2024-25 Rainy Season Analysis and Performance of the Drought Anticipatory Action System

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1. Introduction

The World Food Programme, in collaboration with the National Meteorological Services Department (MSD) and several governmental and non-governmental organizations is committed to establishing an advanced early warning system for droughts in selected districts across the country. This system, known as "Ready, Set & Go!", aims to proactively deal with imminent droughts by establishing pre-defined thresholds, triggers and financing mechanisms for anticipatory action. Based on seasonal forecasts, it seeks to anticipate significant reductions in precipitation during the rainy season, guiding the implementation of measures to mitigate the impacts of rainfall deficits in the critical period between the forecast and the onset of the rainfall anomaly.

In light of the recent adoption of the Maputo Declaration by the Southern African Development Community, which highlights the importance of aligning Early Warning and Early Action, member states have committed to expanding the reach of the early warning system to ensure that no one is left behind. Therefore, it is essential to test and evaluate the strengths and weaknesses of the “Ready, Set & Go!” during years in which the system issues drought alerts.

This report focuses on two main objectives: (i) the analysis of the 2024-25 rainy season in the selected districts and (ii) the evaluation of the performance of the "Ready, Set & Go!" system. This critical analysis seeks to improve understanding of the performance of the rainy season and identify possible socioeconomic impacts attributed to rainfall anomalies, as well as identify the challenges and opportunities experienced due to the use of the system. Furthermore, the report aims to contribute to improving drought risk mitigation strategies, through recommendations and lessons learned during the 2024-25 season.

2. Analysis of the rainy season 2024-25 in the districts for AA

The analysis of rainy season performance is an essential activity for understanding climate patterns, assessing environmental and socio-economic impacts, and guiding future decisions. This type of analysis involves the collection and interpretation of meteorological data, such as precipitation and temperature, throughout the rainy period. Additionally, other indicators may be considered, such as soil moisture levels and deviations in agricultural planting and harvesting patterns. The key elements of a rainy season performance analysis include evaluating the quantity and distribution of precipitation in relation to historical averages, identifying extreme events such as heavy rainfall or long periods without precipitation, and analyzing resulting impacts such as floods and droughts.

In the following analysis, a series of precipitation anomaly indicators were extracted at the selected district level to identify rainfall behavioral patterns in specific periods: (1) 10-day patterns, (2) multi-monthly patterns. The extracted indicators are:

I. **Precipitation anomaly**, calculated based on the long-term average of local station data from MSD blended rainfall, combined with CHIRP precipitation estimates - Climate Hazards Group InfraRed Precipitation.

II. **Standardized Precipitation Index (SPI)** measures anomalies in accumulated precipitation over a 2 and 3-month period.The Standard Precipitation Index (SPI) SPI is an indicator that measures how far rainfall is from a reference value, usually a long-term mean or median. The SPI is a widely used indicator to characterize and monitor droughts at various temporal and spatial scales. SPI values are centered around 0 and usually range within -4 to +4. A value of zero indicates the mean value of the rainfall for a given time and location, whereas negative SPI values represent a rainfall deficit.

III. **Standardized Dry Spell Index (Dry spell 2)** measures anomalies in the maximum length of consecutive days without rain (dry day < 2 mm) over a 2-month period.

The indicators used in the analysis allow us to measure or estimate the degree of rainfall decline over decade-long periods (10 days), monthly, bimonthly, quarterly, and even seasonal periods. These indicators are extracted based on a climate platform called PRISM. This, in turn, is a climate risk monitoring system that integrates geospatial data on hazards from various natural disasters, such as droughts, floods, and tropical storms, among others. PRISM platform data is extracted or generated through land observation using satellite data and ground sensors. The PRISM platform can generate climate monitoring indicators and analytical risk and impact products tailored to each hazard and at-risk population, and this data can be presented in the form of maps, interactive graphics, as well as in tables and reports.

It is important to note that during the 2024-25 rainy season, the non-regret triggers were used given the estimated high vulnerability prior to the start of the season. This means a less conservative drought threshold is applied across all districts, with a forecast system prioritizing the detection of droughts. As a result, there may be more false alarms, but this approach increases the likelihood of the system detecting droughts, reducing the risk of missing an upcoming drought.

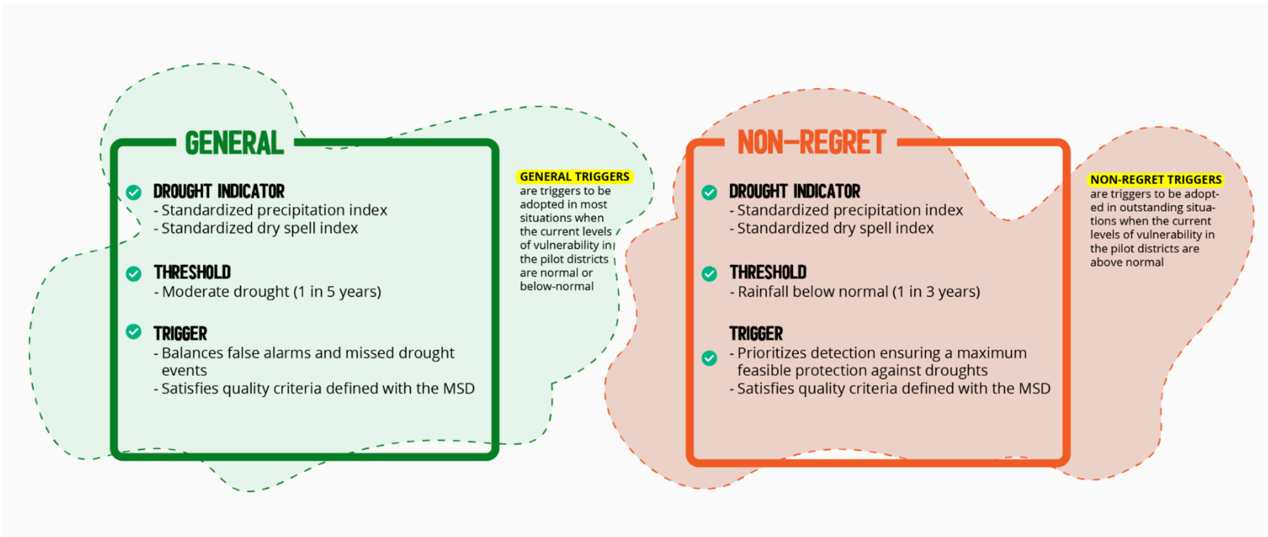


Figure 1: Overview of the requirements used by the general and emergency triggers for AA.

2.1 Indicator extracted at 10 days aggregation

Table 1 presents a summary of precipitation anomalies as a percentage of the average, measured at 10-day intervals during the 2024/25 rainy season from October to April. This timeframe aligns with the rainfall season in Zimbabwe, which is crucial for both agriculture and the population. The data indicates that, for most districts analyzed, the season was generally wetter than the climatological average. However, there were notable dry spells during certain 10-day periods, particularly in mid-October and from mid to late December. Another dry phase occurred at the end of March, impacting all districts. While wetter-than-average conditions can offer essential relief, as seen from January to March in many areas, intense rainfall can result in flash floods that wash away crops and topsoil. Furthermore, excess rainfall often goes unused due to inadequate infrastructure for storage. This underscores the need to analyze rainfall anomalies over various timescales, as monthly averages can mask short but intense rainfall events.

Rainfall patterns vary between districts throughout the season, with much of the country experiencing increased rainfall from January to mid-March, particularly in Masvingo and Matabeleland Provinces, as indicated in the table. In contrast, the 10-day rainfall anomaly for districts in Mashonaland Province shows drier conditions in December, which may have adversely affected already planted crops.

Table 1: Dekadal means rainfall anomaly for each selected district throughout the 2024/25 rainy season. Values closer to 100 represent rainfall in line with the climatological average.

Mean Anomaly 10-day rainfall MSD blended (%)

Provinces	Districts	D1 oct	D2 Oct	D3 Oct	D1 Nov	D2 Nov	D3 Nov	D1 Dec	D2 Dec	D3 Dec	D1 Jan	D2 Jan	D3 Jan	D1 Feb	D2 Feb	D3 Feb	D1 Mar	D2 Mar	D3 Mar	D1 Apr	D2 Apr	D3 Apr
	Windows	Window 1 (ONDJ)																				
											Window 2 (JFMA)											
Masvingo	Chiredzi	113	66	76	205	130	84	53	58	86	144	164	124	139	173	116	102	154	51	98	163	61
	Mwenezi	114	70	72	209	124	97	50	62	83	155	169	86	151	181	120	122	129	45	120	214	102
	Masvingo	112	64	98	177	92	109	48	53	99	164	189	120	159	203	249	104	135	40	92	271	72
	Bikita	108	68	88	203	93	97	56	56	96	114	149	160	162	154	164	87	143	40	90	157	48
Matabeleland South	Gwanda	109	74	92	173	136	93	39	84	130	216	168	58	113	199	129	145	90	48	106	307	162
	Beitbridge	111	111	81	197	106	77	39	82	107	181	177	70	105	167	96	136	107	60	98	224	130
	Matobo	105	66	87	169	121	100	48	103	147	204	137	49	79	206	142	134	84	47	117	410	126
Matabeleland North	Hwange	82	83	87	152	95	88	59	85	114	100	110	102	28	185	275	136	118	57	123	228	170
	Binga	88	97	62	112	114	108	48	75	79	138	69	95	44	196	286	127	107	51	100	371	95
Mashonaland East	Mudzi	108	45	124	126	134	108	67	53	76	132	62	187	66	257	230	72	83	85	188	413	71
Mashonaland Central	Rushinga	106	48	120	143	140	86	132	71	59	108	64	154	48	223	227	73	118	61	239	628	65
	Mbire	116	51	131	78	77	112	70	70	87	94	69	127	90	138	232	81	164	75	185	477	83

Legend (%)														
	< 20	20-40	40-60	60-70	70-80	80-90	90-110	110-120	120-130	130-150	150-200	200-300	300-400	>400

2.2 Indicator extracted at 2 months aggregation

2.2.1 Standardized Precipitation Index (SPI-2)

Drought monitoring using the bi-monthly Standardized Precipitation Index (SPI-2) reveals distinct regional rainfall patterns across Zimbabwe. The southern provinces, including districts such as Masvingo, Bikita, Gwanda, Beitbridge and Matobo, experienced wetter-than-average conditions during October-November and November-December, though this rainfall masked underlying dry spells that continued to pose agricultural challenges. In contrast, northern provinces - particularly Matabeleland North, Mashonaland Central and Mashonaland East - recorded drier-than-average conditions throughout most of the monitoring period. Districts including Binga, Mudzi, Mbire and Rushinga faced prolonged dry spells from November through December, with conditions persisting into January. SPI-2 values for November-December specifically indicated moderate to severe drought in several northern districts, with Mudzi (-1.37), Mbire (-1.21) and Rushinga (-1.62), highlighting significant rainfall deficits that likely impacted agricultural productivity in these regions

At the onset of Window 2, rainfall levels rebounded to near-normal or above-normal across all districts, as evidenced in Tables 3. Most selected districts experienced wetter-than-average conditions between late December and February 2025, driven by enhanced rainfall activity associated with the Intertropical Convergence Zone (ITCZ) and successive westerly cloud systems traversing the country. Particularly in Matabeleland South, Gwanda and Matobo districts received significantly above-average rainfall during the December-January period. While the southern provinces generally recorded higher cumulative rainfall than average, spatial distribution remained uneven. Notably, drought-resistant crops in these areas likely maintained reasonable productivity. In northern districts, including Mbire, Rushinga, and Mudzi, initial seasonal dryness gradually improved by Window 1, eventually resulting in average rainfall conditions that potentially supported agricultural recovery.

Table 2: SPI 2 values for each district during the 2024/25 rainy season.

SPI 2							
Provinces	Districts	ON	ND	DJ	JF	FM	MA
	Windows	Window 1 (ONDJ)					
					Window 2 (JFMA)		
Masvingo	Chiredzi	0.27	0.46	1.11	1.41	0.61	0.12
	Mwenezi	0.49	0.94	1.44	1.72	0.91	-0.31
	Masvingo	0.84	0.10	1.13	1.88	0.83	-0.34
	Bikita	0.76	0.41	0.70	1.13	0.41	0.05
Matabeleland South	Gwanda	0.80	1.42	2.13	2.29	0.92	-0.52
	Beitbridge	0.23	0.78	1.47	1.86	0.79	-0.50
	Matobo	0.90	1.63	2.15	1.97	0.66	-0.69
Matabeleland North	Hwange	-0.89	-0.28	0.46	0.97	0.34	-0.55
	Binga	-0.59	-0.69	-0.10	0.96	0.53	-0.61
Mashonaland East	Mudzi	0.48	-1.37	-0.28	1.32	0.81	0.46
Mashonaland Central	Rushinga	0.55	-1.62	-0.35	1.07	0.57	0.82
	Mbire	0.50	-1.21	-0.67	0.01	-0.29	0.08
	Legend						
		<-2	-1.5 a -2	-1.2 a -1.5	-0.7 a -1.2	-0.5 a -0.7	
	0.5 a -0.5	0.5 a 0.7	0.7 a 1.2	1.2 a 1.5	1.5 a 2.0	> 2.0	

2.2.2 Dry Spell 2 standardized

The anomaly in dry spells indicator (Table 5) is a useful indicator in examining extended periods of dryness in an area as these can contribute to the success or failure of a crop when it comes to agriculture. The analysis was done using a 2-month aggregation for the period December 2024 to March 2025. In this indicator the values and threshold are the opposite to SPI, with drought events defined by a positive value (e.g., Moderate dry spell = values > 0.85). The data indicates very little deviation from the normal during the first period December-January meaning the dry spell indicator has not been pointing to a prolonged period of consecutive dry days. For the period January-February, districts in the northern half of the country except for Mbire experienced dry spells shorter than the climatological average. During the February-March period all the districts experienced much shorter dry spells as indicated by the low dry spell anomaly values signalling a period with a larger number of wet days longer than the normal. This is generally in line with the observed results as much wetter conditions were experienced throughout the country during this period.

Table 3 Dry spell bi-monthly values for each district during the 2024/25 rainy season.

Anomaly dry spell 2 months				
Provinces	Districts	**DJ**	**JF**	**FM**
		Janela 2 (JFMA)		
Masvingo	Chiredzi	-0.17	-0.49	-2.76
	Mwenezi	0.07	-0.24	-3.21
	Masvingo	0.01	-0.22	-2.40
	Bikita	-0.28	-0.62	-2.64
Matabeleland South	Gwanda	-0.10	0.29	-2.99
	Beitbridge	-0.17	0.26	-3.21
	Matobo	-0.06	0.08	-2.53
Matabeleland North	Hwange	0.35	-0.62	-1.93
	Binga	0.01	-1.24	-1.79
Mashonaland East	Mudzi	-0.21	-1.16	-3.74
Mashonaland Central	Rushinga	-0.15	-0.95	-2.87
	Mbire	0.14	0.11	-1.89

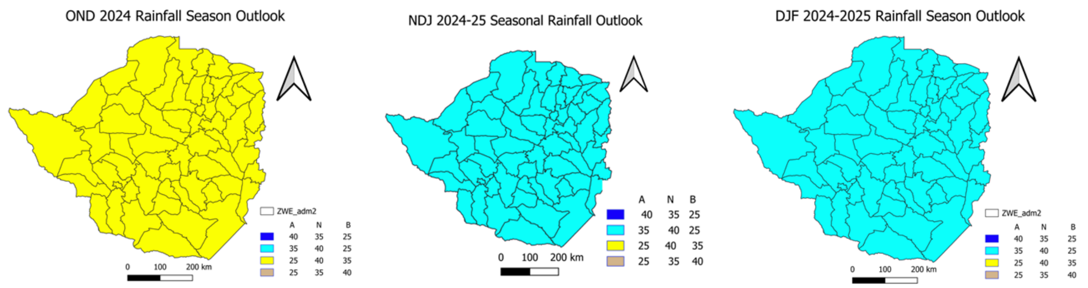
Legend					
	> 2	1.5 a 2	1.2 a 1.5	0.7 a 1.2	0.5 a 0.7
0.5 a -0.5	-0.5 a -0.7	-0.7 a -1.2	-1.2 a -1.5	-1.5 a -2.0	< -2.0

2.3 MSD Seasonal Forecast and the observed Standardized Precipitation Index (SPI-3)

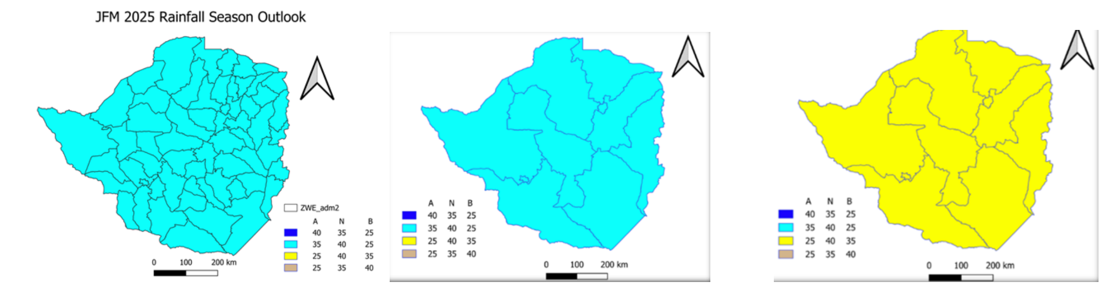
The second phase is monitoring SPI 3, a three-monthly indicator that divides the season into a set of three months.The analysis was done using a 3-month aggregation for the period October 2024 to March 2025. In this indicator the values and threshold are such that the drought events are defined by a negative value while the wetter events are defined by positive values.

2.3.1 MSD seasonal forecast for the rainy season 2024-25

The seasonal forecast that was issued by the Meteorological Department of Zimbabwe had the sub-season of October-November-December (OND) and March- April- May(MAM) going for normal to below normal rainfall. The subseasons November-December-January (NDJ), December-January-February (NDJ), January-February-March (JFM) and February-March-April (FMA) were projected to have normal to above normal rainfall as indicated by Figure 2 below.



a) October- December b) November- January c) December-February



d) January- March e) February- April f) March- May

Figure 2: MSD Seasonal Forecast Outlooks for the subseasons OND, NDJ, DJF, JFM , FMA and MAM.

2.3.2 Observed Standardized Precipitation Index (SPI-3)

Drought monitoring also incorporated the use of a tri-monthly Standardized Precipitation Index (SPI-3) which also reveals the different regional rainfall patterns across Zimbabwe. The selected districts in Matabeleland North (Hwange and Binga), Mashonaland East (Mudzi) and Mashonaland Central (Rushinga and Mbire) experienced drier-than-normal to extremely dry conditions during October-November-December and November-December-January, with prolonged low cumulative rainfall levels that continued to pose agricultural challenges. In contrast to that, districts in the southern provinces, that is Masvingo and Matabeleland South experienced wetter-than-average conditions throughout much of the monitoring period driven by successive westerly cloud systems traversing the country.

Table 4 SPI 3 values for each district during the 2024/25 rainy season.

SPI 3						
Provinces	Districts	**OND**	**NDJ**	**DJF**	**JFM**	**FMA**
	Windows	**Window 1 (ONDJ)**				
				Window 2 (JFMA)		
Masvingo	Chiredzi	0.34	1.18	1.33	1.19	0.81
	Mwenezi	0.80	1.54	1.79	1.45	1.08
	Masvingo	0.25	1.26	1.51	1.54	0.98

	Bikita	0.36	0.85	0.96	0.84	0.63
Matabeleland South	Gwanda	1.35	2.26	2.40	1.89	1.03
	Beitbridge	0.62	1.47	1.60	1.56	0.94
	Matobo	1.52	2.33	2.14	1.57	0.72
Matabeleland North	Hwange	-0.43	0.24	0.82	0.55	0.45
	Binga	-0.78	-0.22	0.60	0.54	0.59
Mashonaland East	Mudzi	-1.31	-0.22	0.55	1.01	1.13
Mashonaland Central	Rushinga	-1.57	-0.27	0.27	0.80	1.01
	Mbire	-1.17	-0.60	-0.59	-0.24	-0.04

Legend					
	<-2	-1.5 a -2	-1.2 a -1.5	-0.7 a -1.2	-0.5 a -0.7
0.5 a -0.5	0.5 a 0.7	0.7 a 1.2	1.2 a 1.5	1.5 a 2.0	> 2.0

SPI-3 values for the districts such as Mudzi (-1.31), Mbire(-1.17) and Rushinga (-1.57) show severe drought conditions for the OND sub season highlighting significant rainfall deficits that likely impacted agricultural productivity in these regions.At the onset of Window 2, rainfall conditions across much of the districts became normal to near-normal or above normal as shown in Tables 4. Most selected districts experienced wetter-than-average conditions between late December and February 2025, driven by enhanced rainfall activity associated with the Intertropical Convergence Zone (ITCZ) and successive westerly cloud systems traversing the country. However, Rushinga and Mbire in Mashonaland Central continued to experience drier than average rainfall between November and January.

The comparison between the MSD seasonal forecast for OND (October-November-December) and observed rainfall patterns indicates a tendency for the forecast to overestimate the severity of dryness anticipated in Zimbabwe's central and southern regions. Contrary to the forecasted drier conditions, these areas recorded normal to above-normal rainfall during this period. In the northern regions, observed rainfall was predominantly normal to below normal, which is partially consistent with the forecast. However, the forecast underestimated rainfall amounts in the central and southern regions, where precipitation was observed to be above normal to normal, rather than the predicted normal to above-normal levels. As the MAM (March-April-May) season is still ongoing, a comparative analysis for this period remains to be completed.

2.4 Summary of the rainy season 2024/25

Section 2 of this report details the 2024/25 rainy season in Zimbabwe, with an emphasis on the temporal distribution of rainfall and its possible impacts on agriculture and population. Through dekadal and multi-month analyses, variations and irregularities in precipitation in different regions of the country are highlighted, focusing on the AA selected districts.

The analysis of the 2024/25 rainy season reveals that most districts across Zimbabwe experienced wetter-than-average conditions, with normal to above-normal seasonal rainfall. However, districts in Mashonaland Province, specifically Mudzi, Rushinga, and Mbire, were notable exceptions. These districts recorded below-normal rainfall in October and December, with significant precipitation only beginning in the second and third dekad of November. Throughout Window 2 of the rainy season (January to March), these areas faced mixed conditions, alternating between wet and dry dekads, reflecting sporadic rainfall patterns.

In contrast, Matabeleland South and Masvingo provinces experienced wetter-than-average conditions as also shown by the SPI indicators. While rainfall distribution improved in January and most of February, March saw a significant decline, affecting both spatial and temporal rainfall patterns. Of significant note is the period January and most of February which contributed substantially to the seasonal accumulations due to the significant falls that were received with March having a notable decrease in precipitation.

This scenario generally had a positive impact in the agricultural sector as these areas did not experience any prolonged dry spells according to the anomaly dry spell 2 months indicator. It also indicated the February-March period as significantly wetter-than-average and by far the wettest 2 months of the season.

3. Performance of the AA System against Drought

3.1 Performance of the system in the first part of the rainy season

Across the 14 monitored districts (including Mount Darwin and Kariba districts covered by the Start Network), a total of 28 pairs of triggers were assessed for the below-normal drought threshold (adopted throughout the 2024-25 season). 6 out 14 districts had a set alert issued. Of these, 14 pairs correctly rejected the occurrence of drought conditions, while 11 resulted in errors, comprising 8 misses and 3 false alarms. 3 alerts were followed by droughts within the tolerant margin of error established in the trigger criteria. Figure 2 presents the districts where AA drought alerts were issued for the first part of the 2024-2025 rainy season in Zimbabwe. In terms of lead time, most of the "set" alerts were issued approximately two months before the anticipated onset of drought.

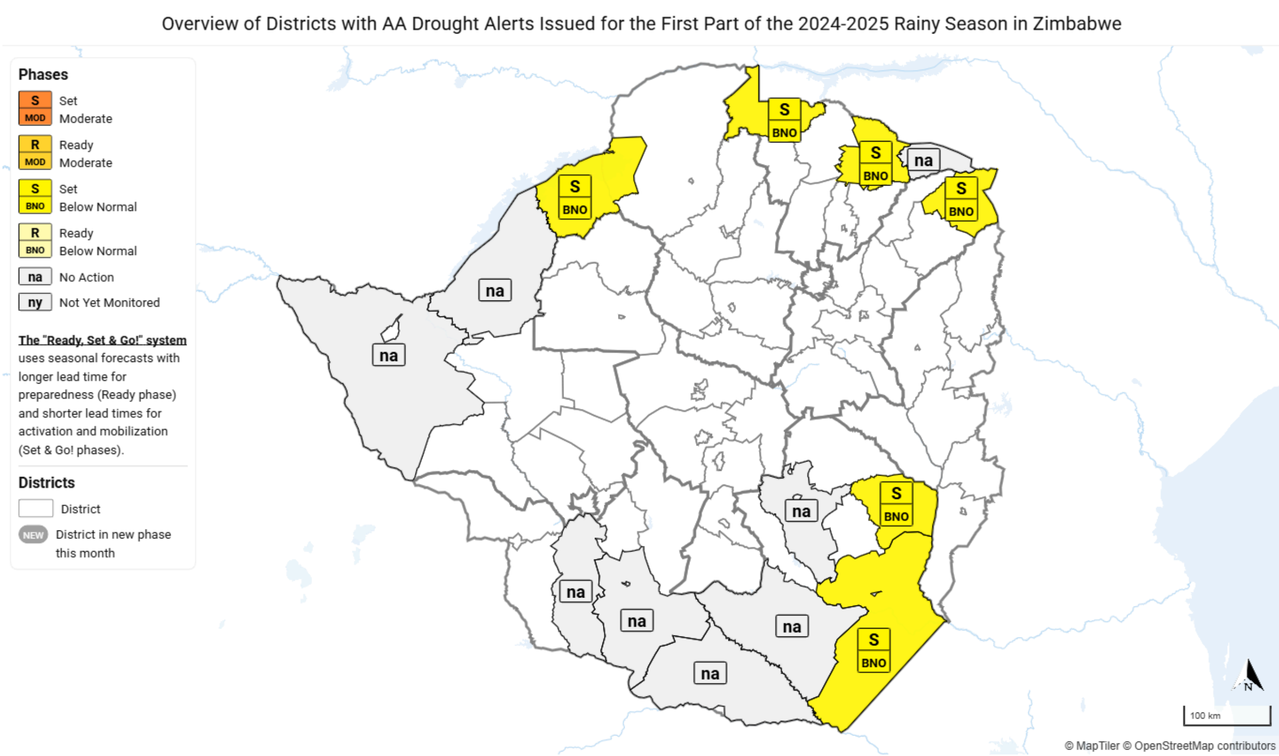


Figure 2: Overview of Districts with AA Drought Alerts Issued for the First Part of the 2024-2025 Rainy Season in Zimbabwe.

Across the 14 monitored districts, most triggers resulted in outcomes that were either accurate or successfully informed anticipatory action (AA) within Window 1. This includes districts that experienced dryness during the OND period, although the timing of the dryness differed from the initial forecasts. In some cases, such as in Mudzi, Mount Darwin, and Kariba, false alarms occurred because the observed dryness did not align with the forecasted period. Nonetheless, these false alarms may still have supported AA efforts, as below-normal conditions eventually materialized during the first part of the rainy season (see Table 5).

In Mbire, the AA triggers correctly identified below-normal rainfall in November to December (ND). Meanwhile, in Mwenezi, Masvingo, Gwanda, Beitbridge, and Matobo, the forecast accurately rejected the likelihood of below-normal rainfall during Window 1.

However, in other districts, such as Chiredzi and Bikita, false alarms were not followed by any significant early-season dryness. These more critical false positives may have led to a misallocation of AA resources, as no moderate or severe drought was detected based on the drought indicators used for AA. Conversely, in Hwange, Binga, and Rushinga, the triggers failed to detect significant dryness during the OND period.

It is worth noting that in Chiredzi and Bikita, rainfall remained below average for 4 to 5 consecutive dekads in November and December, characterized by prolonged periods of below-average 10-day rainfall. As a result, there is still a possibility that drought-related impacts could emerge later in the agricultural season, despite the absence of early-season drought classification in the multi-month indicators.

Table 5: AA triggers performance for window 1

Province	District	Outcome for the assigned triggers	Dryness experience within window 1?
Masvingo	Chiredzi	False alarm, rainfall above normal in ON	Dryness not observed
Masvingo	Bikita	False alarm, rainfall above normal in NDJ	Dryness not observed
Matabeleland North	Hwange	Miss, rainfall below average in ON	Dryness observed
Matabeleland North	Binga	Miss, rainfall below average in ON	Dryness observed
Mashonaland Central	Rushinga	Miss, rainfall below normal in OND	Dryness observed
Masvingo	Mwenezi	Correct Rejection	Dryness not observed
Masvingo	Masvingo	Correct Rejection	Dryness not observed
Matabeleland South	Gwanda	Correct Rejection	Dryness not observed
Matabeleland South	Beitbridge	Correct Rejection	Dryness not observed
Matabeleland South	Matobo	Correct Rejection	Dryness not observed
Mashonaland Central	Mbire	Hit, rainfall below normal in ND	Dryness observed
Mashonaland East	Mudzi	Tolerant false alarm, rainfall below average in NDJ	Dryness observed
Mashonaland Central	Mount Darwin	False alarm, rainfall above normal in ON	Dryness observed IN NDJ
Mashonaland West	Kariba	Tolerant false alarm, rainfall below average in ON	Dryness observed in ON and NDJ

3.2 Performance of the system in the second part of the rainy season

Across the 14 monitored districts (including Mount Darwin and Kariba districts covered by the Start Network), a total of 56 pairs of triggers were assessed for the below-normal drought threshold (adopted throughout the 2024-25 season). 9 out 14 districts had a set alert issued. Of these, 14 pairs resulted in false alarms while 2 pairs correctly detected rainfall below normal and below average (tolerant margin of error established in the trigger criteria). Figure 3 presents the districts where AA drought alerts were issued for the second part of the 2024-2025 rainy season in Zimbabwe. In terms of lead time, most of the "set" alerts were issued approximately three months before the anticipated onset of drought.

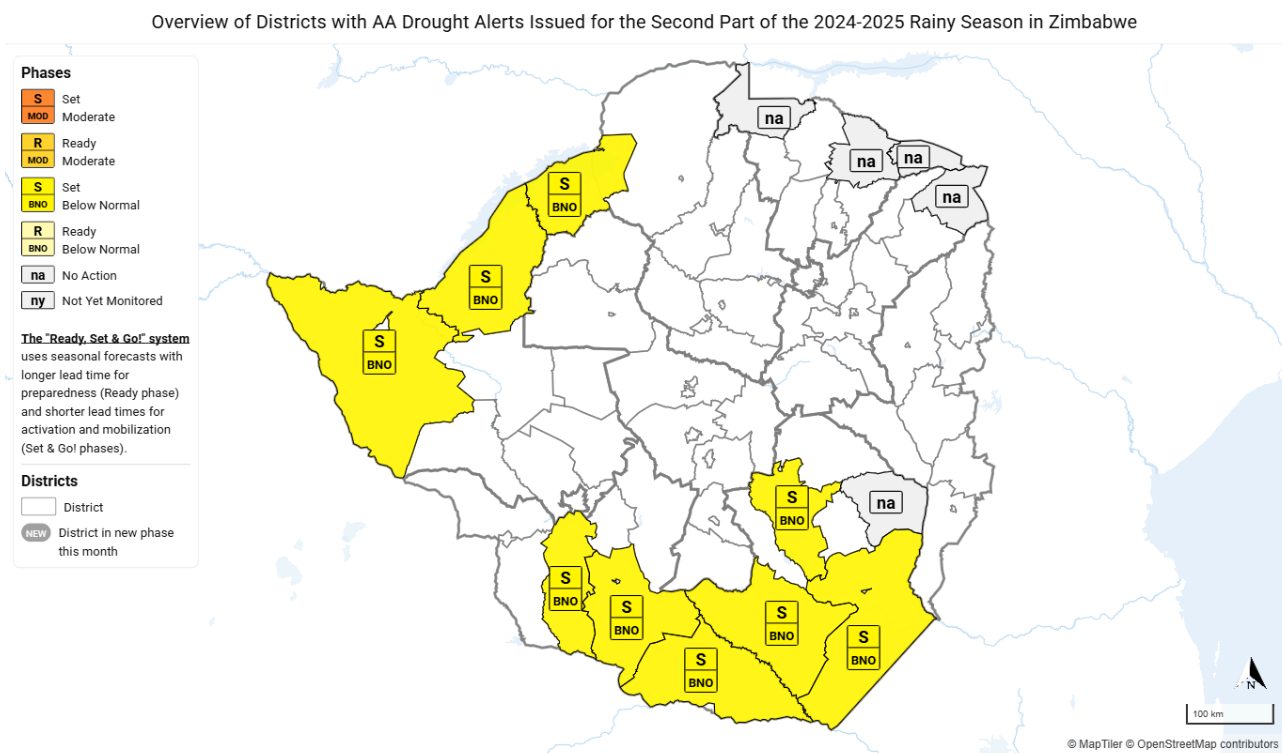


Figure 3: Overview of Districts with AA Drought Alerts Issued for the Second Part of the 2024-2025 Rainy Season in Zimbabwe.

Across the 14 monitored districts, most triggers did not produce accurate outcomes within Window 2. This includes cases where districts experienced dryness during the January–March (JFM) period without any alert being issued (e.g., Mbire and Mount Darwin), as well as instances where alerts were issued but no significant dryness was observed (e.g., Chiredzi, Hwange, Binga, Mwenezi, Masvingo, Gwanda, Beitbridge, and Matobo).

In Kariba, the AA triggers successfully identified below-normal rainfall during January–February (JF). Meanwhile, in Mudzi, Bikita, and Rushinga, the forecast correctly rejected the likelihood of below-normal rainfall for Window 2.

Overall, AA triggers performed better in Window 1 than in Window 2. This is likely due to the fact that most districts received well-above-normal rainfall during the second half of the season, whereas significant dryness was more prominent in the first part of the season, particularly in Matabeleland North, Mashonaland East, and Mashonaland Central.

Table 6: AA triggers performance for window 2

Province	District	Outcome for the assigned triggers	Dryness experience within window 2?
Masvingo	Chiredzi	False alarm, dry spell shorter than normal in JF	Dryness not observed
Matabeleland North	Hwange	False alarm, rainfall above normal in JF	Dryness not observed
Matabeleland North	Binga	False alarm, rainfall above normal in JF	Dryness not observed
Masvingo	Mwenezi	False alarm, rainfall above normal in JF	Dryness not observed
Masvingo	Masvingo	False alarm, rainfall above normal in DJF	Dryness not observed
Matabeleland South	Gwanda	False alarm, rainfall above normal in DJF	Dryness not observed
Matabeleland South	Beitbridge	False alarm, rainfall above normal in JFM	Dryness not observed
Matabeleland South	Matobo	False alarm, rainfall above normal in DJF	Dryness not observed
Mashonaland Central	Mbire	Miss, rainfall below normal in DJF	Dryness observed
Mashonaland Central	Mount Darwin	Miss, rainfall below normal in JF	Dryness observed
Mashonaland East	Mudzi	Correct Rejection	Dryness not observed
Masvingo	Bikita	Correct Rejection	Dryness not observed
Mashonaland Central	Rushinga	Correct Rejection	Dryness not observed
Mashonaland West	Kariba	Hit, rainfall below normal in JF	Dryness observed

3.3 Summary of the performance of the AA trigger model

During the 2024–2025 rainy season in Zimbabwe, 84 trigger pairs were assessed across 14 districts, including Mount Darwin and Kariba. In Window 1 (October–December), the AA model performed relatively well: triggers in five districts correctly rejected drought, and four alerts aligned with drought conditions within the model's tolerance. Although there were some misses and false alarms, many early alerts coincided with emerging dryness, often reflected in consecutive 10-day periods of below-average rainfall.

In contrast, Window 2 (January–March) showed lower model accuracy. Nine districts had alerts issued, but eight were false alarms, and only one correctly detected drought. Notably, districts such as Mbire and Mount Darwin experienced dryness without any alert. The widespread above-normal rainfall during this period likely contributed to the reduced performance.

Overall, the AA trigger model proved more reliable in the first half of the season. While some false alarms still supported early action, several key misses in the second window highlight the need to refine the model for improved accuracy across the full season.

4. Lessons learned in the 2024/25 rainy season

4.1 Performance of the 2024/25 rainy season

The 2024/25 rainy season showed varied rainfall patterns across different districts. Most areas experienced normal to above-normal rainfall, but some districts in Mashonaland province, specifically Mudzi, Rushinga, and Mbire, recorded below-normal precipitation in October and December. Meaningful rains began later, in the second and third dekads of November, as indicated by the SPI 2 and 3 metrics.

In contrast, Matabeleland South and Masvingo provinces experienced wetter-than-average conditions, also reflected in the SPI indicators. Rainfall distribution improved significantly in January and most of February, contributing to substantial seasonal accumulations. However, March saw a notable decline in rainfall, which affected both spatial and temporal patterns.

4.2 About the performance of the AA triggers

The Ready, Set & Go! system issued drought alerts across to all monitored districts (except Rushinga), targeting potential droughts forecasted for either Window 1 or Window 2. Each alert provided a lead time of approximately two months before the anticipated onset of rainfall deficits, meeting the requirement for timely early warning.

During the first monitoring window of the 2024/25 season, dryness was recorded in seven districts. Of these, four received AA alerts for Window 1, while three districts did not receive any alerts. These missed cases may be due to the absence of an identified trigger during the months when dryness occurred, or a failure of the system to issue alerts when needed. Additionally, three districts received alerts but did not experience dryness during Window 1, indicating potential false alarms.

In contrast, during the second monitoring window, dryness was observed in only three districts. One of these received an appropriate alert, while two were missed. Moreover, eight districts received alerts but did not experience significant dryness, further highlighting instances of false positives.

Overall, the AA trigger model performed better during the first half of the season, when drought conditions were more widespread. Nevertheless, there is a need for continued refinement to improve the alignment between forecast timing and observed drought events, and to enhance the methodology used for assessing triggers.

Compared to the 2023/24 season, the system demonstrated lower performance in 2024/25, with a greater number of errors. This outcome should be understood in the context of significant forecasting challenges during the season, including the predominance of Neutral conditions and the late, weak onset of La Niña, which only became apparent in December 2024. Moreover, the use of emergency triggers, based on less reliable seasonal forecasts, naturally increases the potential for error. These triggers are specifically applied in situations of ongoing high vulnerability and are intended to prioritize AA over forecast precision.A key lesson from this experience is that AA should be treated as a no-regret intervention, particularly in years marked by high vulnerability and climatic conditions that are not favorable for seasonal forecasting. It is essential that end users are informed from the outset that a greater margin of error is expected under such uncertain conditions.

Another challenge that has emerged is evaluating the performance of the Ready, Set & Go! system when multiple drought indicators, capturing different periods, are used, as is the case in Zimbabwe. One approach is to adopt a stricter assessment, evaluating the accuracy of the triggers based on how well the forecasted timing and intensity of dryness match the observed conditions, without extending the analysis to the entire rainy season. Alternatively, a more pragmatic approach allows for greater flexibility by evaluating any alert issued for a given window (e.g., Window 1 or Window 2) against the overall dryness observed during that period. This broader approach is more tolerant of timing mismatches, recognizing that anticipatory actions can still effectively support livelihoods when implemented ahead of the general period of drought. In this context, errors in timing are considered less critical than errors in intensity, as the expected severity of drought influences the scale of response and the number of beneficiaries supported. Therefore, it is essential to coordinate with implementing stakeholders to determine the most appropriate way to conduct such performance assessments and to understand the practical implications of different types of errors. Such consultations can offer valuable insights into areas of the system that may benefit from refinement. These may include reducing the number of indicators, particularly reconsidering those related to expected rainfall cessation or the month of October, and reevaluating the use of dry spell indicators. Additionally, adjustments could involve revisiting the reliability levels currently assigned to each trigger or revising the drought thresholds applied. These improvements would help enhance the system's effectiveness and better align it with operational realities and decision-making needs.

During the 2024/25 season, the Meteorological Services Department (MSD) produced monthly monitoring bulletins to strengthen the communication and dissemination of drought alerts, responding to increased interest from a wider range of organizations. To ensure that alerts are effectively adopted and anticipatory actions are planned in a timely manner, further improvements in dissemination are recommended. These could include regularly updating MSD's distribution list and organizing monthly debriefs with the community of practice to foster coordination and shared understanding.

More broadly, the 2024/25 season has shown mixed signals in terms of rainfall performance, with dryness affecting several districts during the first part of the season, followed by above-average rainfall in the latter part. As a result, the overall impact on livelihoods and agricultural productivity is still to be fully assessed. Importantly, the severity of drought impacts remains uncertain, as some of the dryness coincided with critical stages of the planting phase and potentially resulted in a delayed onset of the season. Improved rainfall later in the season does not guarantee crop recovery, particularly if early-season stress has already compromised development. Therefore, further analysis is needed to determine the true extent of the drought’s effects on communities and food security.

5. Recommendations for the 2025/26 rainy season

Ahead of the 2025/26 season, a broader discussion is recommended to improve the trigger methodology. This includes revisiting the drought classification thresholds and streamlining the number of indicators. For instance, Indicators related to the cessation of rains or the month of October (informed by SPI-ON) as well as dry spells should be reassessed to ensure their continued relevance. Simplifying the system in this way could improve clarity for decision-makers and reduce signal noise in the alerting process. One potential approach is to conduct an analysis examining how often at least one assigned indicator exceeds its threshold in any given year, to better understand indicator redundancy and value.

In addition, the community of practice on AA should explicitly acknowledge that during seasons of high vulnerability or low forecast skill, such as those associated with weak or neutral ENSO conditions, anticipatory interventions should be treated as *no-regret actions*. This means placing greater emphasis on timely support to livelihoods, even when forecast confidence is lower, and clearly communicating to stakeholders the rationale for a higher tolerance of false alarms. Setting realistic expectations from the outset can help build trust, improve understanding, and encourage continued uptake of the system.

A further recommendation is to revise the methodology used to evaluate system performance. Rather than relying solely on a strict match between the timing and intensity of forecasted versus observed dryness, a more flexible performance framework should be adopted. This would assess whether alerts issued within a defined window (e.g., Window 1 or Window 2) generally coincided with periods of dryness, recognizing that AA can still deliver protective benefits even if drought conditions occur slightly outside the forecast window. Nonetheless, errors in drought intensity remain more critical, as they determine the scale of response and the number of people supported.

To ensure the system remains responsive and relevant, more regular consultation with implementing stakeholders is recommended, alongside broader dissemination of monitoring bulletins. These engagements can help guide how performance is assessed, clarify the implications of different types of forecast errors, and inform refinements in trigger design and implementation processes.

Finally, given the mixed rainfall signals during the 2024/25 season, where early-season dryness in some districts was followed by above-average rainfall later, it is crucial to carry out detailed postseason impact assessments. Improved conditions later in the season may not fully offset early crop stress, especially if drought occurred during critical planting or development stages. Continuous evaluation of both the timing and impacts of drought is essential for refining the AA system and ensuring it remains effective in protecting livelihoods.

6. Conclusion

The 2024/25 rainy season presented mixed rainfall patterns and varying drought conditions across Zimbabwe's provinces, underscoring the critical role of AA in mitigating climate-induced risks. While some regions like Matabeleland South and Masvingo experienced wetter-than-average conditions, others such as Mudzi, Rushinga, and Mbire in Mashonaland Province faced rainfall deficits that emerged during crucial planting phases. These disparities highlight the need for continued refinement of monitoring and AA to better capture the spatial and temporal dynamics of drought.

The performance of the Ready, Set & Go! system during the season provided essential insights into the effectiveness of its triggers. Although the system achieved timely alerts for many districts, discrepancies between forecasted and observed dryness, particularly during the second monitoring window, pointed to gaps in trigger accuracy. False alarms were prevalent in both monitoring windows, while some significant dryness was missed. This mismatch emphasizes the importance of enhancing the trigger methodology to improve forecast precision and reduce false alarms, especially during seasons marked by forecasting challenges, such as the weak and delayed onset of La Niña in late 2024.

Lessons learned from the 2024/25 season reaffirm the concept of AA as a 'no-regret' intervention. In years of heightened vulnerability and difficult to predict climate signals, prioritizing AA over forecast precision remains vital for protecting livelihoods. This strategic shift requires setting realistic expectations with stakeholders and clearly communicating the trade-offs involved in AA under uncertain conditions.

To improve the system's reliability and effectiveness for the upcoming 2025/26 season, several key recommendations have been proposed. These include revising drought classification thresholds, streamlining indicators, and adopting a more flexible performance assessment approach. Specifically, the evaluation of AA alerts should account for broader windows of potential dryness, recognizing that anticipatory measures can still provide critical support even when exact timing does not align perfectly with observed conditions. Reducing indicator redundancy and reassessing metrics tied to rainfall cessation or dry spells may also help clarify signals and enhance decision-making.

Furthermore, enhanced coordination with stakeholders, including regular consultations and expanded dissemination of monitoring bulletins, is essential to bridge communication gaps and improve the operational uptake of early warnings. MSD has already taken positive steps in this direction by producing monthly monitoring bulletins during the 2024/25 season, which should be further strengthened in the coming year.

Looking forward, the mixed rainfall signals observed during the 2024/25 season serve as a critical reminder of the need for postseason impact assessments to understand the true consequences of early-season dryness, even when followed by above-average rainfall. Such evaluations are crucial for refining AA strategies and ensuring that they remain robust, responsive, and capable of safeguarding vulnerable communities against droughts.

The experiences of the past season provide a foundation for continuous learning and adaptation. By addressing these lessons, enhancing trigger methodologies, and fostering stronger stakeholder engagement, the AA system can be better positioned to deliver timely and effective responses during the 2025/26 rainy season and beyond.