FLOOD & DROUGHT BULLETIN

JUNE 2025

GHANA METEOROLOGICAL AGENCY

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INTRODUCTION

The Flood and Drought bulletin is a monthly analysis of rainfall in Ghana prepared and released by the Ghana Meteorological Agency (GMet). The bulletin provides an authoritative and scientific understanding of rainfall variability which is essential for accurate hydrological modeling, climate change assessments, and effective water resource planning to mitigate risks associated with extreme events like droughts and floods.

Among other services and products, the Flood and Drought bulletin complements the objectives of GMet in line with the National Framework for Climate Services (NFCS) to improve co-production, tailoring, delivery and use of science-based climate predictions and services focused on the five pillars of the Global Framework for Climate Services (GFCS) by the World Meteorological Organization (WMO): agriculture and food security, disaster risk reduction, energy, health and water.

The analysis in the Flood and Drought bulletin is based on the Standardized Precipitation Index (SPI) developed by McKee et al. (1993) for the purpose of *defining and monitoring drought*. Drought is an insidious natural hazard that results from lower levels of precipitation than what is considered normal. When this phenomenon extends over a season or a longer period of time, water becomes increasingly insufficient to meet the demands of human activities and the environment. Drought must be considered a relative, rather than absolute, condition. Drought means different things to different users such as water managers, agricultural producers, hydroelectric power plant operators and wildlife biologists. Even within sectors, there are many different perspectives of drought because impacts may differ markedly. Droughts are commonly classified by type as meteorological, agricultural and hydrological, and differ from one another in intensity, duration and spatial coverage (WMO, 2012).

THE STANDARDIZED PRECIPITATION INDEX (SPI)

SPI indicator, which was developed by McKee et al. (1993), and described in detail by Edwards and McKee (1997), measures precipitation anomalies at a given location, based on a comparison of observed total precipitation amounts for an accumulation period of interest (e.g. 1, 3, 12, 48 months), with the long-term historic rainfall record for that period. This indicator measures anomalies of accumulated precipitation during a given period. In calculating SPI, precipitation is the only required input parameter (McKee and others, 1993, 1995). The SPI calculation for any location is based on the long-term precipitation record for a desired period. This long-term record is fitted to a probability distribution, which is then transformed into a normal distribution so that the mean SPI for the location and desired period is zero (Edwards and McKee, 1997).

The SPI is designed to quantify the precipitation deficit for multiple timescales and can be calculated from 1 month up to 72 months. Statistically, 1–24 months is the best practical range of

application (Guttman, 1994, 1999). The Flood and Drought bulletin of Ghana considers only the 1-month, 3-month, 6-month and 12-month SPI.

1-month SPI

The 1-month SPI compares the precipitation of a specific month with the precipitation totals from the same month for all the years included in the historical record.

3-month SPI

The 3-month SPI provides a comparison of the precipitation over a specific 3 consecutive month period with the precipitation totals from the same 3-month period for all the years included in the historical record.

6-month SPI

The 6-month SPI compares the precipitation for a specific 6 consecutive months with the same 6-month period over the historical record.

12-month SPI

The 12-month SPI is a comparison of the precipitation for 12 consecutive months with that recorded in the same 12 months in all previous years of available data.

These timescales reflect the impact of drought on the availability of the different water resources. Meteorological and soil moisture conditions (agriculture) respond to precipitation anomalies on relatively short timescales, for example 1 to 3 months (SPI-1 to SPI-3), whereas streamflow, reservoirs, and groundwater respond to longer-term precipitation anomalies, for example 3 months to 12 months (SPI-3 to SPI-12) or longer (EDO, 2020).

A real strength of the SPI is its ability to be calculated for many timescales, which makes it possible to deal with many of the drought types described above. The ability to compute the SPI on multiple timescales allows for temporal flexibility in the evaluation of precipitation conditions in relation to water supply.

In the Flood and Drought bulletin, the SPI values for any given location and accumulation period, are classified into nine different precipitation regimes (from dry to wet), as shown in Table 1. As can be seen, increasingly severe rainfall deficits (i.e., meteorological droughts) are indicated as SPI decreases below -0.5, while increasingly severe excess rainfall is indicated as SPI increases above 0.5.

ANOMALY	*RANGE OF SPI VALUES*	*PRECIPITATION REGIME*	*COLOUR*
Negative	Min <= SPI <= -2.0	Extreme dry	
	-2.0 < SPI <= -1.5	Severe dry	
	-1.5 < SPI <= -1.0	Moderate dry	
	-1.0 < SPI <= -0.5	Mild dry	
None	-0.5 < SPI <= 0.5	Normal precipitation	
Positive	0.5 < SPI <= 1.0	Mild wet	
	1.0 < SPI <= 1.5	Moderate wet	
	1.5 < SPI <= 2.0	Severe wet	
	2.0 < SPI <= Max	Extreme wet	

Table 1: SPI classification scheme used in the Flood and Drought bulletin

SPI ANALYSIS FOR JUNE 2025

The SPI analysis for rainfall in June 2025 has been generated in multiple timescales of 1-month (June 2025), 3-month (April 2025 - June 2025), 6-month (January 2025 – June 2025) and 12-month (July 2024 - June 2025). The maps generated depict the severity (positive or negative) of rainfall anomalies for the period under review.

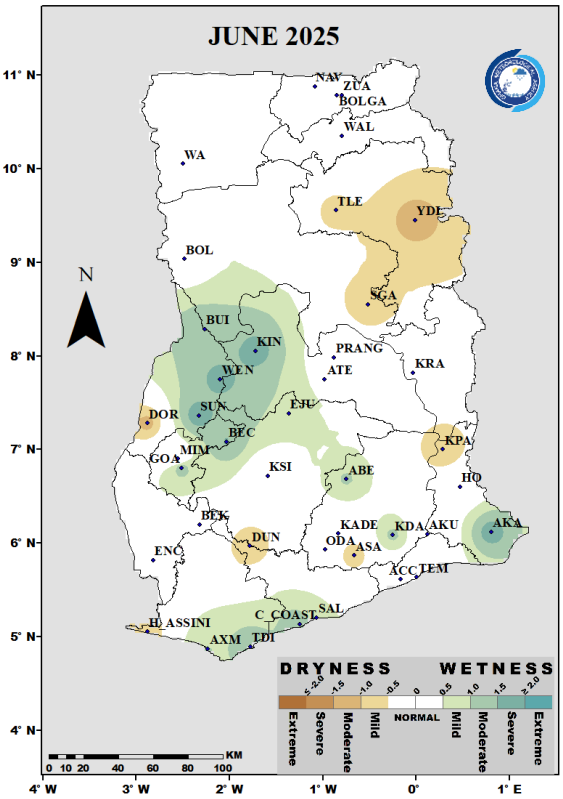

Fig. 1(a): 1-Month SPI *(for meteorological drought)*: June 2025

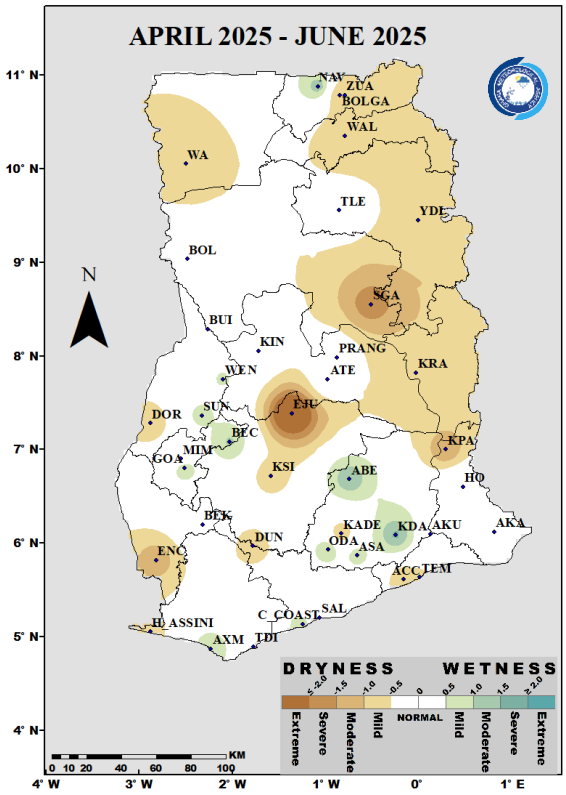

Fig. 1(b): 3-Month SPI *(for agricultural drought)*: April 2025 – June 2025

1-Month SPI (June 2025)

Figure 1(a) presents the 1-Month Standardized Precipitation Index (SPI), indicating predominantly normal conditions across the northern part of the country. In the western portion of the Transition zone, areas such as Bui, Kintampo, Wenchi, Sunyani, and Bechem experienced extremely wet conditions. Isolated pockets of mild dryness were observed in Tamale, Salaga, Kpando, Asamankese, Dunkwa and Half Assini with moderate dry conditions recorded in Yendi and Dormaa. The Forest zone remained largely normal, although slight wet conditions were noted in Abetifi and Koforidua. Along the coast, severe wet conditions were observed in Akatsi, Cape Coast, and Takoradi, whereas Accra, Tema, and Saltpond experienced mild to normal conditions.

3-month SPI (April 2025 - June 2025)

The 3-Month SPI shown in Fig. 1(b) reveals that the northeastern part of the country, including Zuarungu, Bolgatanga, Walewale, and Yendi, experienced mild dry conditions, with Wa in the northwest showing similar dryness. Parts of the Transition zone remained within normal conditions, though its eastern portion experienced mild dryness. Notably, extreme dryness was observed in Salaga and Ejura. Scattered areas of mild to moderate wetness were recorded in Sunyani, Bechem, Goaso, Akim Oda, and Asamankese, while Abetifi and Koforidua in the Forest zone registered moderate wet conditions. Dormaa, Enchi, Dunkwa and Kade also recorded mild dryness. Along the coast, conditions were generally normal, with slight wetness observed in Axim and Cape Coast, and mild dryness in Accra.

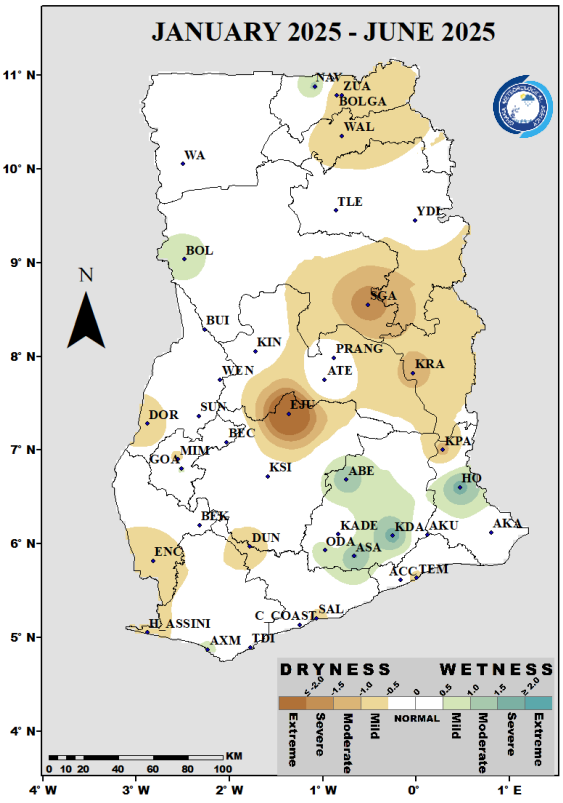

Fig. 1(c): 6-Month SPI *(for hydrological drought)*: January 2025 – June 2025

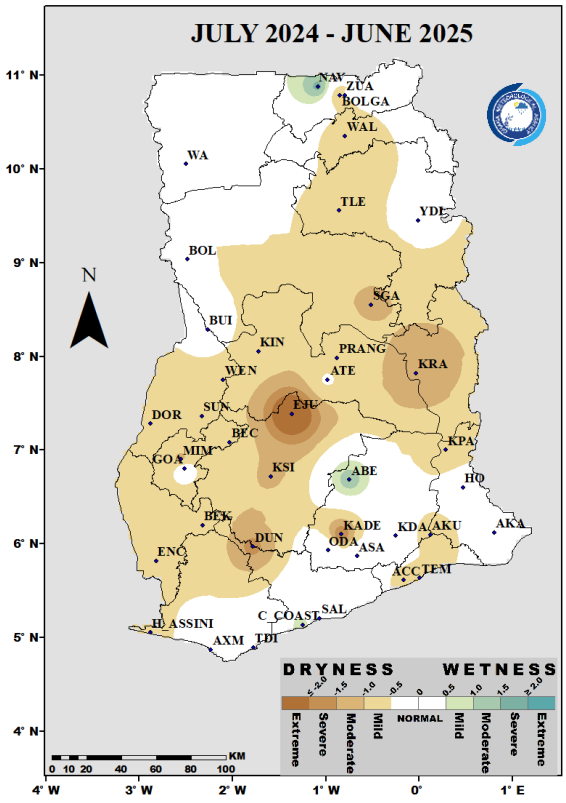

Fig. 1(d): 12-Month SPI *(for streamflow and lake storage drought)*: July 2024 – June 2025

6-month SPI (January 2025 - June 2025)

The 6-month SPI shown in Fig. 1(c) reveals normal conditions over most parts of the Savanna zone while mild dry conditions persist in areas such as Zuarungu, Bolgatanga and Walewale. The Transition zone displays severe to extreme dryness in Ejura and Salaga with areas such as Bui, Kintampo, Wenchi, Sunyani, Bechem and Atebubu showing normal conditions. Normal condition is mainly seen in the Forest zone with mild to moderate wet conditions in areas such as Akim Oda,

Asamankese, Abetifi, Ho and Koforidua while Dunkwa and Enchi show mild dry conditions. Normal conditions dominate the Coastal zone with mild wet conditions seen in Axim.

12-month SPI (July 2024 - June 2025)

The 12-Month SPI illustrated in Fig. 1(d) shows a band of mild dry conditions extending from the Transition zone into portions of the Forest zone. Areas such as Salaga, Kete Krachi, Ejura, Dunkwa, and Kade experienced moderate to severe dryness. In contrast, moderate wet conditions were observed in Navrongo and Abetifi. Along the coast, conditions were generally normal, although Half Assini, Accra, and Tema recorded mild dryness, while Cape Coast experienced mild wetness.

STATIONS

Station	Abbreviation	Station	Abbreviation	Station	Abbreviation
Abetifi	ABE	Enchi	ENC	Sunyani	SUN
Accra	ACC	Goaso	GOA	Takoradi	TDI
Akatsi	AKA	Half Assini	H_ASSINI	Tamale	TLE
Akim Oda	ODA	Ho	HO	Tema	TEM
Akuse	AKU	Kade	KADE	Wa	WA
Asamankese	ASA	Kete Krachi	KRA	Walewale	WAL
Atebubu	ATE	Kintampo	KIN	Wenchi	WEN
Axim	AXM	Koforidua	KDA	Yendi	YDI
Bechem	BEC	Kpandu	KPA	Zuarungu	ZUA
Bole	BOL	Kumasi	KSI		
Bolga	BOLGA	Mim	MIM		
Bui	BUI	Navrongo	NAV		
Cape Coast	C_COAST	Prang	PRANG		
Dormaa	DOR	Salaga	SGA		
Dunkwa	DUN	Saltpond	SAL		
Ejura	EJU	Sefwi Bekwai	BEK		

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Kindly send feedback to:
The Director-General
Ghana Meteorological Agency
P. O. Box Lg 87, Legon, Accra-Ghana
Email: info@meteo.gov.gh
Phone: 0302764926 / 0302777172