Environment and Tourism

MINISTRY

Republic of Botswana

Department of Meteorological Services

DEPARTMENT OF METEOROLOGICAL SERVICES

STATEMENT

SEASONAL RAINFALL AND TEMPERATURE OUTLOOK

FOR

JANUARY TO APRIL 2025

BY

BOTSWANA DEPARTMENT OF METEOROLOGICAL SERVICES (BDMS)

23th December 2024

ABSTRACT

This statement is a presentation of the seasonal rainfall and temperature outlook presented by the Department of Meteorological Services for the second half of 2024/25 rainfall season. The statement consists of four sections:

- **Section 1:** Is introductory section that describes the scope of the seasonal rainfall and temperature outlook statement and provides the background behind the forecast.

- **Section 2:** Provides the methodology used for the production of the forecast, and this constitute the analysis of the current status of sea surface temperature over the Pacific and Indian Ocean, as well as the El Niño-Southern Oscillation (ENSO) prediction.

- **Section 3:** Provides seasonal rainfall and temperature outlook for the second half of the 2024/25 rainfall season presented in three-monthly periods: JFM and FMA. Each of the three-monthly periods describes the expected rainfall and temperature outlook.

- **Section 4:** Provides a summary of the second half of the 2024/25 rainfall and temperature season outlook.

GLOSSARY

BDMS	Botswana Department of Meteorological Services
CSC	Climate Services Centre
ENSO	El-Nino /Southern Oscillation
IRI	International Research Institute
JFM	January, February, March
FMA	February, March, April
SADC	Southern African Development Community
SARCOF	Southern African Regional Climate Outlook Forum
SST	Sea Surface Temperatures
STE	Short Term Expertise
SH	Southern Hemisphere
TEM	Thematic Expert Meeting
ToR	Terms of Reference

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STATEMENT

EXECUTIVE SUMMARY:

The Department of Meteorological Services (DMS) has reviewed the state of the global climate systems and analyzed the rainfall and temperature prospects for the second half of this current rainfall season, i.e. January to April 2025. Largely normal to above-normal precipitation is expected for JFM and FMA countrywide. Above average temperatures are predicted for JFM and FMA throughout the country. The outlook is as follows:

JANUARY, FEBRUARY AND MARCH (JFM) 2025

Botswana: Largely normal to above normal rain**fall.** Above normal temperatures. *Normal rainfall ranges from 85mm in the southwestern parts of Southern Kgalagadi District to 340mm in Chobe District in the north. Normal temperatures range from 30^{0}C over the northern parts to 33.5^{0}C over the southern parts of Botswana.*

FEBRUARY, MARCH AND APRIL (FMA) 2025

Botswana: Largely normal to above normal rainfall. Above normal temperatures. *Normal rainfall ranges from 70mm over southwestern Kgalagadi to 220mm over Chobe District. Normal temperatures range from 29.6°C over eastern parts of Botswana to 31.8°C over the northwest.*

1. INTRODUCTION

1.1 SCOPE OF THE STATEMENT

The scope of this statement is to provide the updated National Seasonal Rainfall and Temperature Outlook for Botswana for the second half of the 2024/25 rainfall season. Its aim is to be used for the benefit of policy-making-decisions in the climate sensitive sectors for socio-economic purposes as well as to manage risk arising from climate variability and climate change.

1.2 BACKGROUND

January to March constitutes the last half of the rainfall season over Botswana. This outlook has been extended into April. The outlook has been divided into rolling three-month forecast namely; January-February- March (JFM) and February-March-April (FMA). According to the models, ENSO neutral conditions are present but La Niña is most likely to emerge during October-December 2024 (57% chance) and is expected to persist through January-March 2025. For Botswana climate, warming and cooling of the Equatorial Pacific Ocean, south-western and north-western sectors of the Indian Ocean, and additional influence from the Atlantic Ocean, determines how rainfall over Botswana will evolve during the season (See Fig. 1). It must be noted however, although this is a major influencing factor, is not the only one. Other factors, including but not limited to the presence of tropical cyclones in the Indian Ocean are also contributing factors.

The outlook is relevant only for seasonal time scale and relatively large areas. It addresses cumulative rainfall distribution over the three-month period. Local and month-to-month variations might occur as the season progresses. Users are therefore strongly advised to contact the Department of Meteorological Services for interpretation of this forecast, finer details and additional guidance.

2. METHODOLOGY

In order to generate this seasonal forecast, the Department of Meteorological Services, through its participation in the Southern African Regional Climate Outlook Forum (SARCOF), developed statistical models for Botswana which were used to generate the seasonal rainfall and temperature outlook for 2024/25. A number of predictors such as observed and forecasted Sea Surface Temperatures (SSTs) as well as downscaled International Models were used, whilst Botswana rainfall and temperature were used as the predictands. The January to April 2025 rainfall performance were assessed using coupled ocean-atmosphere general circulation models (COAGCM) and some statistical models forecasts provided by Global Producing Centres (GPCs).

Experts in the Department established probability of distributions to indicate the likelihood of above, near, or below normal rainfall and temperature for the whole of Botswana (refer to figures 4, 6, 8 and 10). Above-normal is defined as within the wettest(rain) and hottest (temperature) third of long term recorded rainfall and temperature, near-normal is defined as the third of the record of rainfall and temperature amounts centred around the climatology mean, below-normal rainfall as within the driest third of the rainfall and coolest third of the temperature amounts. Climatology refers to a situation where any of the three categories have equal chances of occurring.

2.1 ENSO STATUS:

ENSO neutral conditions are present. Equatorial sea surface temperatures (SSTs) are near aveage to below average in the central and eastern Pacific Ocean. La Niña is most likely to emerge in October-December 2024 (57% chance) and is expected to persist through January March 2025.

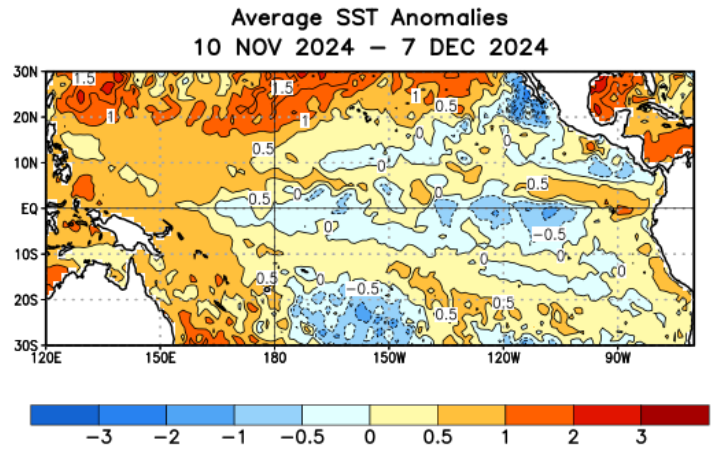

Figure 1: Shows SSTs Anomalies over the Equatorial Pacific Ocean. (Source: IRI)

SST Anomalies:

In the last four weeks, Equatorial sea surface temperatures (SSTs) were above average in the western and in the far eastern Pacific Ocean. Near to below average SSTs were evident across most of the central Pacific and east-central Pacific Ocean.

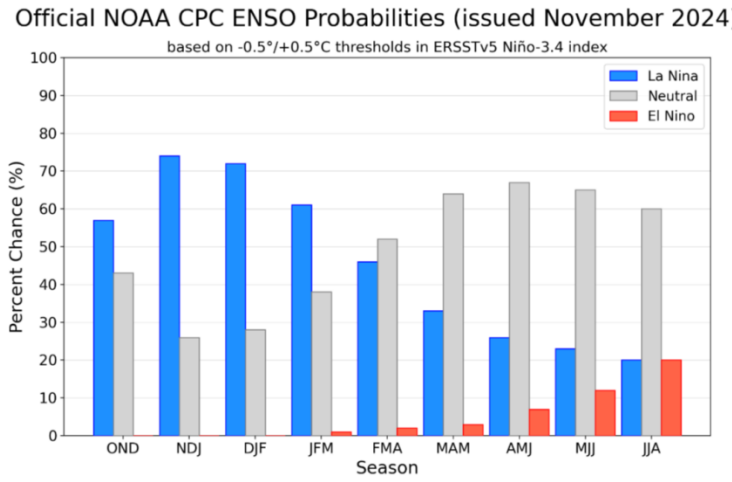

Figure 2: Latest ENSO Forecast 2024/25. (Source: IRI)

ENSO Status:

La Niña is favored to emerge during October-December (57% chance) and persist through January March 2025.

Current NINO 3.4 Anomaly: -0.3^{0}C

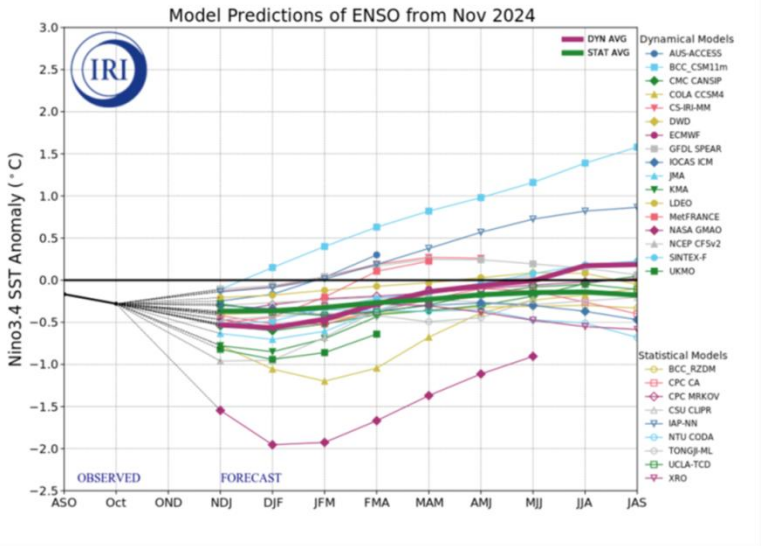

Figure 3: Dynamical and Statistical Models ENSO Predictions. (Source: IRI)

ENSO Forecast Plume:

The majority of dynamical models indicate an imminent transition to La Niña, lasting through January-March 2024, while the average of statistical models predicts ENSO neutral through summer 2024/2025.

3. SEASONAL RAINFALL OUTLOOK FOR JANUARY TO APRIL 2025

JANUARY, FEBRUARY AND MARCH (JFM) 2025: Largely normal to above normal rains.
Normal ranges from 85mm in the southwestern parts of Southern Kgalagadi District to 340mm in Chobe District in the north.

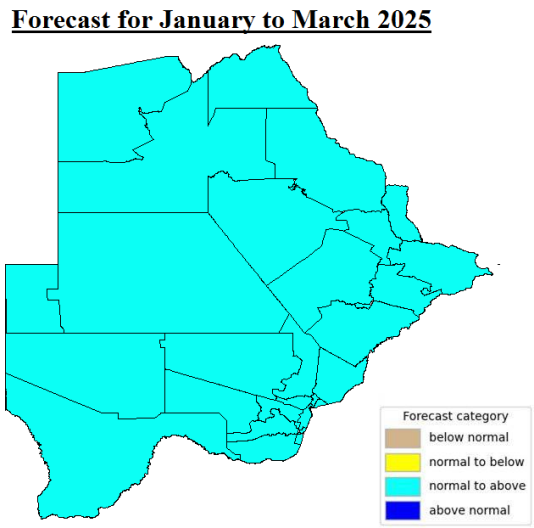

Figure 4: Seasonal Rainfall forecast for JFM 2025

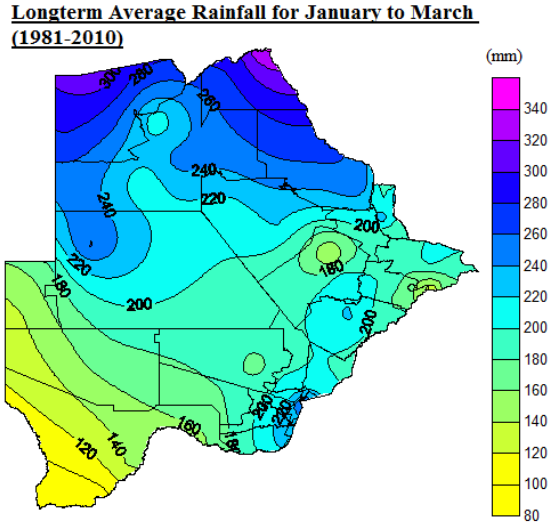

Figure 5: Seasonal averages for JFM (1981-2010)

FEBRUARY, MARCH AND APRIL (FMA) 2025 : Largely normal to above normal rains.
Rainfall over the whole country is predicted to be largely normal with a tendency to above normal. Normal rainfall ranges from 70mm over southwestern Kgalagadi to 220mm over Chobe District.

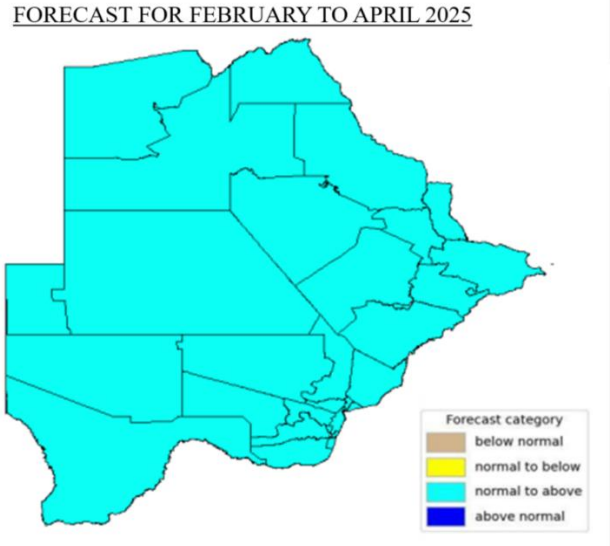

Figure 6: Seasonal Rainfall forecast for FMA 2025

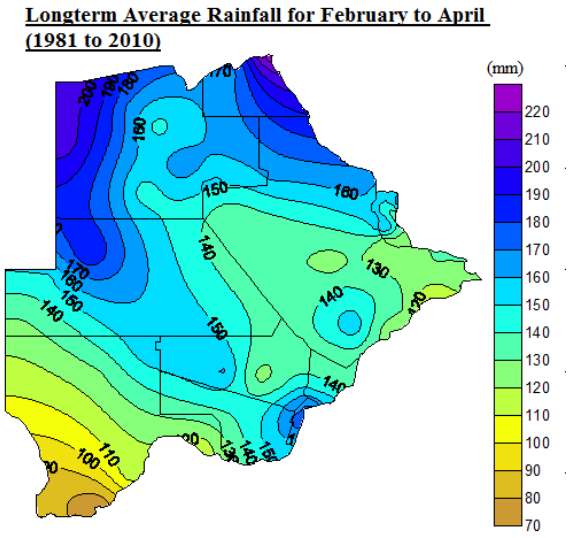

Figure 7: Seasonal averages for FMA (1981-2010)

3.1 Seasonal Temperature Outlook for January to April 2025

JANUARY, FEBRUARY AND MARCH (JFM) 2025: Increased likely hood of above normal temperatures.

Normal range from 30^{0}C over the northern parts to 33.5^{0}C over the southern parts of Botswana.

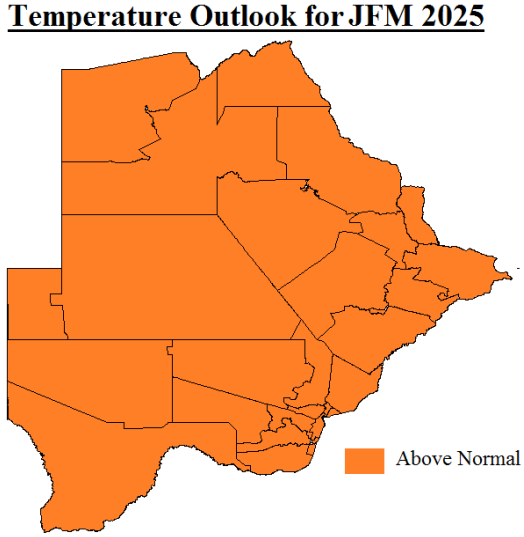

Figure 8: Seasonal Temperature forecast for JFM 2025

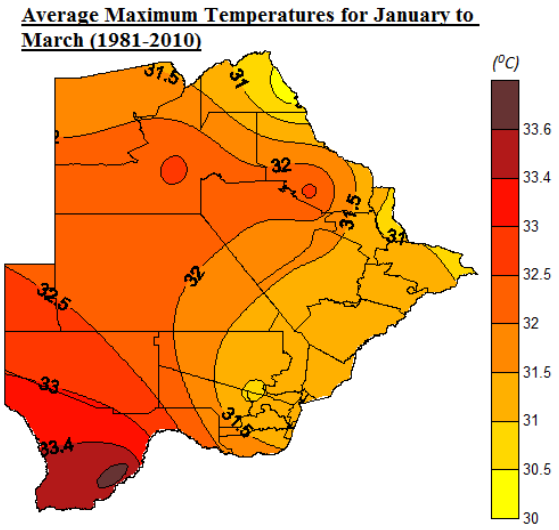

Figure 9: Seasonal averages for JFM (1981-2010)

FEBRUARY, MARCH AND APRIL (FMA) 2025 : Increased likely hood of above normal temperatures.

Normal temperatures range from 29.6°C over eastern parts of Botswana to 31.8°C over the northwest.

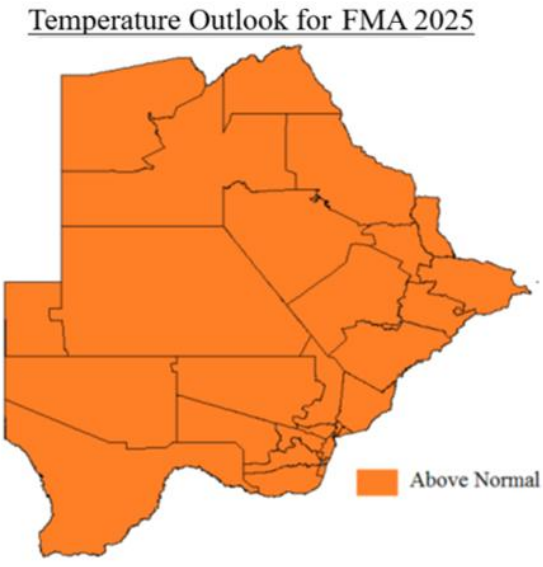

Figure 10: Seasonal Rainfall forecast for FMA 2025

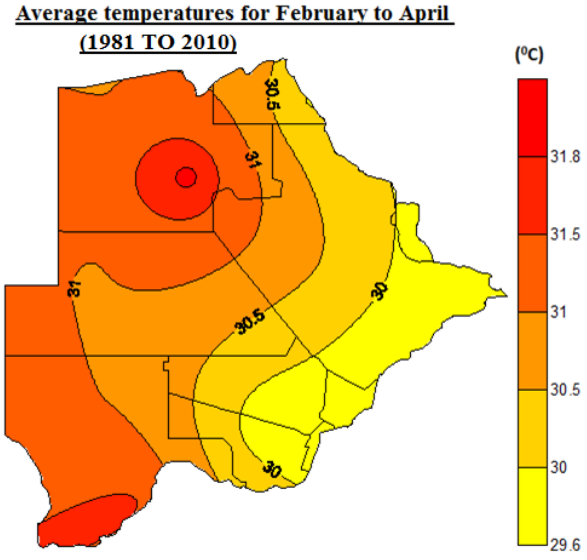

Figure 11: Seasonal averages for FMA (1981-2010)

4. SUMMARY

- Largely normal to above-normal precipitation for JFM and FMA.
- Above normal temperatures expected over the entire country.
- Weak La Nina is favoured throughout JFM.
- Overall, an improved season than the previous one is anticipated.

Advisory:

The outlook is relevant only for seasonal time scale and relatively large areas. It addresses cumulative rainfall distribution over the three-month period. Local and month-to-month variations might occur as the season progresses. Users are therefore strongly advised to contact the Department of Meteorological Services for interpretation of this forecast, finer details and additional guidance.

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Our Vision: *A modern weather service that nurtures and harbours innovation and creativity in the provision of quality weather and climate information*