MINISTRY OF ENVIRONMENT, CLIMATE AND WILDLIFE
Meteorological Services Department
Telephone: +263 (242) 778204 – 6, 778218, 778027
Website: www.weatherzw.org.zw
Box BE 150, Belvedere, Harare, Zimbabwe
All correspondences should be addressed to the Director

Minimizing Risks through Science

Rainfall Season Report: 2023-24

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SUMMARY

The initial dekad of October was characterized by dry and hot weather. However, during the second dekad, cloud bands originating from the west brought about substantial rainfall across the entire country. Most regions experienced precipitation exceeding 50mm within a 24-hour span. This wet spell was followed by an extended period of scant rainfall that persisted from the third ten-day period of October until the end of the second dekad of the month of December 2023.

Throughout November, predominantly sunny and hot conditions prevailed nationwide. Despite the development of weak cloud bands, significant rainfall could not be produced due to the simultaneous presence of high-pressure systems forming in the subcontinent. These systems ushered in cool air, diminishing the potential for convective activity and impeding the formation of rain. Certain locales, such as Beitbridge, Buffalo Range, Kariba, and Kanyemba, endured exceedingly high temperatures surpassing 40°C during this period.

Another episode of abundant precipitation unfolded from the second ten-day period of December 2023 until mid-January 2024. This period marked the onset of the 2023-2024 rainy season for most areas across the country. The rainfall during this period was influenced by two primary weather systems: the Inter-Tropical Convergence Zone (ITCZ) and the eastward-moving cloud bands traversing the country. Numerous instances of flooding were reported in various places during this time. Notable incidents included the destruction of Rafemoyo Primary School in Gutu, Masvingo, due to strong winds in the week ending December 18, 2023, the damage inflicted on Jotsholo Secondary School in Lupane, Matabeleland North, and the damage of some property in Budiriro 5B extension, Harare, caused by the flooded Marimba River in the week ending January 2, 2024. Lightning strikes, hailstorm-damaged crops, and reports of property damage in specific areas were also documented during the season.

Following the wet spell, another protracted and severe dry period persisted from mid-January until the end of March, surpassing one month in duration in parts of the country. The ITCZ had receded, resulting in dry conditions predominated by abundant sunshine and heat across a large portion of the country. This adversely affected the agricultural sector, as most crops were at the vegetative stage still requiring substantial rainfall.

Although isolated thunderstorms occurred in March, the amount of rainfall was insufficient to alleviate the damage caused by the preceding dry spells. The initial week of April witnessed some noteworthy showers, although they provided limited benefits to the affected

crops. The El Niño phenomenon, exerted a significant influence on the season, leading to poor spatial and temporal distribution of rainfall. The season was mainly affected by the two major dry spells in November and February, which were the driest months of the season.

1 INTRODUCTION

The Southern Africa Development Community Climate Services Centre (SADC-CSC) conducts Climate Expert Meetings (CEMs) to enhance the knowledge and capabilities of regional climate experts in the National Meteorological and Hydrological Services (NMHSs) from regional member states. These meetings take place in August/September and December/January, and the workshop venue rotates among the member countries. During these meetings, climate scientists generate the seasonal rainfall forecast for the SADC Region. Subsequently, the CEM is followed by the SARCOF meeting, which is attended by users of the seasonal forecast. At this forum, the regional seasonal forecast is presented to the users with the advice to refer to their national climate outlook statement, which takes into account local microclimates that impact their specific countries. In this regard the National Meteorological Services Departments organise the National Climate Outlook Forums (NACOFs) to disseminate the national seasonal outlook for the upcoming rainfall season. The review and an update of the seasonal rainfall outlook was conducted in January 2024.

2 THE 2023-24 RAINFALL SEASON OUTLOOK.

The rainfall season is subdivided into two sub-seasons: October-November-December (OND) and January-February-March (JFM); whilst, the country is divided into three homogenous zones according to the three main rainy bearing systems that affect the country. Zimbabwe lies entirely in the tropics and the rainfall types that dominate the country are convectional, convergence and orographic. The rainfall distribution in the country is also affected by global climate drivers such as the El Niño Southern Oscillation (ENSO) and the Indian Ocean Dipole (IOD). The El Niño phase of the ENSO is associated with reduced rainfall over the country while the La Nina normally causes increased rainfall over the country. The Indian Ocean Dipole occurs in three phases similarly to the ENSO. The negative phase normally favours Zimbabwe by causing enhanced rainfall while the positive phase results in reduced rainfall over the country. The whole season was forecast to be an El Niño season and the IOD was forecast to be positive for the bulk of the season.

a. OUTLOOK FOR OND 2023

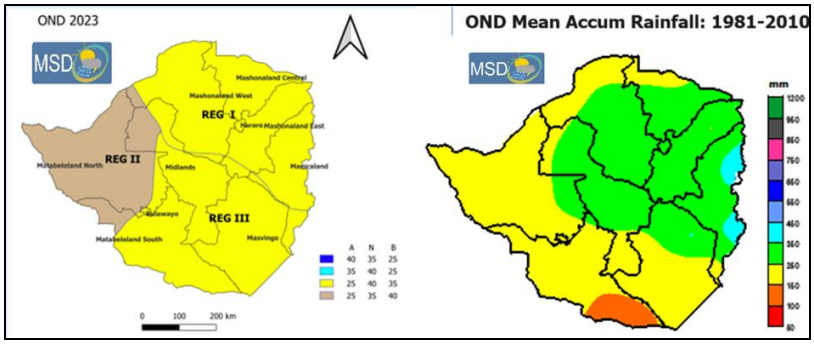

Figure 1: (a) October-November-December (OND) forecast, (b) OND Mean Accumulated Rainfall 1981-2010

Region I:

Harare, much of Mashonaland East, Mashonaland West, Mashonaland Central, northeastern parts of Midlands, most of Manicaland:

Highest chance of normal with a bias of below normal rainfall was expected.

Region II:

The greater part of Matabeleland North, parts of Midlands and parts of Mashonaland West:

Highest chance of below-normal with a bias of normal rainfall was expected.

Region III:

Masvingo, the bulk of Midlands, the extreme southern parts of Manicaland and the bulk of Matabeleland South:

Highest chance of normal with a bias of below normal rainfall was expected.

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b. THE OUTLOOK FOR JFM 2024

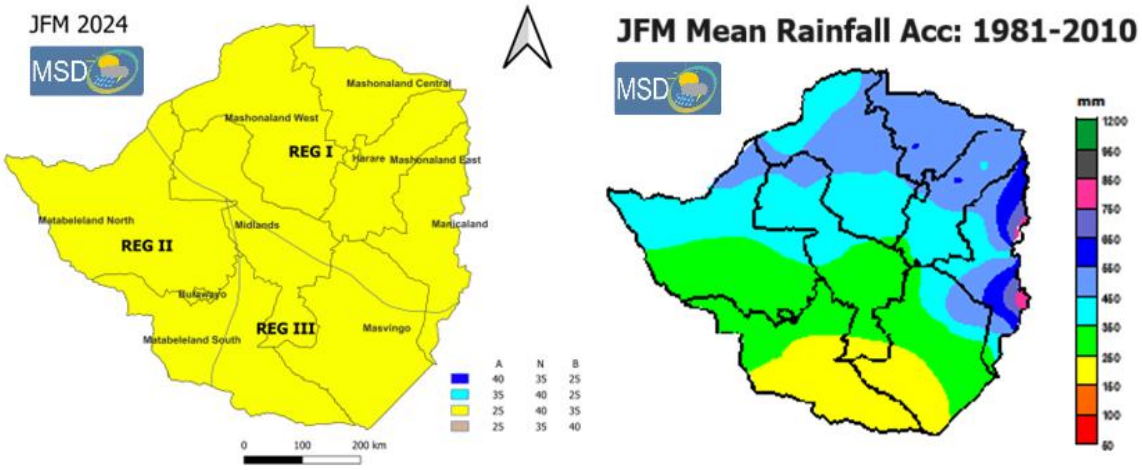

Figure 2: (a) January-February-March (JFM) forecast, (b) JFM Mean Accumulated Rainfall 1981-2010

Region I:

Mashonaland Provinces, Harare, most of Manicaland, northern parts of Masvingo and northern parts of Midlands:

Highest chance of normal with a bias of below normal rainfall was expected.

Region II:

The greater part of Matabeleland North, northwest Matabeleland South, Bulawayo:

Highest chance of normal with a bias of below-normal rainfall was expected.

Region III:

The greater part of Masvingo, the extreme southern parts of Manicaland, southeast Matabeleland South and the southern parts of Midlands:

Highest chance of normal with a bias of below normal rainfall expected.

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3 PERFORMANCE OF THE SEASON

Any day after 1 October that a place receives 20 mm or more in two days or less and there is no dry spell of more than 10 days in the next 30 days is considered the onset of the rainy season for that place. When these conditions are not satisfied at a place then the season is considered not started or if they are partially satisfied a false start would have occurred.

Although the country received significant rainfall during October, the dry conditions that were experienced during the month of November affected the onset of the rainy season. The start of season was delayed in most places. The normal start of season is around the second dekad of November to the end of November (Fib 3a). However, this season the effective start of season was from mid-December to the end of December indicating that it was delayed by a month (Fig 3b).

a. START OF SEASON

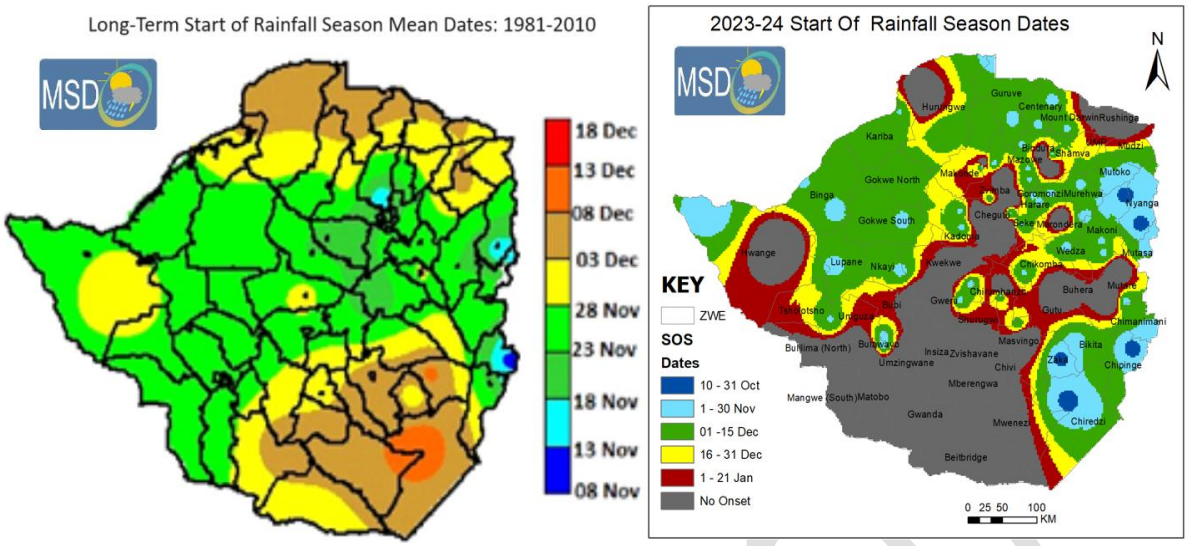

Figure 3. Start of season dates for (a) the period 1981-2010 and (b) 2023/2024 rainfall season

The average onset of the season country wide is indicated by map (a) and in the bulk of the country starts during the middle of November to the end of November as shown by the yellow and green legend. During the 2023-24 season the season delayed to start by almost a month as most places had seasonal onset in December as shown in map (b) by the green and yellow legend. It should be noted that in a significant part of the country the season did not start due to inter-seasonal dry spells that occurred as the season progressed. These places are indicated in brown on map (b).

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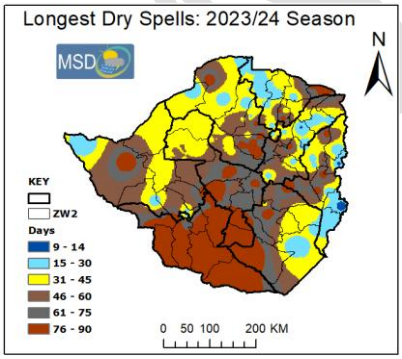
b. DRY SPELLS / WET SPELLS



A consecutive number of dry days is called a dry spell. A day on which rainfall accumulation below 0.85mm is measured is considered a dry day. If 24-hour rainfall accumulation measured on a given day exceeds 0.85mm then the day is a wet day. However, the threshold amount varies from sector to sector. A wet spell is a prolonged period of wet days. The current season was characterised by very long and severe dry spells, most of which were experienced during the month of November, February and March. These were the driest months of the season. Dry spells exceeding a month were experienced in several places across the country. This greatly affected the agricultural sector. The farmers who planted their crops in October had their crops greatly affected and those crops planted with the December rains succumbed the severe dry spell of February. The lowest number of dry

spells occurred in as Chipinge, Chimanimani and Nyanga while the longest dry spells were experienced in those areas where there was a false start of season such as the bulk of Matabeleland South, southern parts of Midlands, some parts of Masvingo provinces among other places. Dry spells exceeding 45 days were recorded in the greater part of the country (Fig 4).

c. MONTHLY RAINFALL PERFORMANCE

i. RAINFALL PERFORMANCE FOR OCTOBER 2023

The month of October started very dry especially during the first dekad of the month. However significant rainfall was received in the second dekad of October. From the third dekad of October to the end of the first dekad of December it was dry.

The rainfall that was received during the second dekad of October surpassed the long term average accumulated rainfall for the month. A significant number of stations measured rainfall exceeding 50mm in 24 hours as shown below (Fig 5). These stations include Norton 110mm, Chinhoyi, Kwekwe and Henderson 85mm each among other stations.

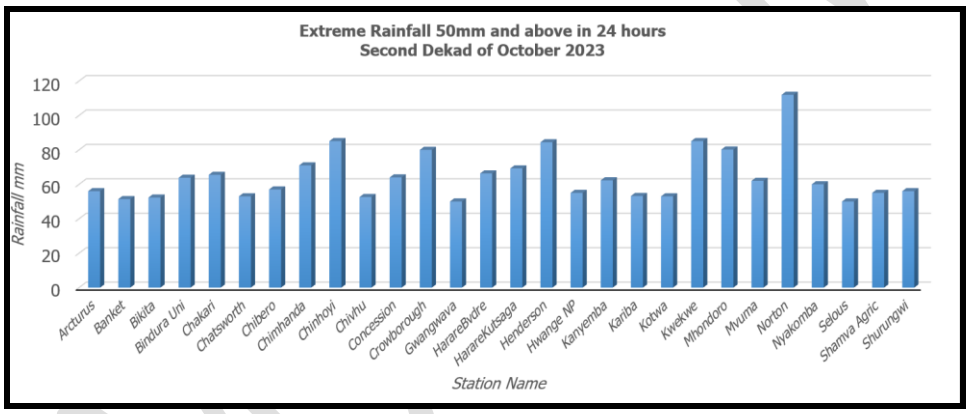


Figure 5: Extreme rainfall 50mm and above in 24hours

The distribution of rainfall across the country was spatially favourable, with notable amounts recorded in various areas. However, the temporal distribution of rainfall was unfavourable, as it occurred in a short period of less than ten days with the rest of the month being dry.

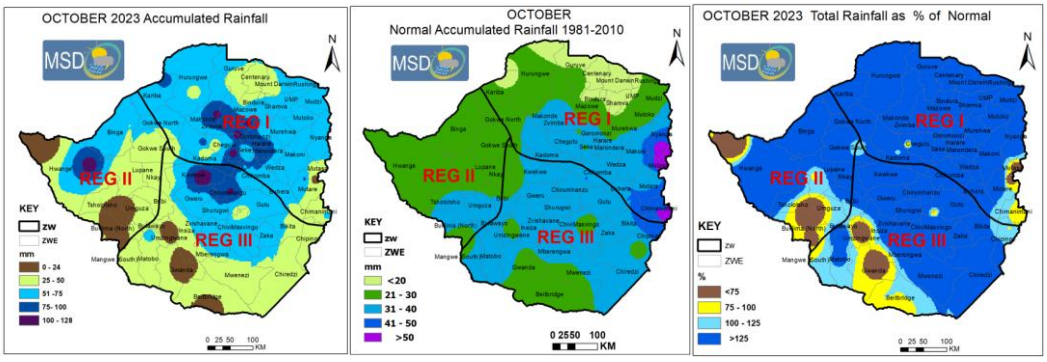


Figure 6: (a) October 2023 accumulated rainfall, (b) Long term average October rainfall 1981-2010, (c) October 2023 rainfall as a percentage of normal

Region 1, received higher October rainfall totals ranging between 51mm and 100mm, while the other parts of the country experienced monthly totals between 25mm and 50mm as shown in Fig 6a. Most of these monthly rainfall totals surpassed the long-term average for the month as shown in Fig 6c. As a result, some farmers took the opportunity to plant their crops following these rains.

This seemed to be the onset of the season, as most parts of the country measured rainfall above 20mm in one or two consecutive days. However, this initial wet spell turned out to be deceptive, as it was followed by an extended dry period that lasted for over a month.

d. DOMINANT WEATHER SYSTEMS DURING OCTOBER 2023

The weather systems that were responsible for the October wet spell were westerly troughs that swept across the country during the second dekad of the month as indicated below. These troughs were witnessed from the 13th of October through to the 18th causing heavy rain in most parts of the country.

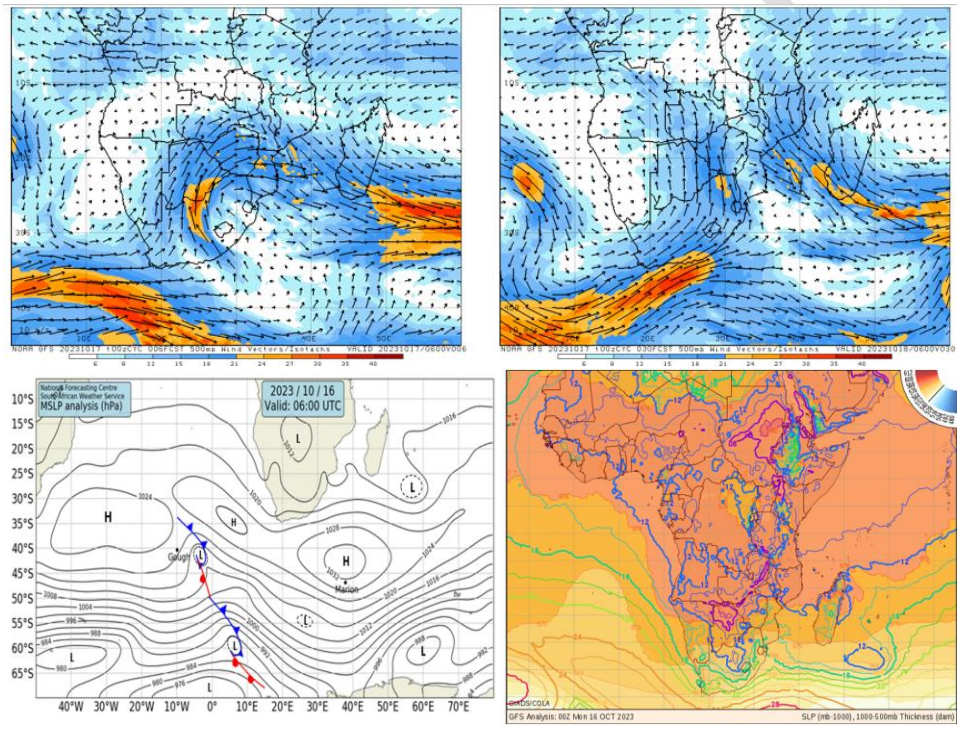


Figure 7

The widespread thunderstorms ocurred on the 16th and 17th of the month with some places measuring rainfall in excess of 50mm. The systems subsided from the 20th and prolonged dry conditions occurred until the end of the month.

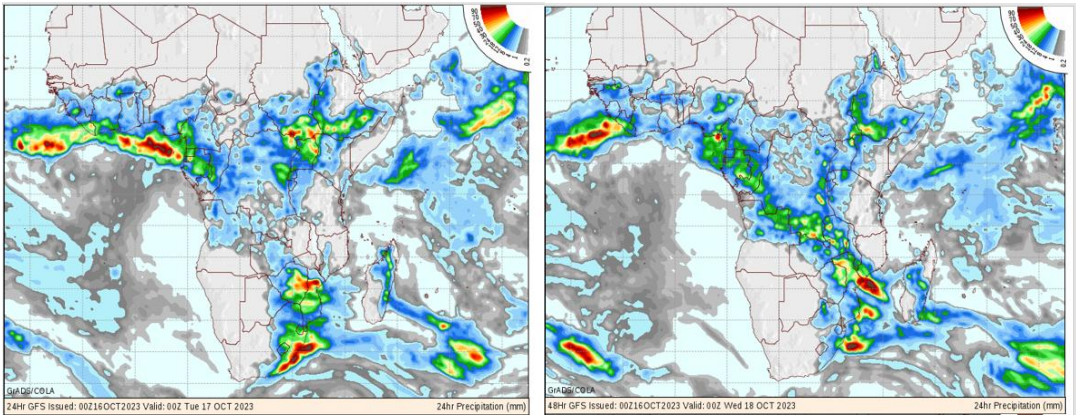


Figure 8

e. RAINFALL PERFORMANCE FOR NOVEMBER 2023

During the OND 2023 sub-season, November emerged as the driest month. The majority of places received monthly accumulated rainfall of less than 25mm, which is considerably lower when compared to the long-term average for November (Fig 9a). Typically, most areas across the country receive monthly accumulated rainfall between 75mm and 100mm, although certain areas in the far eastern parts of the country may exceed this range (Fig 9b). When expressed as a percentage of normal, the accumulated monthly rainfall for November 2023 indicated that below-normal rainfall was experienced nationwide (Fig 9c).

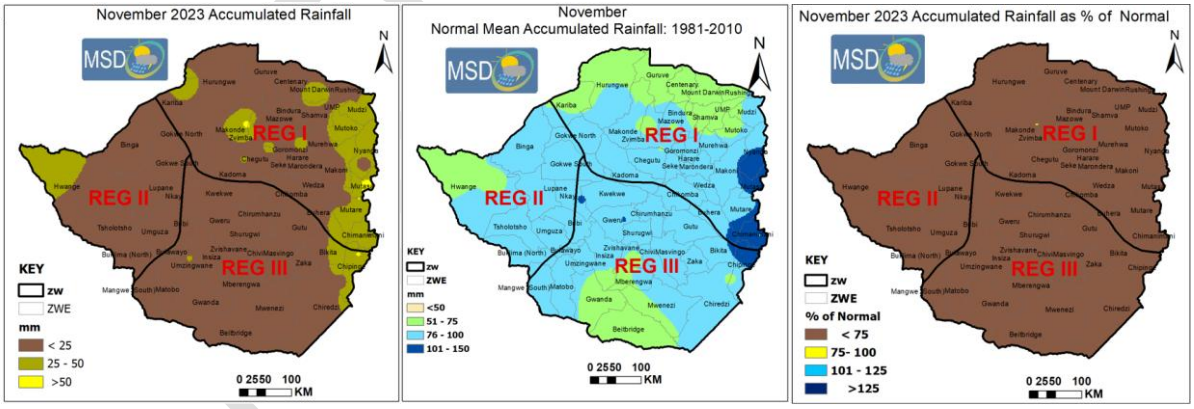


Figure 9: (a) November 2023 accumulated rainfall, (b) Mean Rainfall for November 1981-2010, (c) Accumulated rainfall as a % of normal

November was notably dry, with many places recording only trace amounts of rainfall in the form of light drizzle and rain. These amounts fell significantly below the threshold for a rainy day. The extended dry spell during this month had a detrimental impact on crops that had been planted following the October rain. The sweltering temperatures and dry conditions greatly hampered crop survival, with only a few managing to endure. The presence of

blocking high-pressure systems impeded the formation and movement of the westerly cloud bands that typically characterize this part of the season.

f. DOMINANT WEATHER SYSTEMS DURING NOVEMBER 2023

In November, the prevailing weather conditions were characterized by the presence of strong high-pressure systems and feeble cloud bands originating from the west. The influx of cool air from the south-easterly airflow inhibited the formation of clouds capable of producing significant rainfall, resulting in minimal precipitation, primarily in the form of traces, across most regions of the country. These conditions align with the characteristics of a positive Indian Ocean Dipole, whereby relatively high-pressure systems dominate the southeastern parts of the subcontinent due to cooler-than-normal temperatures.

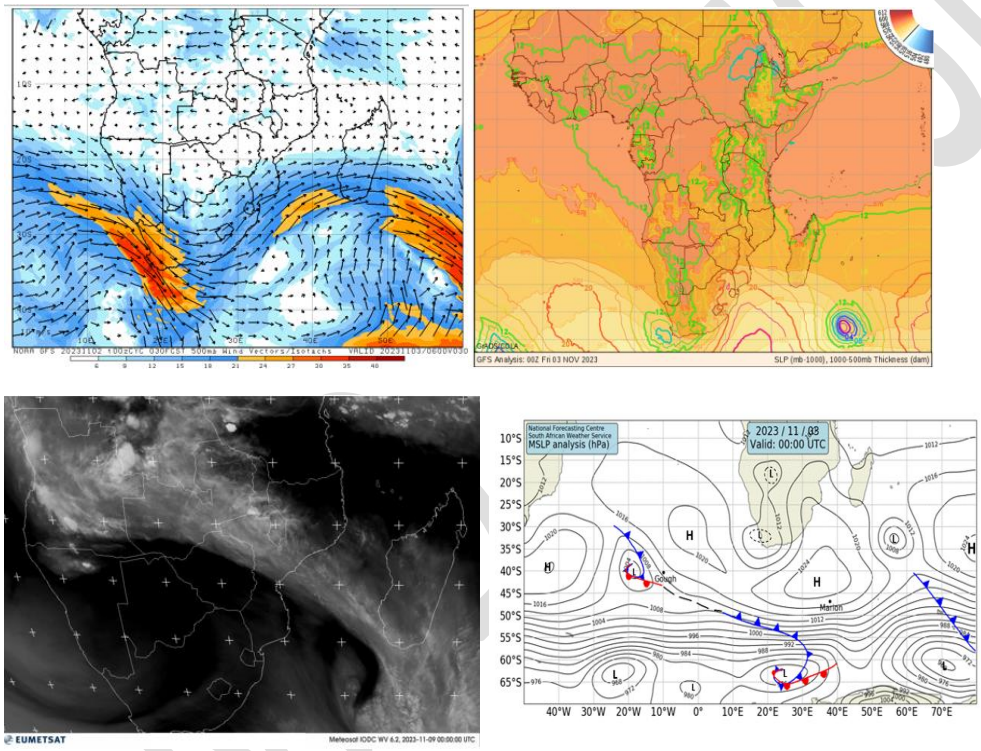


Figure 10

The presence of both high-pressure systems and weak westerly cloud bands had a significant impact on the overall performance of the season, particularly in November and parts of October. In a typical summer season, it is expected that the Mascarene high-pressure system (South Indian Ocean) and St Helena high-pressure system (South Atlantic Ocean) would weaken, allowing the development and movement of cloud bands across the country. However, when these two high-pressure systems are intense, as indicated above, the atmosphere remains cool and lacks sufficient energy for the formation of robust rain-bearing systems. Additionally, the Intertropical Convergence Zone (ITCZ) is unable to move

southward as it becomes obstructed by these high-pressure systems. Even if troughs form, they would also be impeded from traveling eastward.

Under such conditions, stable weather predominates, leading to episodes of drizzle and light precipitation, as observed during the month of November. This stable weather pattern restricts the development of significant rainfall events.

4.3 RAINFALL PERFORMANCE FOR DECEMBER 2023

The dry spell that persisted throughout November extended until the first ten days of December 2023. However, this dry period came to an end when a well-organized cloud system originating from the west and north moved in, leading to convective rainfall across the country. December subsequently became the wettest month of the OND 2023 season, with particularly high rainfall accumulation in Region 1 and certain parts of Region 3 (Fig 11a). Some areas even received monthly rainfall exceeding 300mm. On the other hand, Region 2 received the least amount of rainfall in December 2023.

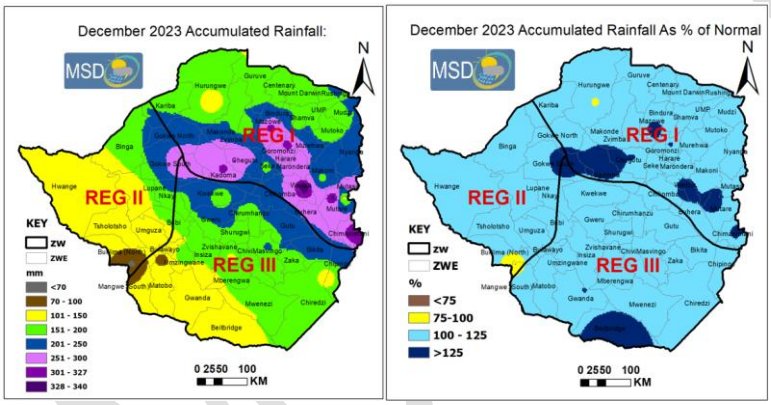


Figure 11: (a) December 2023 accumulated rainfall, (b) December 2023 accumulated rainfall as a % of normal

When expressed as a percentage of the long-term average rainfall, the accumulated rainfall for December 2023 fell within the normal range, although it leaned slightly towards above-normal category (Fig 11b).

Despite a very dry start in the first ten days of December, the atmospheric conditions over the country underwent a transformation due to moisture drifting from the north and west. From the second ten days of the month until the end of December, a series of cloud bands drifted into the country from both Zambia and Botswana, resulting in widespread thunderstorms nationwide. The heavy rainfall amounts were experienced between the 16th and 20th of December, followed by a brief lull until the 25th of the same month. The

systems intensified once again from the 26th to the 30th of December. Several locations recorded heavy downpours during this period.

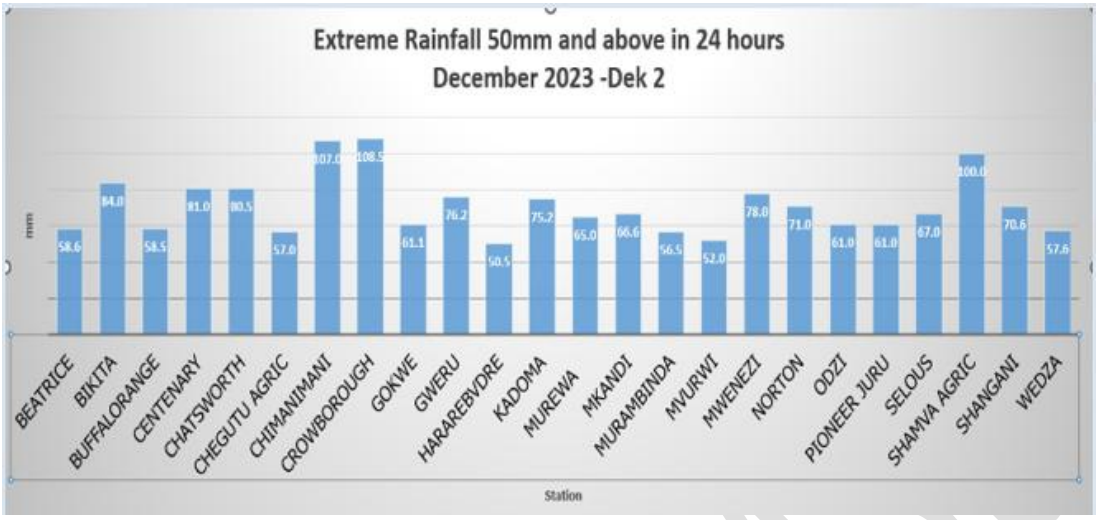


Fig 12: Extreme rainfall 50mm and above in 24hours Dekad 2, December 2023

Several stations recorded significant amounts, with Crowborough measuring 109mm, Chimanimani measuring 107mm and Shamva measuring 100mm of rainfall within a twenty-four-hour period. Additionally, a total of twenty-one stations reported rainfall exceeding 50mm, as show in Fig 12.

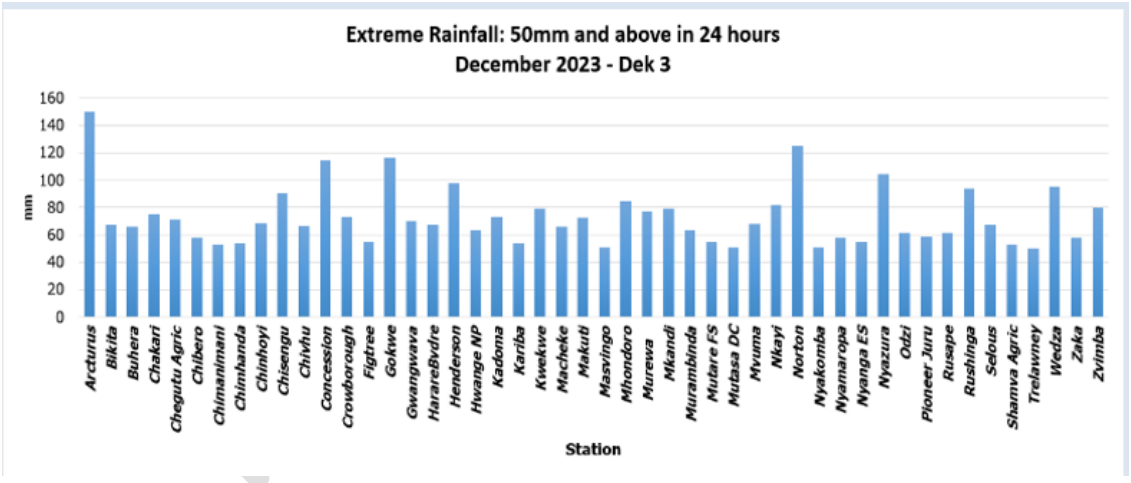


Figure 13: Extreme rainfall 50mm and above in 24hours Dekad 2, December 2023

In the third dekad of the month, the number of stations measuring rainfall exceeding 50mm notably increased (Fig 13). A minimum of 50 stations reported rainfall above this threshold during this period. Unfortunately, there were reports of flooding in certain areas, such as Budiriro in Harare, where the Marimba River overflowed and affected several houses in the Budiriro 5 extension suburb. Additionally, strong winds caused damage to at least two

schools as reported —one in Gutu, Masvingo, and another in Lupane district, Matabeleland North Province.

g. DOMINANT WEATHER SYSTEMS DURING DECEMBER 2023

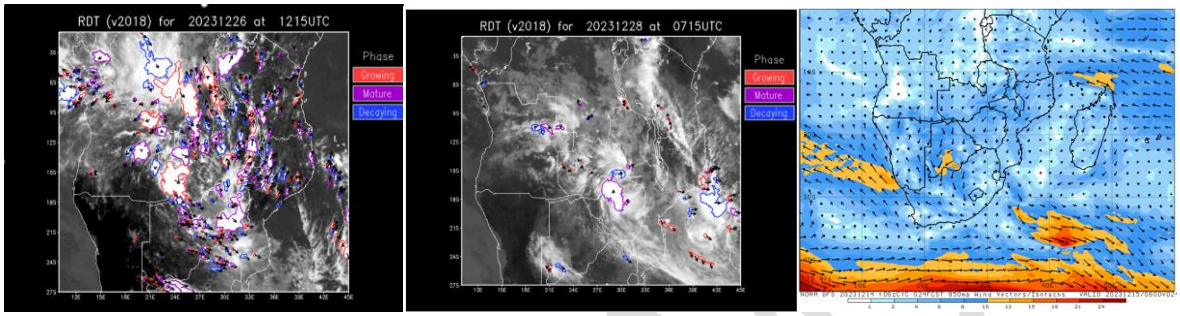


Figure 14

The presence of ample moisture in the atmosphere in December 2023, that led to the occurrence of thunderstorm activity and heavy rainfall across the country, indicated the influence of the Inter Tropical Convergence Zone (ITCZ), which had established itself over the country. The prevailing winds were northerly, facilitating the influx of moist airflow into the country. The primary weather systems during December and January were the ITCZ, which extended over the country, and the westerly cloud bands.

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h. RAINFALL PERFORMANCE FOR JANUARY 2024

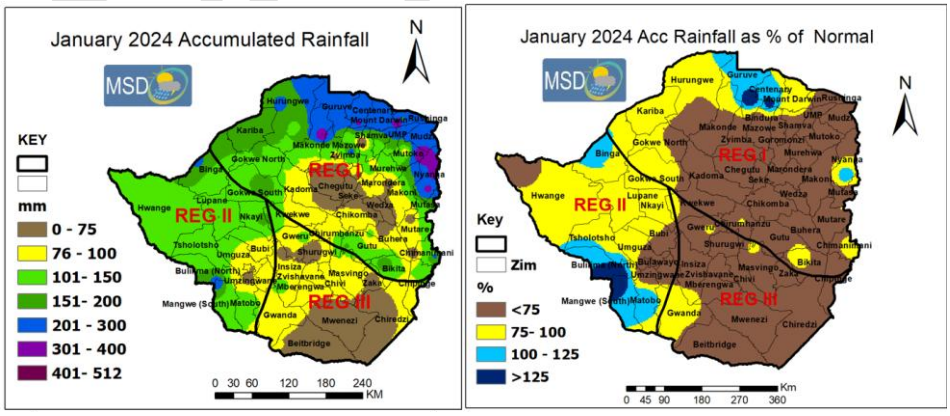

Figure 15: (a) January 2024 accumulated rainfall, (b) January 2024 accumulated rainfall as a % of the normal

Although January 2024 was wet during the first fifteen days of the month, the last fifteen days witnessed very dry conditions. Rainfall accumulation was highest in the extreme

northern parts of the country covering northern parts of Manicaland, Mashonaland Central, some parts of Mashonaland West. The bulk of the country recorded rainfall ranging from 76mm to 200mm in total (Fig 15). The lowest rainfall was recorded in the extreme southern parts of Masvingo and Matabeleland South Provinces in areas such as Chiredzi, Beitbridge, Mwenezi and Zaka. However there were also areas in the Mashonalands and Midlands that received low rainfall and this included Chegutu, Seke, Wedza and Shurugwi districts.

The most affected parts of the country were Masvingo, Manicaland, Mashonaland East, Midlands, Harare Metropolitan, and Bulawayo Metropolitan Provinces which received rainfall below 75% of the long-term average. These areas were drier than expected meaning that they had received less rainfall that the normal for that month. The remainder of the country parts recorded normal to below normal rainfall as indicated by the yellow region in Fig 15b. Very few places recorded rainfall in the normal to above normal range.

The prolonged dry spell that characterised the last part of January was due to the ITCZ that had retreated back to the north due to the intensified and quasi stationary high-pressure systems in the middle level that featured and persisted from the 20th of January until the end of January 2024. The dry conditions greatly impacted the seasonal cumulative rainfall.

i. DOMINANT WEATHER SYSTEMS DURING JANUARY 2024

The high-pressure systems were extending over Zimbabwe through Botswana into Namibia. Such pressure systems termed Botswana Upper High-pressure systems suppress the rainfall activity mainly over Zimbabwe and Botswana. Depending on their spatial extent, these systems may affect as far as Mozambique from Botswana. This season they were present during a January and February. Normally bigger systems like this takes time to weaken.

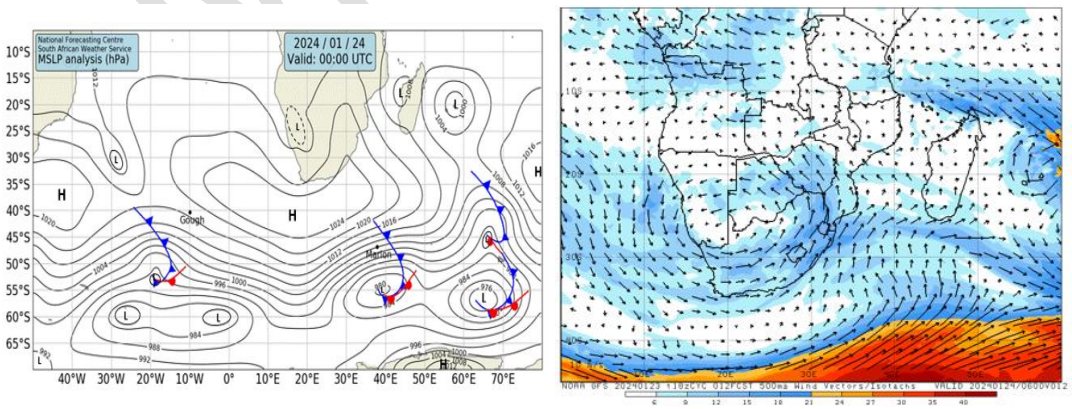

Figure 16

Surface pressure analysis indicated strong high pressure system over the southern parts of the subcontinent coupled with another middle level high pressure system on the same period.

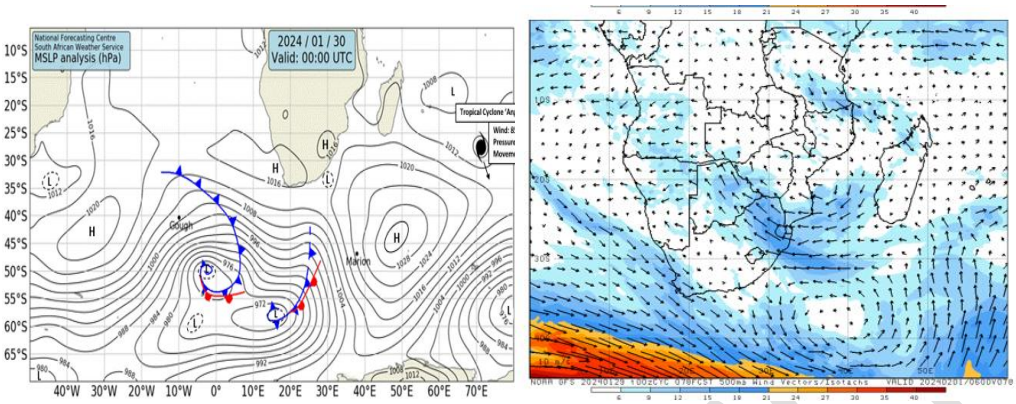

Figure 17

On the 30th of January, there were persistent strong high pressure systems both at the surface and in the middle level of the atmosphere. These systems blocked the Cyclones that developed in the Southern West Indian Ocean Basin from moving westwards. They thus diverted the trajectory of the cyclones by blocking them.

The prolonged dry spell experienced in the latter part of January was primarily attributed to the retreat of the ITCZ. The ITCZ is a region near the Earth's equator where trade winds from the northern and southern hemispheres converge, leading to the formation of clouds and precipitation. The position of the ITCZ moves southward during our summer and back to the north towards the end of our summer season. However, during mid January, the ITCZ had shifted northward, resulting in reduced rainfall activity over Zimbabwe.This was due to the influence of the intensified and quasi-stationary high-pressure systems in the middle level of the atmosphere which pushed the ITCZ further to the north.

These weather patterns and systems highlight the complex dynamics that influence rainfall distribution and contribute to variations in weather conditions during the rainy season.

j. RAINFALL PERFORMANCE FOR FEBRUARY 2024

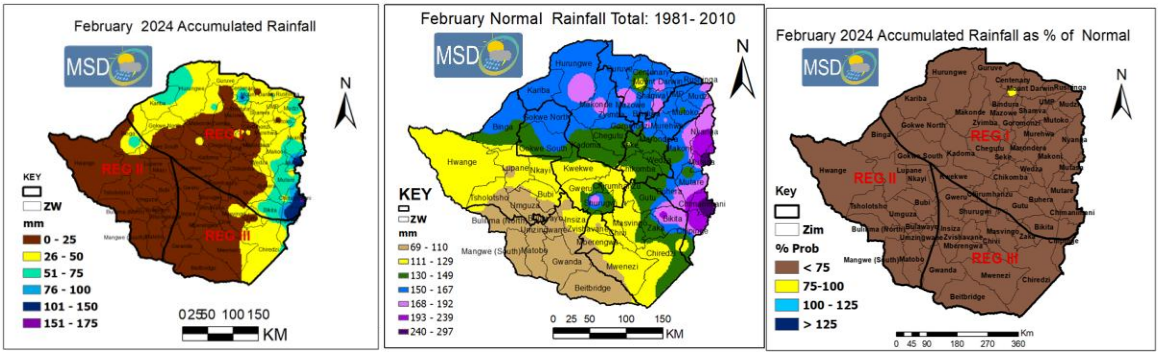

Figure 18: (a) February 2024 accmulated rainfall, (b) Mean February rainfall 1981-2010, (c)

The persisting high pressure system both at the surface and at the middle level affected the perfomance of JFM mainly mid to end of January, the bulk of February and March 2024. February received cumulative rainfall below 50mm over much of the country as indicated by the brown and yellow colour in Fig 18a. A small part of Manicaland Province recorded monthly rainfall between 51mm and 100mm. Below nomral rainfall was received in February indicating that drier conditions were mostly dominant.

DOMINANT WEATHER SYSTEMS DURING FEBRUARY 2024

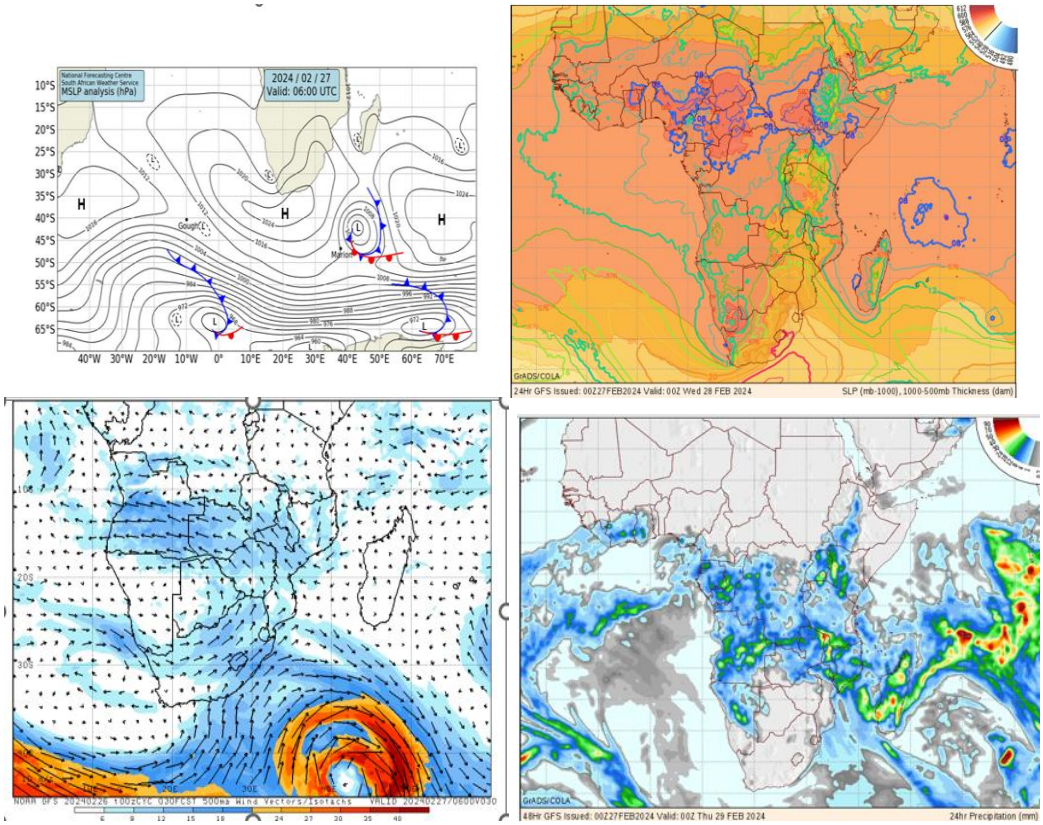

Figure 19

Major systems responsible for the reduced rainfall in February 2024.

k. RAINFALL PERFORMANCE FOR MARCH 2024

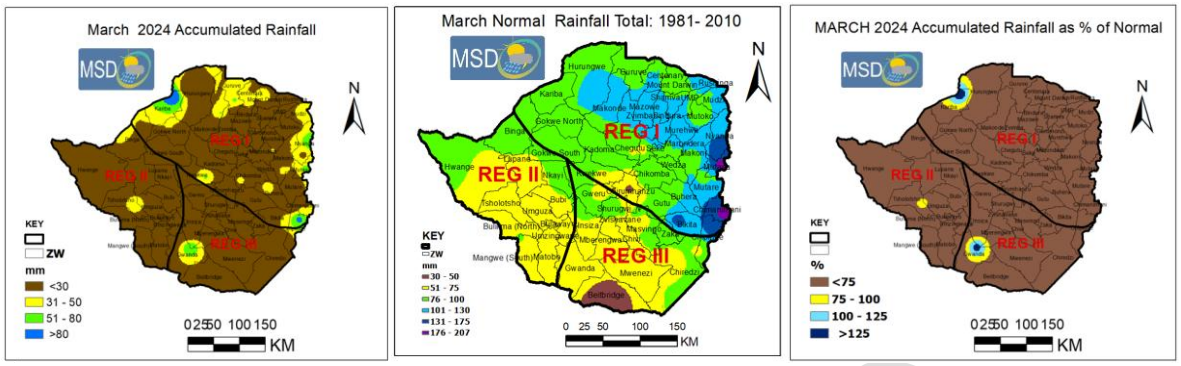

Figure 20: (a) Accumulated monthly rainfall, (b) Mean rainfall 1981-2010, (c) Percentage of normal

Monthly rainfall totals were below 50mm across the country which translated to below normal when compared with the long-term average for the month (Fig 20a and c).

4 2023-24 SUB-SEASONAL RAINFALL PERFORMANCE

a. OND 2023 Sub-season.

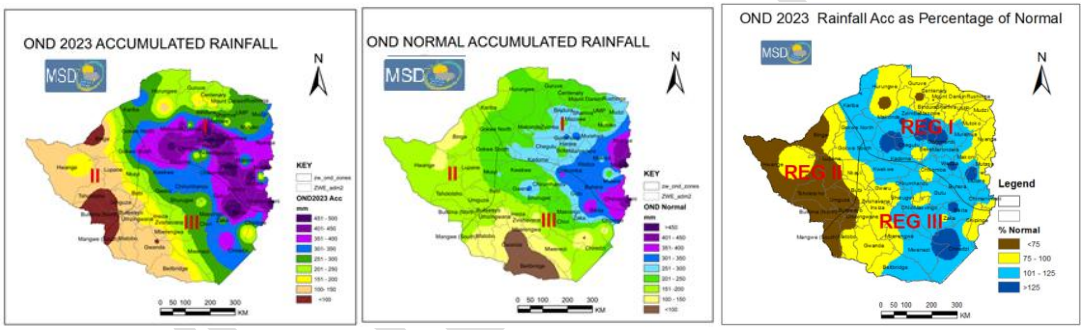

Figure 21: (a) OND accumulated rainfal, (b) OND Mean Rainfal 1981-2010. (c) Percentage of Normal

OND 2023 rainfall was erratic especially during the first two months of the season (October and November). The first and third dekad of October were generally dry while the second dekad was wet. November was mainly dry throughout although some isolated precipitation was experienced in some places, though not significant. Most of the seasonal rainfall was received in December during the second and third dekad of the month. Hence December was the wettest month of the sub-season OND. Highest cumulative rainfall for the sub-season was above 400mm whilst the least being recorded in the Matabelelands of below 100mm. Parts of the

Mashonalands and Masvingo were wetter than the norm whilst the greater part of Matabeleland North was drier (below normal) (Fig 21c).

b. JFM 2024 Sub-season.

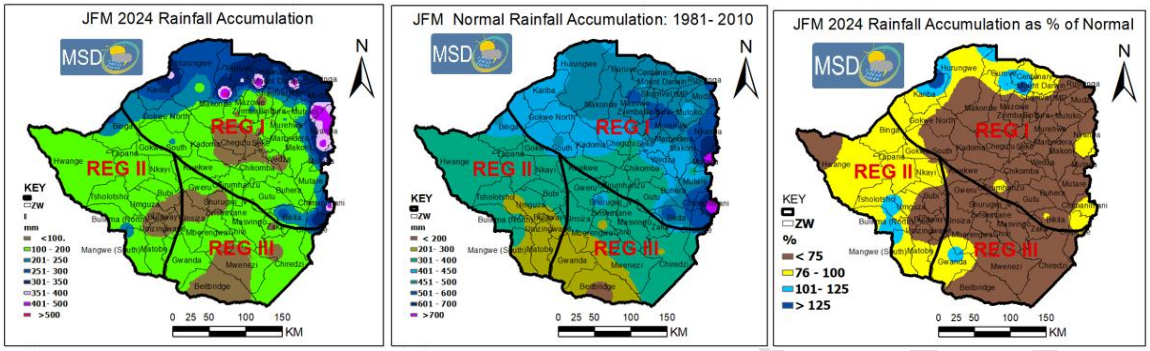

Figure 22: (a) Accumulated rainfall for JFM 2024, (b) Mean rainfall 1981-2010, (c) Percentage of normal JFM 2024

The second half of the season (JFM) was dry compared to the long term average. Most of the areas received rainfall below the long-term average as shown in Fig 22c. January ha the highest rainfall of the sub-season whilst the other months were dry. February was the driest of the three months.

5 2023-24 SEASONAL RAINFALL PERFOMANCE

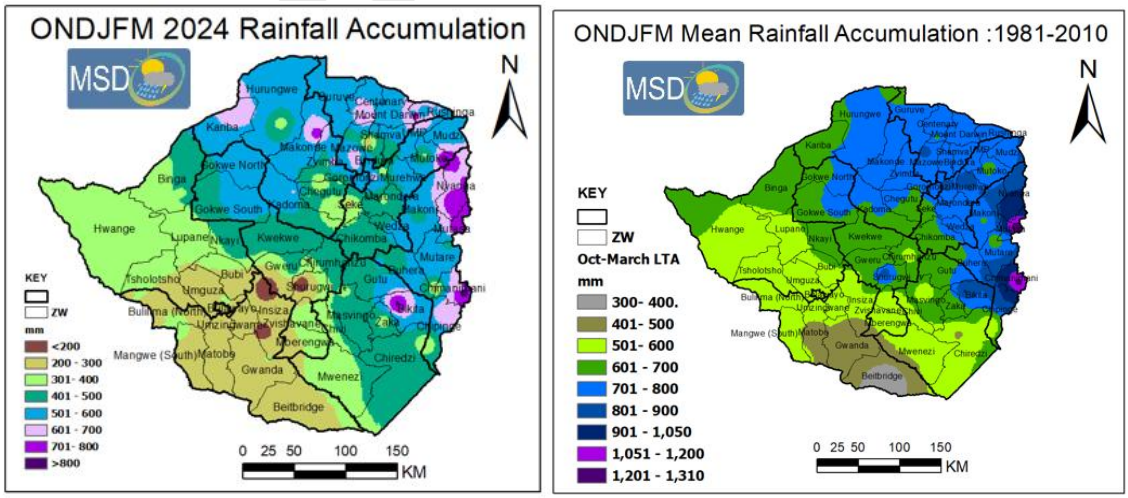

Figure 23. (a) Accumulated rainfall for ONDJFM 2024 and (Right) Long term mean accumulation ONDJFM 1981-2010.

The greater part of the country experienced seasonal rainfall ranging from 300mm to 600mm (Fig 23). Matabeleland South and the southern portions of Matabeleland North received the lowest seasonal rainfall, which was below 300mm. Only a few locations received rainfall exceeding 600mm in total, which include areas in the far eastern regions

such as Nyanga, Chimanimani, Mutasa, and Chipinge districts. However, the cumulative rainfall for the 2023-24 season was significantly below the long-term average for those areas.

Normally, the bulk of Matabeleland provinces, southern Masvingo, and the extreme southern parts of Midlands Provinces are expected to receive a seasonal rainfall total ranging from 400mm to 600mm while most of Manicaland, Mashonaland East, Mashonaland Central, and Mashonaland West usually receive the highest in the order of 700mm to 1050mm.

a. PERCENTAGE OF NORMAL RAINFALL FOR 2023-24 SEASON (ONDJFM)

The country received seasonal rainfall below 75% of the long-term average, as depicted in Fig 24. A few locations, indicated by the yellow regions, received rainfall ranging between 75% and 100% of the long-term average.

The country experienced drier conditions during the 2023-24 rainfall season which negatively impacted the agricultural and water sectors.

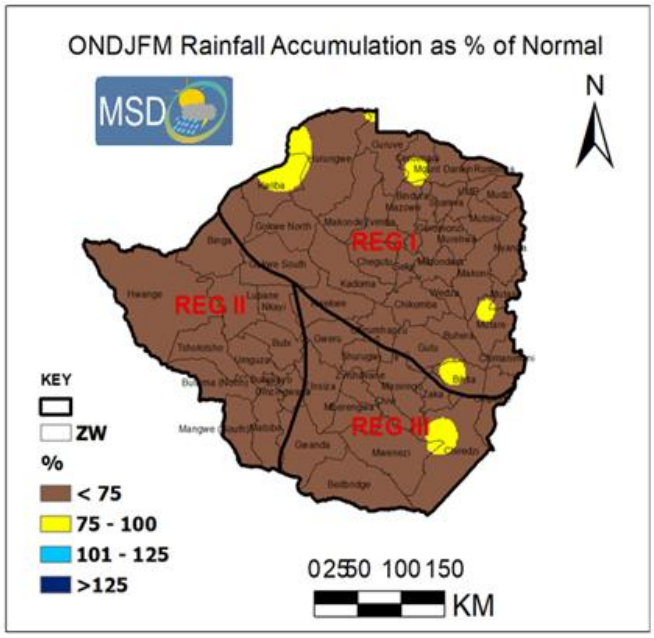

Figure 24. Percentage of normal rainfall for ONDJFM 2023/2024

6 2023-24 EL NIÑO SEASON COMPARED WITH OTHER ANALOGUE YEARS.

The 2023-24 rainfall season coincided with an El Niño phase of the ENSO, in line with the predictions. The conditions were first observed in June 2023 and increased in intensity until it peaked in January 2024. The Oceanic Niño Indices, which measure the intensity of El

Niño, recorded a peak level of 2.0 which translate to a strong El Niño phenomenon. Subsequently, the intensity has been gradually decreasing since then.

Similar levels of intensity were observed in the 1991-92, 1997-98 and 2015-2016 seasons. Among these, the 1991-92 and 2023-24 seasons were classified as strong El Niño events, while 1997-98 and 2015-2016 were considered very strong El Niño seasons.

To assess the rainfall performance during these seasons, the seasonal rainfall was compared to the long-term average. Additionally, rainfall anomalies were analysed to evaluate how different seasons responded to similar atmospheric conditions.

a. Percentage of Normal

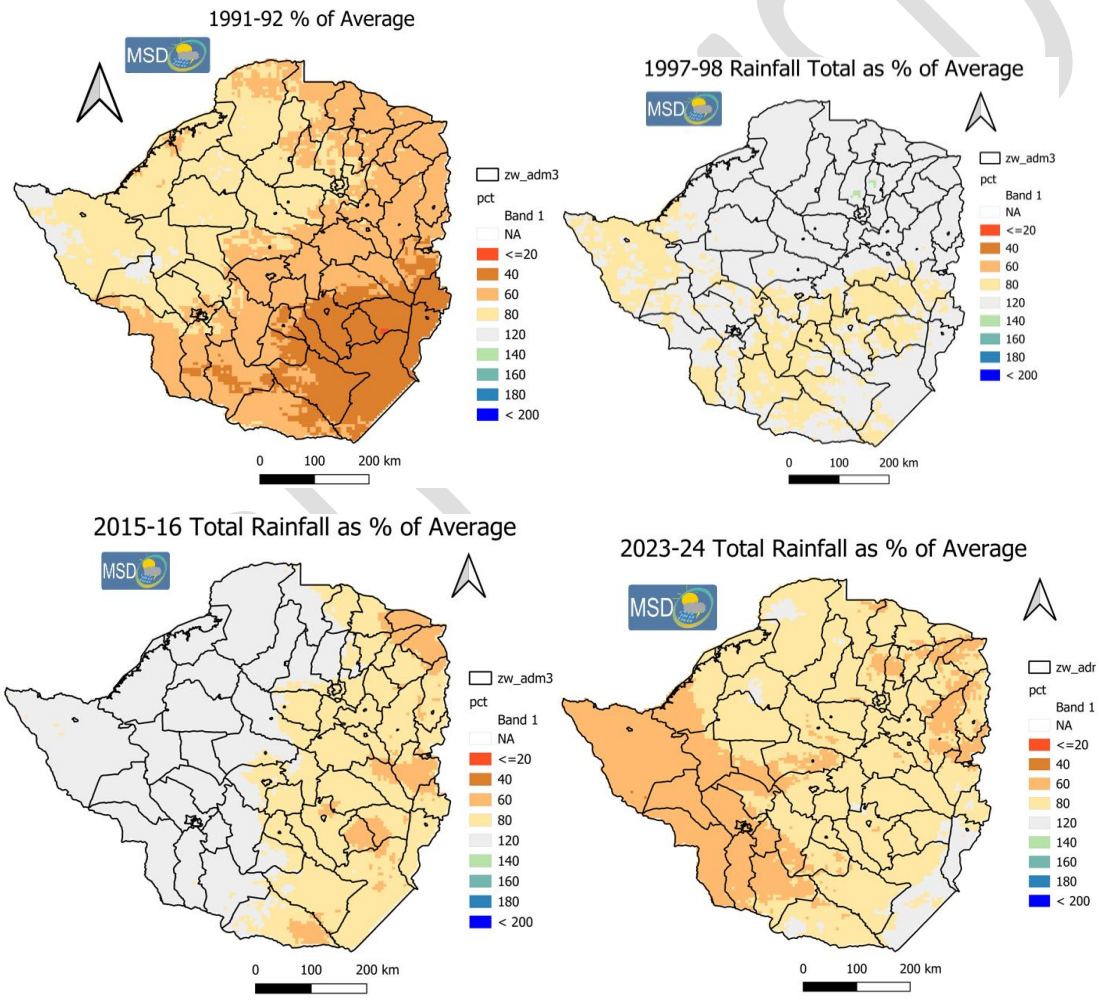

Fig 25

The current season exhibited similarities to the 1991-92 season, with the exception of a shift in the areas that were most impacted (Fig 25). In 1991-92, the eastern and southern regions of the country were most affected. During that season, over sixty percent of the

country received cumulative rainfall below 60% of the long-term average, while the remaining areas received cumulative rainfall around 80% of the long-term mean. However, in the 2023-24 rainfall season, the western parts, particularly the Matabeleland provinces, were the most affected. Seasonal rainfall in these areas fell below 60% of the long-term average. Other areas received seasonal rainfall within the range of 60% to 80% of the long-term average.

Comparatively, the rainfall seasons of 1997-98 and 2015-2016 were better in terms of rainfall accumulation, despite being experienced more severe El Niño phenomena compared to the other two seasons. In the 1997-98 season, the majority of the country received rainfall within the normal range, with only a small portion recording rainfall accumulation ranging between 60% and 80% of the long-term average. In the 2015-16 season, the eastern half of the country was significantly impacted, experiencing rainfall accumulation ranging between 40% and 80% below average. However, the other half of the country was less affected, as cumulative rainfall in those areas remained mostly within the normal category.

b. Rainfall Anomaly.

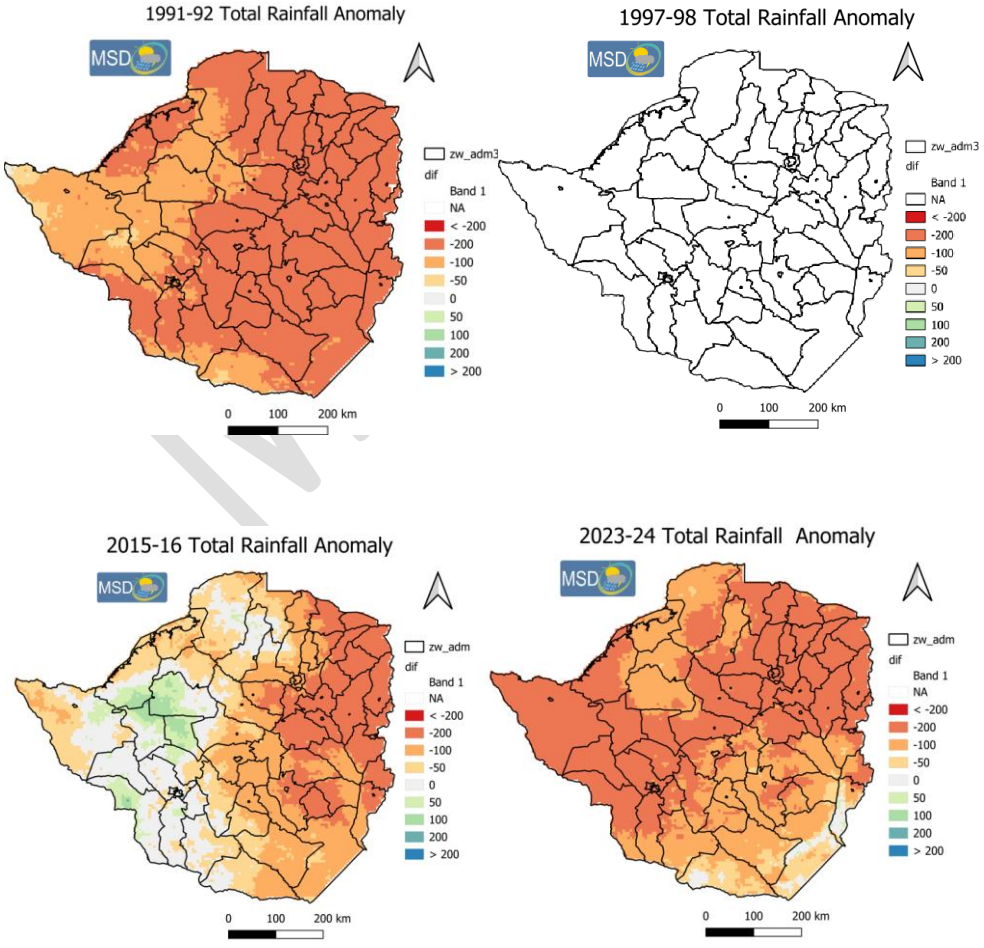

Fig 26

The rainfall anomaly, which represents the difference between the accumulated rainfall received during these years and the long-term average, provides a similar analysis to the percentage of normal rainfall. The current season (2023-24) closely resembles the 1991-92 season (Fig 26). The 1997-98 rainfall season was relatively moderate in comparison. The rainfall anomalies also indicate that the eastern half of the country experienced the greatest impact during the 2015-2016 rainfall season.

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a. END OF SEASON

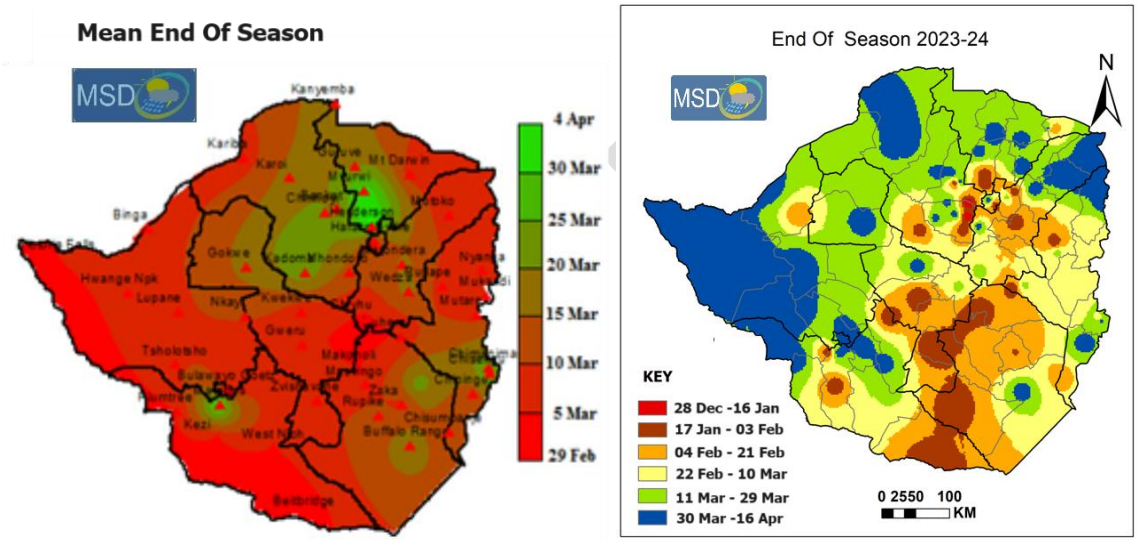
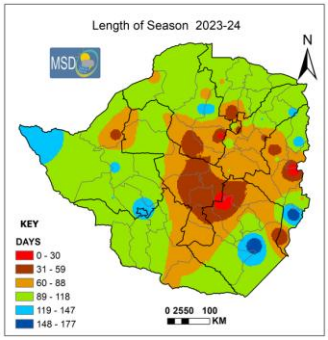


Figure 27: (a) Mean end of season 1981 – 2010, (b) end of season 2023-24

The 2023-24 rainfall season ended before the end of March in most places as shown in Fig 27b. However there was an earlier end for parts mostly in Masvingo and Matabeleland South.

The end of rain season is the last day before the end of April that a place receives 15mm or more in 24 hours. Although this day occurred in April in some places for this season the preceding dry spells had already affected the crops. The rains were beneficial in improving the water levels and grazing.

Season length



The length of season is defined as the number of days between the start of season and the end of season. The bulk of the

country recorded between 89 and 118 days. A small portion of the country recorded a season length of less than sixty days. There are some areas whose length of season exceeded 120 days.

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7 THE STATE OF THE GLOBAL CLIMATE DRIVERS DURING THE SEASON:

The sea surface temperatures in the Central Eastern Pacific Ocean were forecast to be warmer than normal for the October 2023 to March 2024 rainfall season. This El Niño phase of the ENSO normally results in reduced rainfall over Zimbabwe. The conditions remained more or less the same for the whole season. The southern parts of the subcontinent remained relatively cooler than the north eastern parts of the subcontinent. The coast along parts of Kenya and Tanzania were warmer than the coast along the eastern parts of South Africa and Mozambique. This difference in SSTs resulted in the persistent existence of the high-pressure systems that dominated much of the season pushing cold air into the atmosphere.

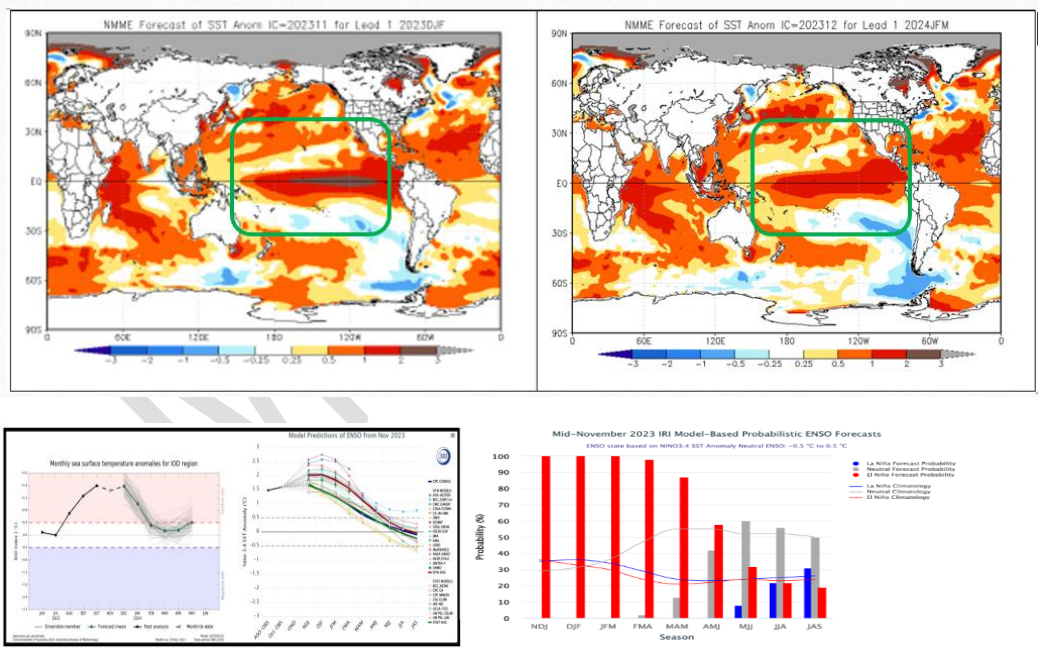

Fig 29

The IOD (Indian Ocean Dipole) indices had been positive at the beginning of the season and were expected to remain like that until the end of the season. The conditions occurred as forecast and this greatly affected the season. The positive IOD and the El Niño phenomenon enhanced the dry conditions that were experienced through out the season.The ONI

(Oceanic Niño Indices) which is a measure of the intensity of the El Niño or La Niño peaked to +2.0 above the long-term average in January 2024 which translated to a strong El Niño phase. After January the indices started to decrease as the SSTs anomalies are transitioning towards a likely La Nina phenomenon.

ENSO Type	Season	JJA	JAS	ASO	SON	OND	NDJ	DJF	JFM	FMA	MAM	AMJ	MJJ
SL	2010-2011	-1.0	-1.4	-1.6	-1.7	-1.7	-1.6	-1.4	-1.1	-0.8	-0.6	-0.5	-0.4
ML	2011-2012	-0.5	-0.7	-0.9	-1.1	-1.1	-1.0	-0.8	-0.6	-0.5	-0.4	-0.2	0.1
	2012-2013	0.3	0.3	0.3	0.2	0.0	-0.2	-0.4	-0.3	-0.2	-0.2	-0.3	-0.3
	2013-2014	-0.4	-0.4	-0.3	-0.2	-0.2	-0.3	-0.4	-0.4	-0.2	0.1	0.3	0.2
WE	2014-2015	0.1	0.0	0.2	0.4	0.6	0.7	0.6	0.6	0.6	0.8	1.0	1.2
VSE	2015-2016	1.5	1.9	2.2	2.4	2.6	2.6	2.5	2.1	1.6	0.9	0.4	-0.1
WL	2016-2017	-0.4	-0.5	-0.6	-0.7	-0.7	-0.6	-0.3	-0.2	0.1	0.2	0.3	0.3
WL	2017-2018	0.1	-0.1	-0.4	-0.7	-0.8	-1.0	-0.9	-0.9	-0.7	-0.5	-0.2	0.0
WE	2018-2019	0.1	0.2	0.5	0.8	0.9	0.8	0.8	0.7	0.7	0.7	0.5	0.5
	2019-2020	0.3	0.1	0.2	0.4	0.5	0.6	0.5	0.5	0.4	0.2	-0.1	-0.3
ML	2020-2021	-0.4	-0.6	-0.9	-1.2	-1.3	-1.2	-1.1	-0.9	-0.8	-0.7	-0.5	-0.4
ML	2021-2022	-0.4	-0.5	-0.7	-0.8	-1.0	-1.0	-1.0	-0.9	-1.0	-1.1	-1.0	-0.9
WL	2022-2023	-0.8	-0.9	-1.0	-1.0	-0.9	-0.8	-0.7	-0.4	-0.2	0.1	0.5	0.8
ME	2023-2024	1.1	1.3	1.6	1.8	1.9	2.0	1.8	1.5				
ENSO Type	Season	JJA	JAS	ASO	SON	OND	NDJ	DJF	JFM	FMA	MAM	AMJ	MJJ

Fig 30

The forecasts for these Global Climate Drivers by NOAA Climate Prediction Centre are promising a different story in the next season if the conditions happen as predicted. The Central Eastern Pacific Ocean is cooling a condition that is called La Nina which should result in favourable conditions over Zimbabwe. However, it still premature to confirm that a La Nina condition will be experienced as the atmosphere and oceanic systems are very dynamic and may change as the season continue to unfold. Climate Scientists will continue to monitor the situation and update when necessary most appropriately in Augusts during the dissemination of the 2024-25 rainy season outlook.

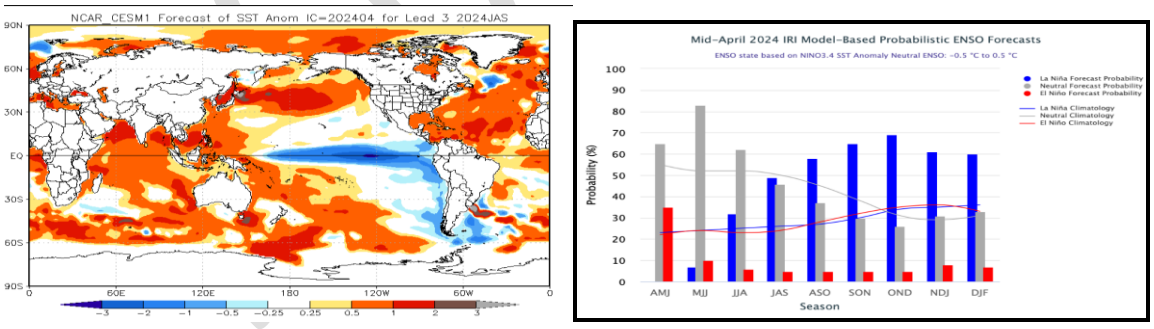

Fig 31

The current state and the forecast of the SSTs in the Central Eastern Pacific Ocean indicates that a cooling of the ocean waters in eastern equatorial part of the Pacific Ocean is anticipated. The ENSO probabilistic forecast issued during mid April by NOAA Climate Prediction Centre shows a higher chance of La Nina phase in the coming season.