FAMINE EARLY WARNING SYSTEMS NETWORK

South Sudan

Monthly Climate and Weather

16 January 2025

Highlights

- According to the outlook, La Niña conditions emerged during December 2024. A weak La Niña is expected to persist with a 59% chance through February – April 2025, then transition with a 60% chance to El Niño Southern Oscillation (ENSO)-neutral conditions during March – May 2025, according to the latest ENSO outlook.
- Based on historical records, La Niña conditions are associated with near-average rainfall and near-average mean temperatures in South Sudan during February - April season.
- During December 2024, many areas of eastern, southern, southwestern and central parts of the country received 10-50 mm rainfall. The remaining areas remained dry.
- The North American Multi-Model Ensemble (NMME) models indicate above-average rainfall for February 2025 over central, southern, and eastern parts of the country.
- During December 2024, maximum temperatures were 1 to 4°C above average over most parts of the country, while minimum temperatures were 1-4°C below average over southern, central, and northwestern regions of the country.
- The NMME models suggest that most of South Sudan will experience above average temperatures in February 2025 and February -April 2025, with probabilities exceeding 40 to 50% in western, central, southern and northern parts of the country.

The FEWS NET Monthly Climate and Weather information bulletin is based on current weather and climate information and monthly and seasonal outlooks from the NOAA CPC. Information on crops, soil moisture, flooding, and evapotranspiration data were produced by FEWS NET, USGS, NASA and USDA. Various sources were used to assess impacts of extreme conditions. Questions or comments about this product may be directed to Dr. Wassila Thiaw, Head, International Desks/NOAA, wassila.thiaw@noaa.gov. Questions about the USAID FEWS NET activity may be directed to Dr. James Verdin, Program Manager, FEWS NET/USAID, jverdin@usaid.gov.

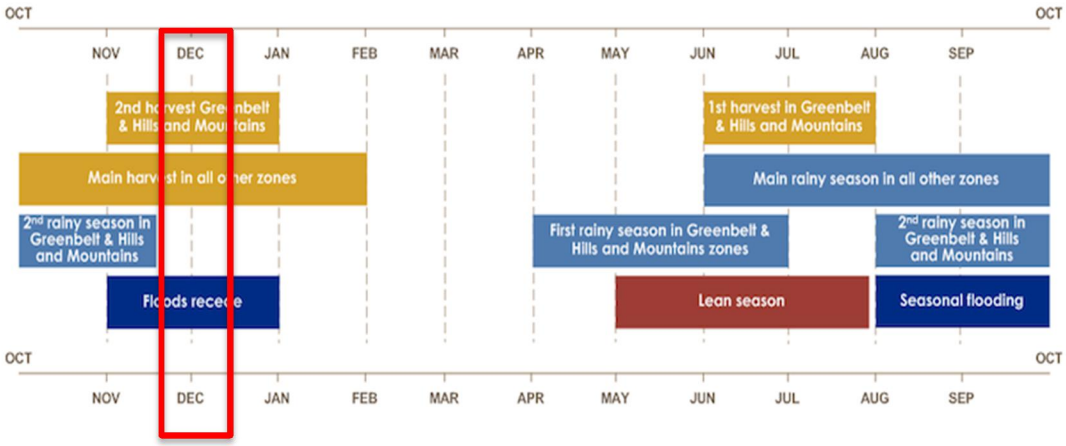


Figure 1: Seasonal calendar for South Sudan. **Source: FEWS NET**

Current Climate Modes and Teleconnections

- As of mid-January, La Niña conditions are present as are reflected by below-average SSTs across the central and east-central equatorial Pacific Ocean. Subsurface cooling strengthened across the equatorial Pacific, with below-average temperatures dominating the central and eastern equatorial Pacific. Low-level wind anomalies were easterly over the western and central Pacific, while upper-level wind anomalies were westerly over the central and eastern Pacific.

- The latest ENSO outlook indicates that a weak La Niña is expected to persist with a 59% chance through February – April 2025, then transition with a 60% chance to ENSO-neutral conditions during March – May 2025 (Fig. 2). The latest update of the NOAA Climate Prediction Center's El Niño/Southern Oscillation diagnostic discussion can be found here.

- La Niña conditions are typically associated with near-average rainfall and near-average mean temperatures in South Sudan during the February-April (JFM) season (**Fig. S1**).

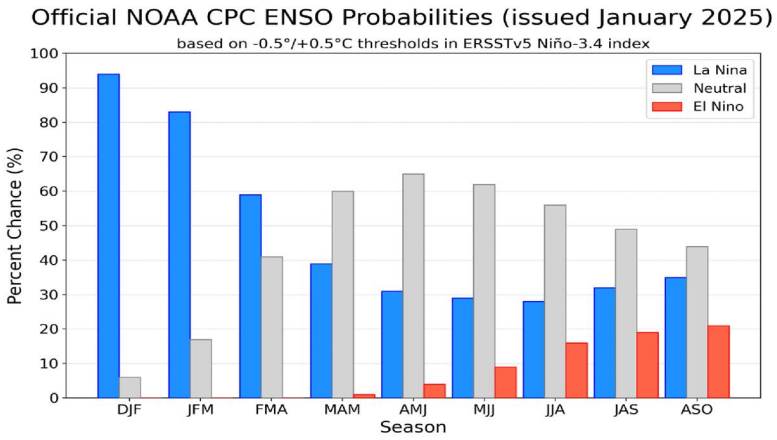


Figure 2: Official CPC ENSO probabilities outlook. **Source: NOAA/NCEP**

Extreme Events

- Inundation has continued in the Sudd wetlands of South Sudan with improvements along the upstream Nile and Lol rivers.
- There were no notable forest fires over the past 30 days across South Sudan.
- South Sudan had no notable wind anomalies over the past 30 days.

Rainfall/Precipitation

Past 3 Months (October 2024 to December 2024):

- **Totals:** Much of South Sudan received 100-500 mm of rainfall over the last 3 months. **(Fig. 3a)**. The highest rainfall amounts of 300-500mm occurred in Western Equatoria, Central Equatoria, and over southwestern parts of Eastern Equatoria and eastern parts of Jonglei states.

- **Anomalies:** Rainfall was above-average in most places in South Sudan with large rainfall surpluses (100-200 mm) in the western, northern, southern and central parts of the country. On the other hand, isolated areas in southern Western Bahr el Ghazal, northwestern and southern Western Equatoria, eastern Upper Nile and southern Jonglei, and eastern parts of Eastern Equatoria states experienced below average rainfall of 10-100 mm **(Fig. 3b)**.

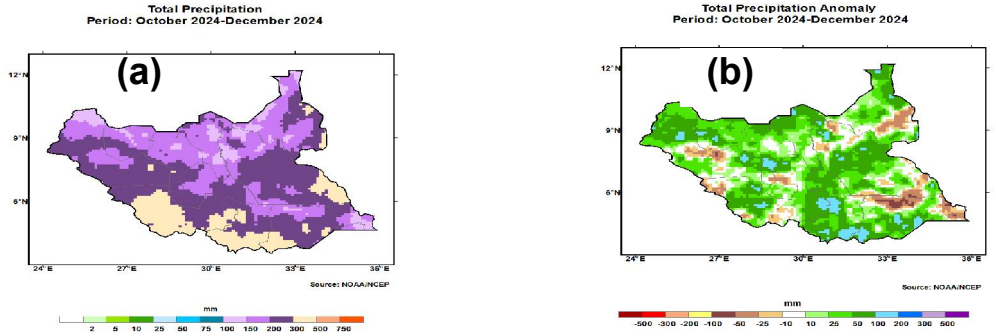


Figure 3: Spatial distribution for October-December 2024: (a) total precipitation and (b) total precipitation anomaly. **Source: NOAA/NCEP**

Past 1 Month (December 2024):

- **Totals:** Much of South Sudan observed dry conditions over the past month. In contrast, above average rainfall of 10-50 mm was registered in eastern and northern Jonglei,

southern border of Central Equatoria and Eastern Equatoria, southwestern Western Equatoria, northern and eastern Lakes state **(Fig. 4a)**.

- **Anomalies:** Rainfall was 10-100 mm below-average over much of South Sudan, including Eastern Equatoria, Central Equatoria, Western Equatoria and southern Jonglei. However, above-average rainfall (10-25 mm) was observed in a few places in southern parts of Upper Nile, northern Jonglei states (**Fig. 4b**).

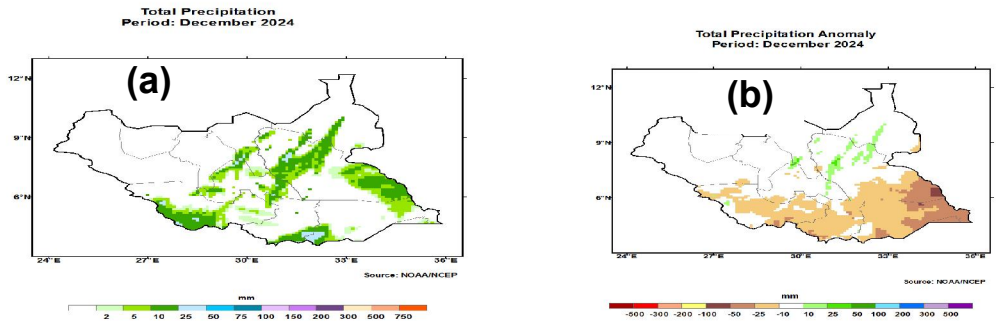


Figure 4: Spatial distribution for December 2024: (a) total precipitation and (b) total precipitation anomaly. **Source: NOAA/NCEP**

Monthly and Seasonal Forecasts (February 2025 and Feb 2025-Apr 2025):

- **Monthly:** The NMME model forecast suggests a 40 to 60% chance for above-average rainfall over central, southern, western and eastern parts of country. No dominant tercile category is indicated over northern and northwestern parts of country (**Fig. 5a**).
- **Seasonal:** The NMME seasonal rainfall forecast shows above 40% chance for above-normal rainfall over isolated areas in Northern el Bahr Ghazal, southern Jonglei, and northern Eastern Equatoria (**Fig. 5b**).

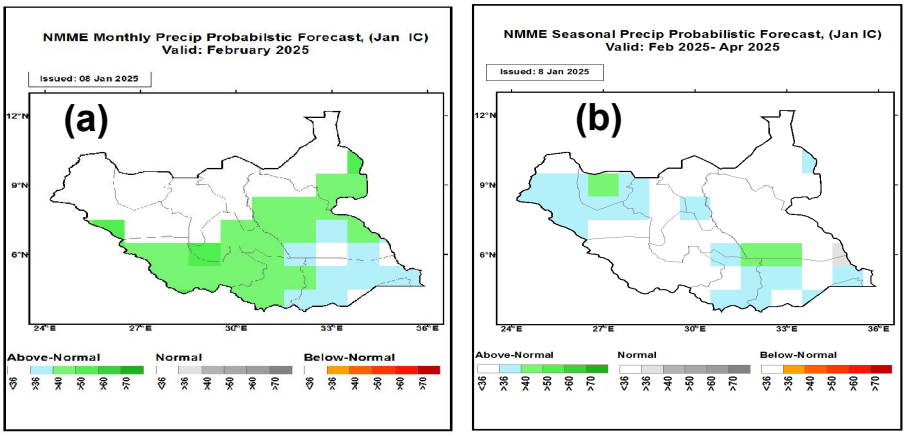


Figure 5: Rainfall forecast for (a) February 2025 and (b) February 2025 – April 2025. **Source: NOAA/NCEP**

Temperature

Past 3 months (October 2024 – December 2024):

- **Maximums:** Most of South Sudan recorded mean maximum temperatures of 30-40°C. Compared to the long-term average, many areas experienced above-average mean maximum temperatures (1-4°C). The far eastern part of Eastern Equatoria state observed near-average conditions (**Fig. 6a**).
- **Minimums:** Much of South Sudan recorded mean minimum temperature between 15-25°C. The southwestern Western Equatoria and eastern Upper Nile states regions saw above-average temperatures of 1 to 2°C. The northern parts of Northern Bahr el Ghazal and northern Warrap states recorded 1-2ºC below average minimum temperatures (**Fig. 6b**).

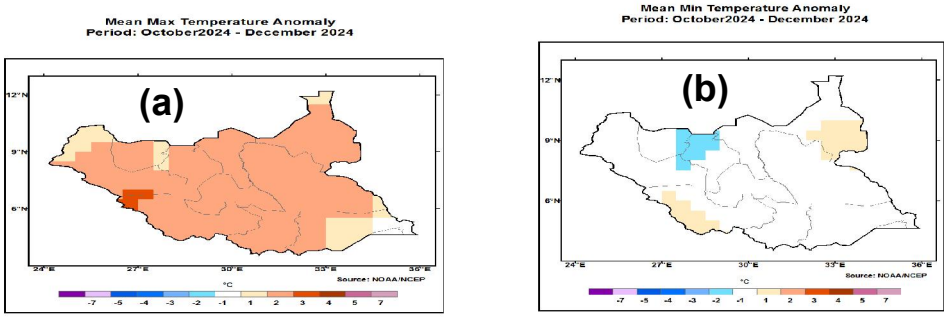


Figure 6: Spatial map for October – December 2024: (a) mean maximum temperature anomaly and (b) mean minimum temperature anomaly. **Source: NOAA/NCEP**

Past 1 month (December 2024):

- **Maximums:** In December, South Sudan reported average maximum temperatures between 30-40°C, with the highest temperatures exceeding 35°C occurring in the northern, central, eastern and western regions. Temperatures were generally 1 to 4°C above average over most parts of South Sudan. Anomalies exceeded 4°C in parts of Western Equatoria (**Fig. 7a**).
- **Minimums:** In December, much of South Sudan recorded mean minimum temperatures between 15-25°C. The lowest minimum temperatures of 10-15°C were registered over Western Bahr el Ghazal. Compared to the long-term average, most parts of the southern, central, and northwestern parts of the country experienced 1-3oC below average minimum temperatures. On the other hand, the eastern Upper Nile and western boarder of Western Equatoria regions reported 1 to 2°C above average minimum temperatures. (**Fig. 7b**).

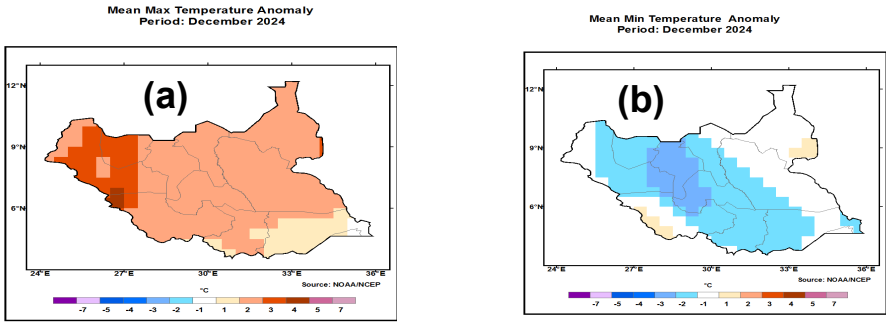


Figure 7: Spatial map for December 2024: (a) maximum temperature anomaly and (b) mean minimum temperature anomaly. **Source: NOAA/NCEP**

Monthly and Seasonal Forecasts (February 205 and February–April 2025):

- **Monthly:** During February 2025, probabilities for above-average mean temperatures exceed 40% over the cross-border areas of Lakes and Western Equatoria states, southern and far northern parts of Central Equatoria, southern Jonglei, and over parts of Eastern Equatoria States (**Fig. 8a**).

- **Seasonal:** Above-average mean temperatures are expected over most parts of country, except over southeastern regions where no dominant tercile category is indicated. Probabilities for above-average temperatures are greater than 50% across northern Upper Nile and western Western Bahr el Ghazal states (**Fig. 8b**).

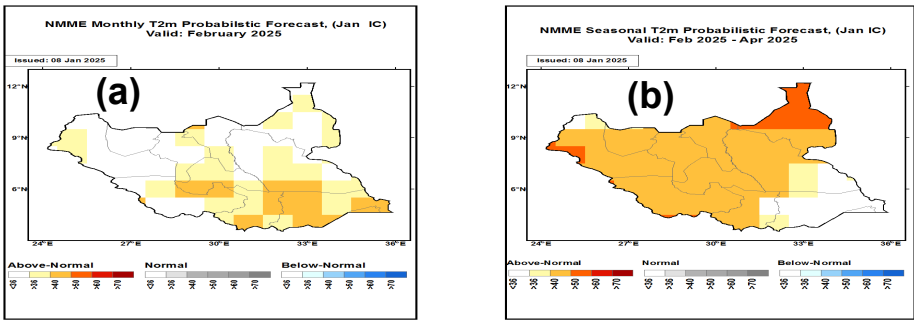


Figure 8: Spatial map for (a) February 2025 mean temperatures forecast and (b) February 2025 – April 2025 mean temperatures forecast. **Source: NOAA/NCEP**

Flooding and Areas of Inundation

- Inundation has increased in the Sudd wetlands of South Sudan due to persistent flooding since May, particularly in Jonglei, Unity, and Warrap states along the Sudd Wetlands.

- In South Sudan, flooding primarily affects areas along the Nile and Lol rivers, particularly the Sudd marshlands, with the states of Jonglei, Unity, and Upper Nile experiencing the most severe inundation, impacting a large portion of the population due to rising water levels from heavy rains and controlled releases from Lake Victoria; recent reports indicate

over a million people affected across multiple counties, with significant displacement occurring in Northern Bahr el Ghazal and Unity states. A month into the cholera outbreak, suspected cases continue to be recorded in flood-hit locations

Drought and Dryness:

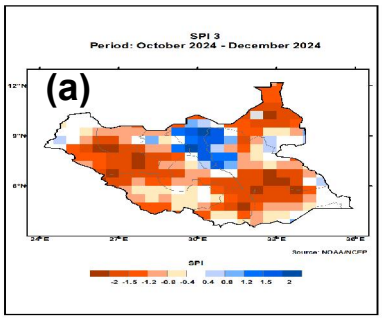
The Standardized Precipitation Index (SPI) is used to characterize meteorological drought. SPI compares the precipitation over a specific period of time with the climatology from that same period. Therefore, the SPI values can be thought of as the number of standard deviations that the observed anomaly deviates from the climatology. The 1-month SPI values are a good representation of the monthly precipitation anomaly as well as the soil moisture and vegetation health. The 3-month SPI values are a good representation of seasonal precipitation anomalies. The Standardized Precipitation Evapotranspiration Index (SPEI) is similar to the SPI, but it also takes evapotranspiration into account (and therefore the impact of temperatures on water demand).

Past 3 months (October-December 2024):

- The SPI analysis for October to December 2024 indicated drier-than-average conditions across much of South Sudan, except over western Jonglei an, with the exception of a few areas in southeastern Jonglei and Unity states that experienced wetter-than-average conditions (**Fig. 9a**).

Past 1 month (December 2024):

- The SPI analysis for December 2024 indicates that wetter-than-average conditions were recorded at isolated places in western Jonglei and Unitiy States. Eastern Equatoria, southern Central Equatoria and southwestern Western Equatoria experienced drier-than-average conditions (**Fig. 9b**).



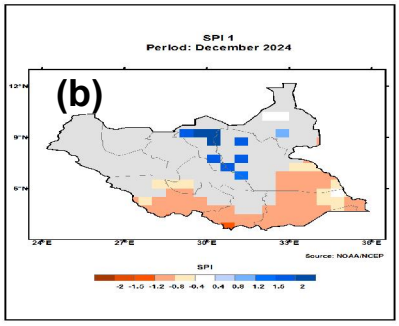


Figure 9: Spatial structure of Standardized Precipitation Index (SPI) (a) October – December 2024 (b) December 2024. Source: NOAA/NCEP. **Source: NOAA/NCEP**

Current/Forecast (05 November 2024 to 03 February 2025):

- The SPI forecast suggests that drier-than-average conditions will cover southeastern Jonglei, Central Equatoria, and Western Equatoria, while wetter-than-average conditions will cover parts of Jonglei and Unity and eastern Upper Nile states.

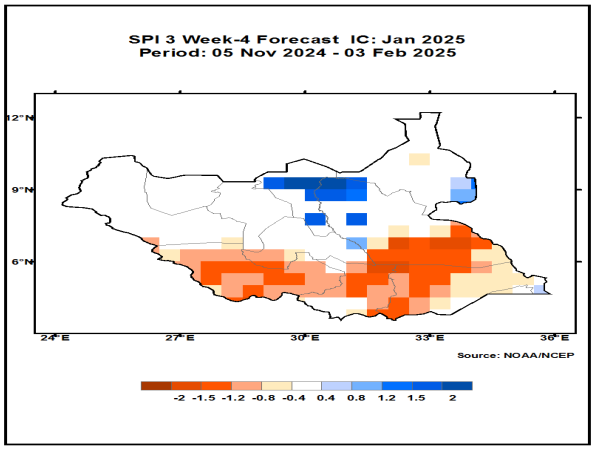


Figure 10: Spatial structure of SPI constructed from observations for 5 November to 5 January 2025 and 4 weeks forecast ending on 4 February 2025. **Source: NOAA/NCEP**

Water Requirement Satisfaction Index (WRSI)

- WRSI values during the 3rd Dekad of December indicated not a good conditions for crop in South Sudan.

GEOGLAM Crop Monitor

In **South Sudan**, harvesting of first season cereals is underway in unimodal regions of the centre and north. Overall seasonal rainfall conditions were close to average, except for wetter than usual conditions in south Jonglei state located in the centre-east as well as in the bimodal regions of Central Equatoria and East Equatoria located in the centre-south. This season, wetter than normal conditions in July were followed by moderately drier conditions in August and September. Since 2020, the country has been affected by widespread flooding in the centre along the Sudd wetlands. The flooding has become a multi-year event that is driven by record levels and very high overflows from Lake Victoria that were exacerbated by seasonal rains. Unity, Warrap, Lakes, and Jonglei states are the most severely affected, and the flooding has resulted in displacement and loss of crops and livestock. In bimodal regions of the centre-south and southwest, second season maize and sorghum crops continue to develop under favourable conditions.

Additional Resources

https://www.inam.gov.mz/index.php/pt/

https://www.sadc.int/pillars/meteorology

https://fews.net/node/32023/print/download

Annex:

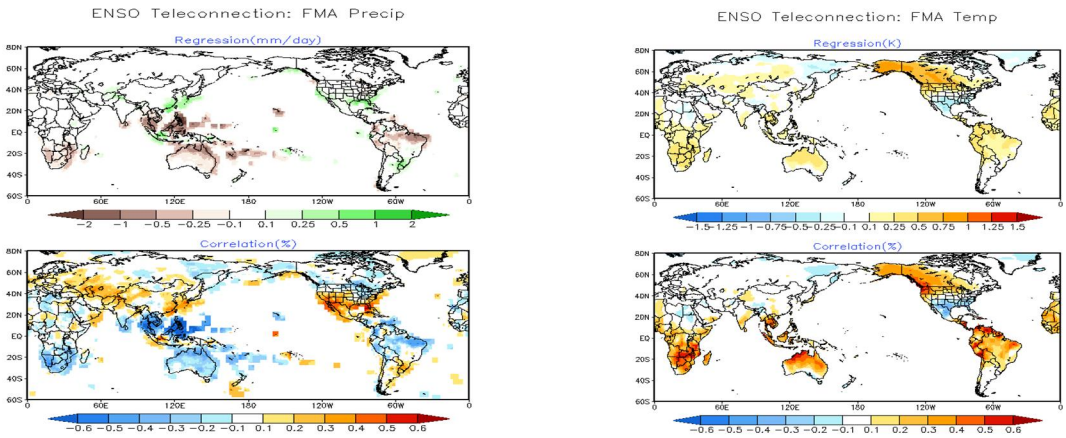
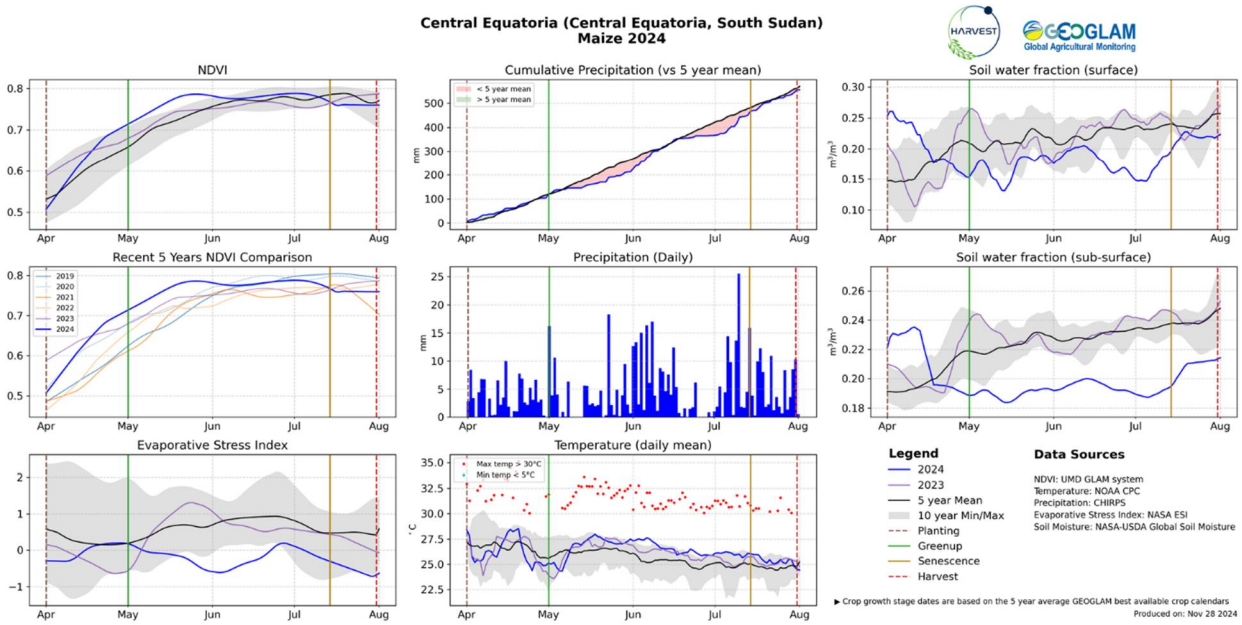


Figure S1: For three month season (FMA), precipitation and temperature anomalies are regressed onto the standardized Niño-3.4 index (upper panel). In the bottom panel, the correlation is calculated between Nino-3.4 and the anomalies.

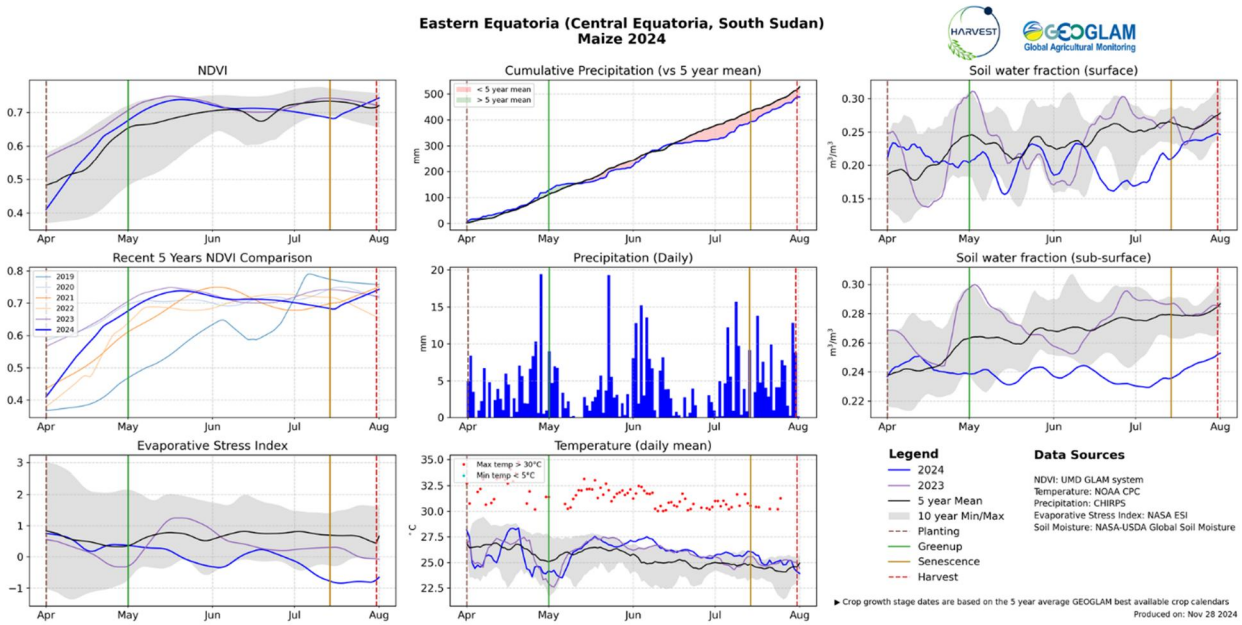
GEOGLAM Agro-meteorological Earth Observation Indicators:

Second-Season Maize

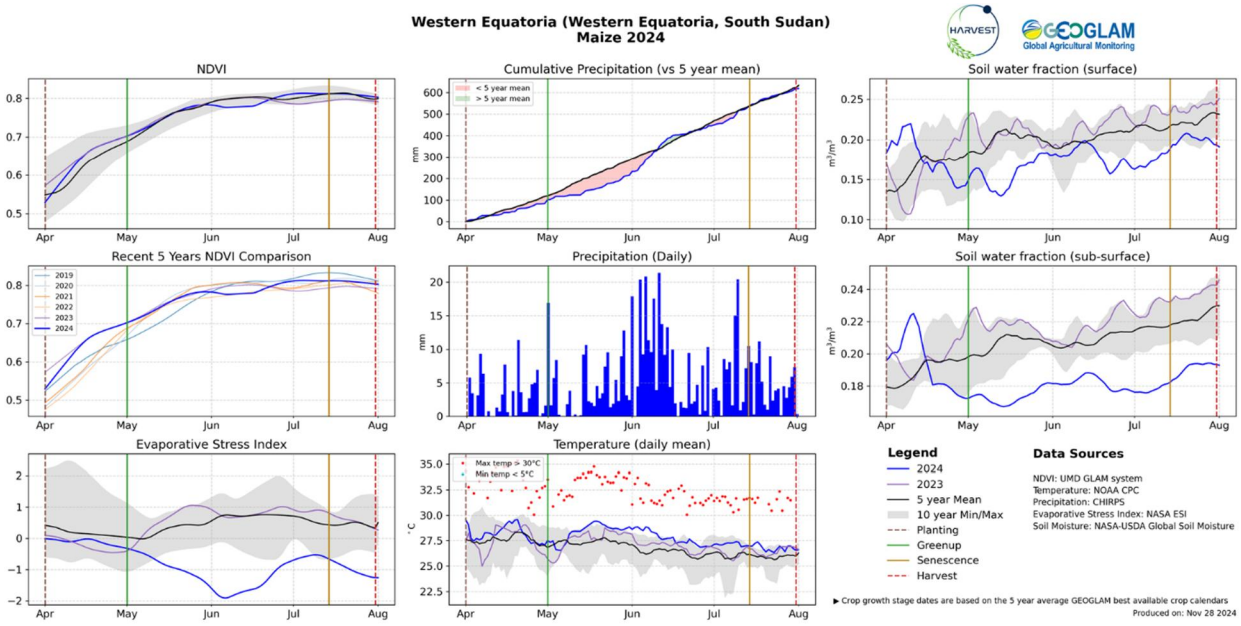
Central Equatoria:



Eastern Equatoria:



Western Equatoria:


Western Equatoria (Western Equatoria, South Sudan)
Maize 2024
HARVEST
GEOGLAM
Global Agricultural Monitoring
NDVI
Cumulative Precipitation (vs 5 year mean)
< 5 year mean
> 5 year mean
mm
Soil water fraction (surface)
m³/m³
Recent 5 Years NDVI Comparison
2019
2020
2021
2022
2023
2024
Precipitation (Daily)
Soil water fraction (sub-surface)
Evaporative Stress Index
Temperature (daily mean)
Max temp > 30°C
Min temp < 5°C
°C
Apr
May
Jun
Jul
Aug
Legend
2024
2023
5 year Mean
10 year Min/Max
Planting
Greenup
Senescence
Harvest
Data Sources
NDVI: UMD GLAM system
Temperature: NOAA CPC
Precipitation: CHIRPS
Evaporative Stress Index: NASA ESI
Soil Moisture: NASA-USDA Global Soil Moisture
▶ Crop growth stage dates are based on the 5 year average GEOGLAM best available crop calendars
Produced on: Nov 28 2024