, CCSM4, GEOSS2S) calibrated at SADC CSC



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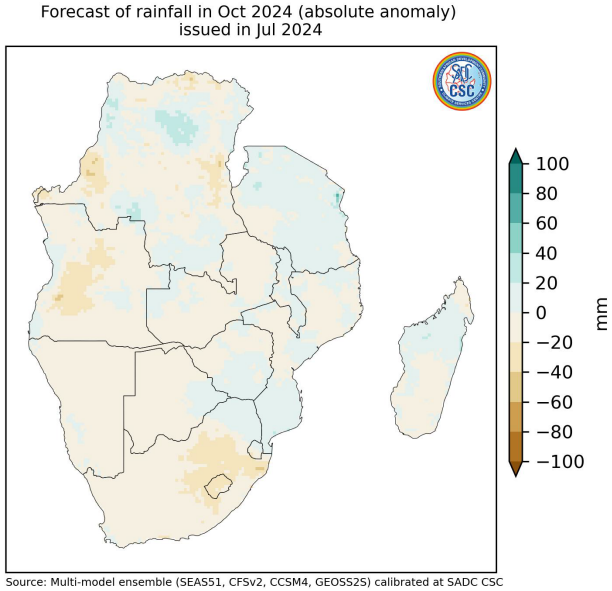

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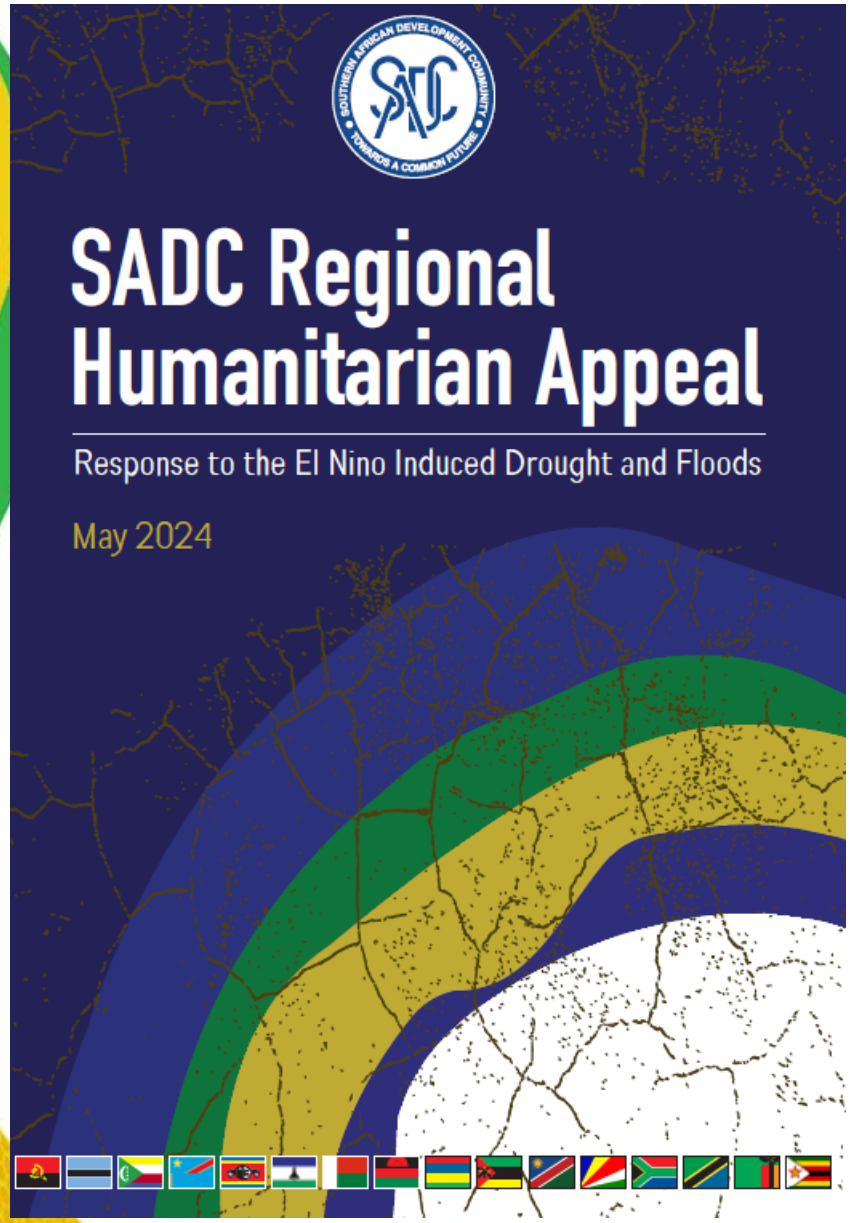
(SEAS51, CFSv2, CCSM4, GEOSS2S) calibrated at SADC CSC

Seasonal forecast
& Monthly-Multi Model
Ensemble/individual models

# SADC launched the Regional Humanitarian Appeal in Response to the El Nino Induced Drought and Floods

- This Appeal was necessitated by the declaration of a state of national disaster by Madagascar, Malawi, Zambia and Zimbabwe. It highlights that about 61 699 026 people were affected by the impacts of El Nino, and that the overall response requirements amounts to USD 5 Billion. Other MS Namibia and Botswana also declared a state of drought emergency May 2024 and June 2024.
- State of national disaster owing to the compromised agriculture production, compromised food and nutrition security, as well as water scarcity and its implications for energy production and health
- Received US$ 34 Million in pledged resources. Several partners have been supporting Member States affected by El Nino with different interventions.
- To track this, joint monitoring will be conducted by the Secretariat and the United Nations Office for the Coordination of Humanitarian Affairs (OCHA), to facilitate reporting to Member States.

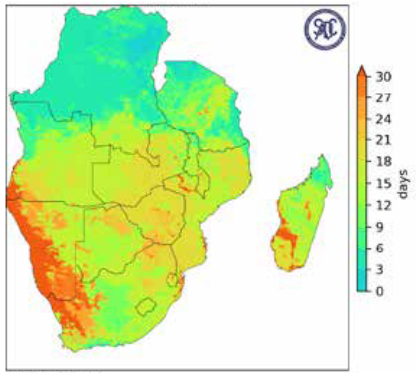



# 5. Regional Situation

## a) El Niño impacts

**Delayed onset, record mid-season dry spell and extreme temperatures.**

Recorded maximum consecutive dry days
April 2024




Recorded daytime heat wave days
April 2024

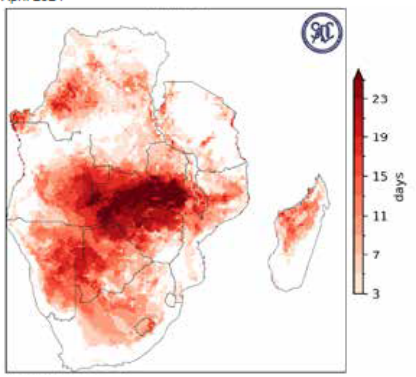



Figure 1. (a) Dry spells and (b) heat waves experienced during February 2024

The 2023/2024 El Niño event caused widespread drought conditions across southern Africa, characterized by a late onset of rains, extended mid-season dry spells, and extreme high temperatures. El Niño typically results in hotter and drier than usual conditions in southern Africa, but this season was characterized by record dry conditions in many areas. The onset of rains, which usually occurs in November in most parts of the region, was delayed by as much as 30 days in central areas, including south-eastern Angola, northern Botswana, southern Malawi, southern Mozambique, northern Namibia, north-western South Africa, southern and central Zambia and central Zimbabwe. In many of these areas, November rainfall was the lowest on record, dating as far back as in 1981. The low November rainfall contributed to reductions in areas planted to crops.

Following a brief respite in December and January, a severe mid-season dry spell ensued. From 21 January to 31 March 2024, extremely dry and hot conditions were experienced region, where February rainfall was the lowest on record, for over 100 years, for the area covering south-eastern Angola, most of Botswana, southern Malawi, north-eastern Namibia, most of Zambia and most of Zimbabwe. The February rainfall totals over this area is comparable to, but lower than 1992, a year that recorded severe drought impacts. This mid-season dryness marked in some cases an effective end of the cropping season.

### Widespread crop failure due to severe crop water deficits

The extended dry conditions have had a widespread, severe impact on crops, as it occurred at a time when cereal crops are generally most susceptible to water deficits. Field observations, reports, early crop assessments, and crop modelling results indicate that severe soil moisture deficits caused extensive permanent wilting of crops in many central areas including Malawi, Namibia, Zambia, and Zimbabwe, and widespread crop failure occurred. Across the southern half of the region, many areas experienced significant crop water

# Some of the key achievements

- Through the CLIMSA Project, the **User Interface Platform (UIP) Helpdesk** has been operationalised and **a Community of Practice** and commenced **online Lunch & Learn sessions** with climate services stakeholders in Nov 2023 (as of July; 3 L&L sessions conducted online).
- ToRs for the Regional Sectoral UIP and the National UIP (for Angola) under development for priority sectors.
- Equipment procured for CSC and Member States **(servers/Desktop PCs for ClimSA Station/Early Warning, Data Rescue equipment).**
- 8 training workshops conducted for Member States in the following:
  - 3 Climate Expert (CEM) workshops preceding the SARCOFs;
  - Capacity building in ClimSA Station (supported by JRC)
  - Homogenisation of climate data
  - Harmonisation of Climate Data Management System in the SADC Region and data rescue (supported by WMO)
  - Foundational Seasonal forecasting;
  - Water, Energy , Food and Agriculture and Environment (WEFE) Nexus, Climate Variability, and Environmental Monitoring. (supported by JRC)

# Training and Capacity Building




# *Thank You*

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