FAMINE EARLY WARNING SYSTEMS NETWORK

South Sudan

Monthly Climate and Weather

19 December 2024

Highlights

- According to the outlook, La Niña conditions are most likely to emerge during November 2024 – January 2025 (59% chance), with a transition to El Niño Southern Oscillation (ENSO)-neutral most likely by March-May 2025 (61% chance).
- Based on historical records, La Niña conditions are associated with near-average rainfall and mean temperatures in South Sudan during January - March season.
- During November 2024, most of South Sudan received 10-300 mm rainfall that exceeded the average by more than 50 mm in many areas of eastern, southern and central parts of the country.
- The North American Multi-Model Ensemble (NMME) models indicate that no dominant tercile category emerges during the forecast period.
- During November 2024, maximum temperatures were 1 to 3°C above average in the Upper Nile and Western Equatoria states. Minimum temperatures in the Northern Bahr el Ghazal were 1 to 2°C below average. Above average (1 to 2°C) temperature was observed over the Upper Nile and southwestern Western Equatoria states.
- The NMME models suggest most of South Sudan is expected to experience above average temperatures in January 2025 and January 2025-March 2025, with probabilities exceeding 40 to 50% in western, central 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.

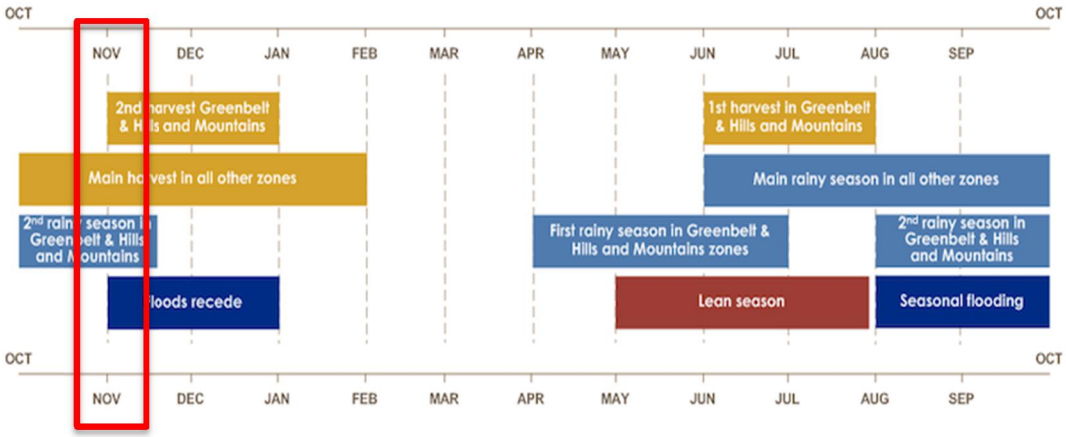


Figure 1: Seasonal calendar for South Sudan. **Source: FEWS NET**

Current Climate Modes and Teleconnections

- ENSO-neutral continued in November, with near-average sea surface temperatures (SSTs) observed across the central and eastern equatorial Pacific Ocean. Below-average subsurface ocean temperatures persisted across the east-central and eastern equatorial Pacific Ocean. Over the western and central equatorial Pacific, low-level wind anomalies were easterly and upper-level wind anomalies were westerly. Collectively, the coupled ocean-atmosphere system reflected ENSO-neutral.

- The latest outlook indicates a weak and short-duration La Niña over the upcoming few seasons. La Niña is most likely to emerge with a 59% chance during November 2024 – January 2025 and persist through February – April 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 January-March (JFM) season (**Fig. S1**).

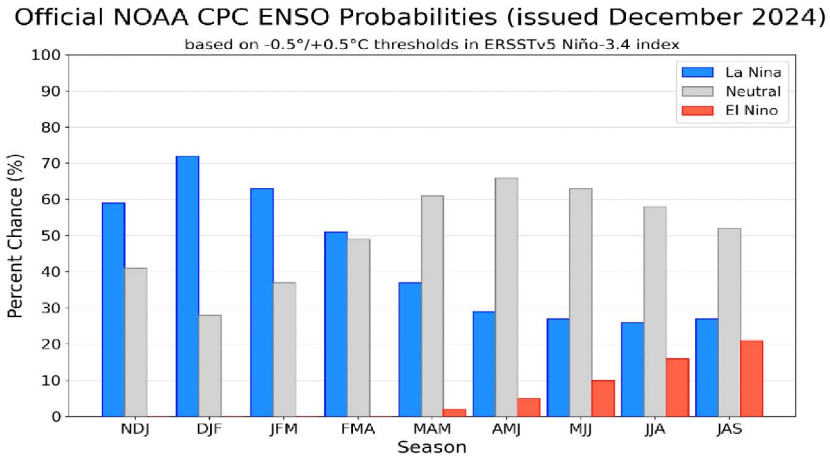


Figure 2: Official CPC ENSO probabilities outlook. **Source: NOAA/NCEP**

Extreme Events

- Inundation has continued in the Sudd wetlands of South Sudan with improvements along the upstream White Nile.
- 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 (September 2024 to November 2024):

- **Totals:** Much of South Sudan received 300-500 mm of rainfall over the last 3 months. In contrast, few places in northern and eastern parts of Central Equatoria and Eastern Equatoria states and northern parts of Upper Nile state recorded the lowest rainfall of 100-300 mm **(Fig. 3a)**.

- **Anomalies:** Rainfall was above-average in most places in South Sudan with high rainfall surpluses (100-300 mm) in the western, northern, southern borders and central parts of the country. On the other hand, isolated areas in southern Western Bahr el Ghazal, northwestern Western Equatoria, eastern Upper Nile and southern Jonglei, and northern Eastern Equatoria states experienced below-average rainfall of 10-100 mm **(Fig. 3b)**.

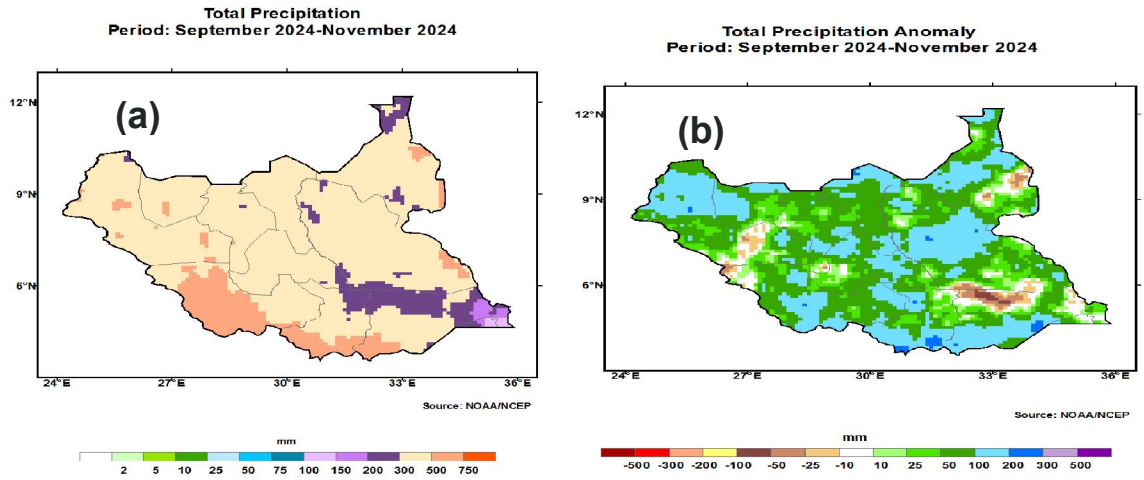


Figure 3: Spatial distribution for September-November 2024: (a) total precipitation and (b) total precipitation anomaly. **Source: NOAA/NCEP**

Past 1 Month (November 2024):

- **Totals:** Except for the northern Upper Nile and Unity states that remained dry, much of South Sudan received 2-300 mm rainfall over the past month. The highest rainfall in excess of 200 mm was recorded in southeastern Jonglei state. In contrast, northern, central and western parts of country experienced the lowest rainfall between 10-75mm **(Fig. 4a)**.

- **Anomalies:** Rainfall was 10-100 mm below-average over much of western and central parts of South Sudan, including Western Bahr el Ghazal, Western Equatoria, Warrap, northern Unity and Upper Nile. However, above-average rainfall (10-50 mm) was observed in a few places in Eastern Equatoria, southern parts of Jonglei, southeastern Upper Nile, and central Lakes states (**Fig. 4b**).

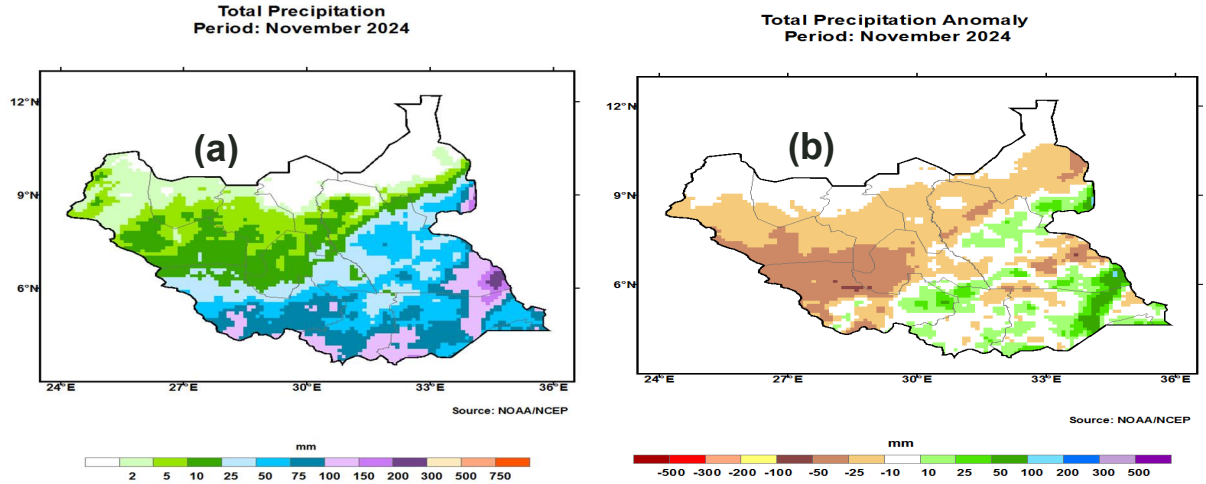


Figure 4: Spatial distribution for October 2024: (a) total precipitation and (b) total precipitation anomaly. **Source: NOAA/NCEP**

Monthly and Seasonal Forecasts (January 2025 and Jan 2025-Mar 2025):

- **Monthly:** The NMME model forecast suggests equal chances of occurrence for the above-, near-, and below-average rainfall over entire country, indicating low skill of prediction for climatologically dry month (**Fig. 5a**).

- **Seasonal:** The NMME seasonal forecast indicates that there is no dominant tercile category across much of South Sudan, except over southern Eastern Equatoria state low probability for above-normal rainfall is indicated (**Fig. 5b**).

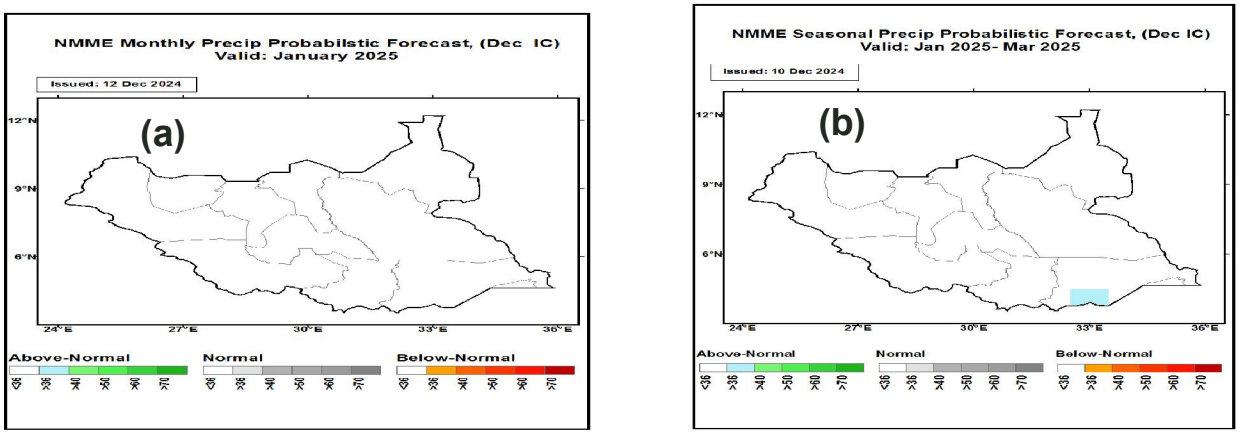


Figure 5: Rainfall forecast for (a) January 2025 and (b) January 2025 – March 2025. **Source: NOAA/NCEP**

Temperature

Past 3 months (September 2024 – November 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 (1-3°C), except with pocket areas in Western Equatoria which recoded up to 4°C above the average. The eastern part of Eastern Equatoria state observed near-average conditions (**Fig. 6a**).
- **Minimums:** From September to November, much of South Sudan had a mean minimum temperature between 20-25°C, while pocket areas in Western Bahr el Ghazal, Central Equatoria and Eastern Equatoria states recorded 15-20°C. The southwestern, southern, and eastern regions saw above-average temperatures of 1 to 3°C. The remaining areas recorded within 1°C of the average minimum temperature values (**Fig. 6b**).

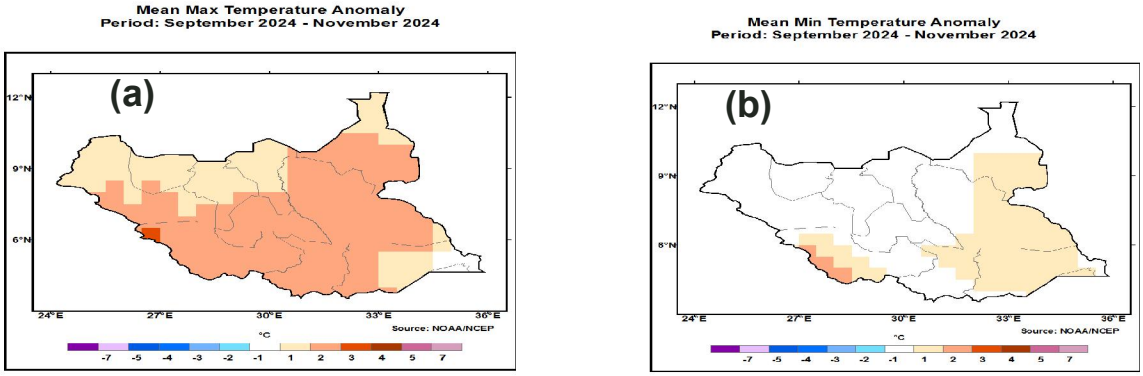
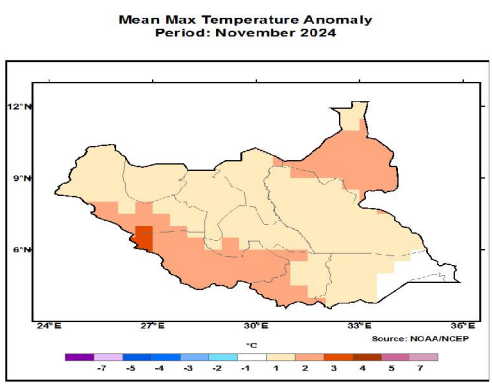


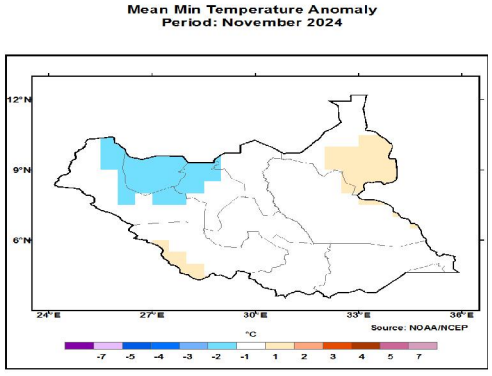
Figure 6: Spatial map for September – November 2024: (a) mean maximum

temperature anomaly and (b) mean minimum temperature anomaly. **Source: NOAA/NCEP**

Past 1 month (November 2024):

- **Maximums:** In November, South Sudan reported average maximum temperatures between 30-40°C, with the highest temperatures exceeding 35°C occurring in the northern regions. Temperatures were generally 1 to 3°C above average, except in parts of Western Equatoria where anomalies exceeded 3°C (**Fig. 7a**).
- **Minimums:** In November, much of South Sudan had a mean minimum temperature between 20-25°C, with some areas in Western Bahr el Ghazal, Northern Bahr el Ghazal, Central Equatoria, Eastern Equatoria and eastern Jonglei reporting 15-20°C. The central and eastern Upper Nile, western boarder of Western Equatoria regions reported 1 to 2°C above average minimum temperatures,





while the Northern Bahr el Ghazal, northeastern Western Bahr el Ghazal and northern Warrap states experienced 1 to 2°C below-normal temperatures (**Fig. 7b**).

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

(a) **(b)**

Monthly and Seasonal Forecasts (January 205 and Jan 2025– Mar 2025):

- **Monthly:** Above-average mean temperatures are forecasted over most parts of South Sudan during January 2025. Probabilities for above-average temperatures are greater than 50% over southern Central Equatoria. (**Fig. 8a**).
- **Seasonal:** Above-average mean temperatures are expected over most parts of country, except over southeastern regions. Probabilities for above-average temperatures are greater than 50% across northern Upper Nile and western Western Bahr el Ghazal states (**Fig. 8b**).

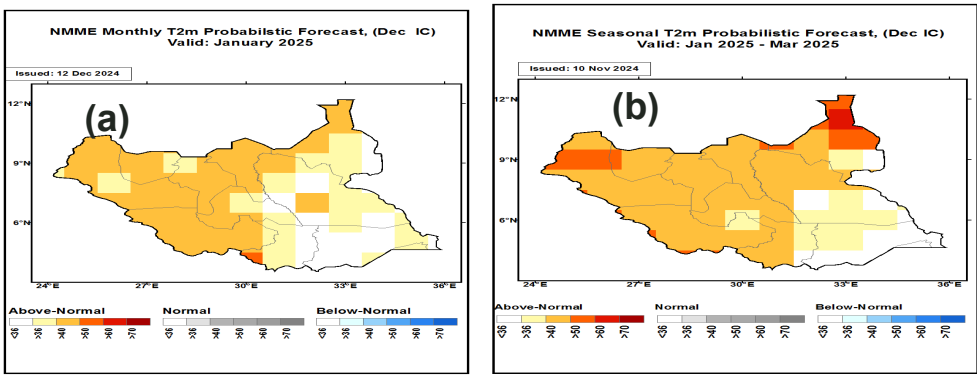


Figure 8: Spatial map for (a) January 2025 mean temperatures forecast and (b) January 2024 – March 2025 mean temperatures forecast. **Source: NOAA/NCEP**

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.
- As of 29 November, over 1.4 million people remain affected by flooding across 44 counties and the Abyei Administrative Area. More than half of the affected people are in Jonglei and Northern Bahr el Ghazal states. Over 379,000 people are flood-displaced across 22 counties and Abyei. 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 (September-November 2024):

- The SPI analysis for September to November 2024 indicated drier-than-average conditions across much of South Sudan, with the exception of a few areas in southeastern Jonglei, the eastern part of Eastern Equatoria, and some pockets in the north and northern Unity that experienced near-average to wetter-than-average conditions (**Fig. 9a**).

Past 1 month (November 2024):

- The SPI analysis for November 2024 indicates that drier-than-average conditions were recorded over many places in South Sudan. Northern parts of Unity, Warrap, Jonglei and eastern Upper Nile experienced wetter-than-average conditions (**Fig. 9b**).

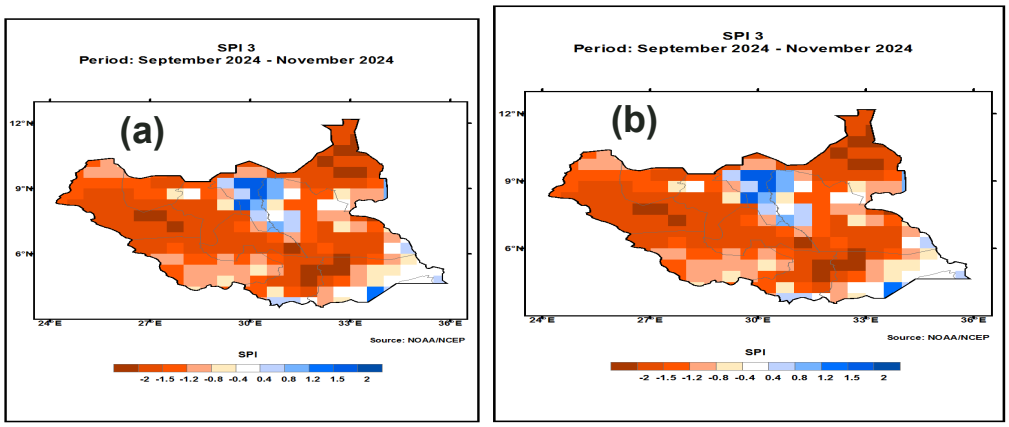


Figure 9: Spatial structure of Standardized Precipitation Index (SPI) (a) September – November 2024 (b) November 2024. Source: NOAA/NCEP. **Source: NOAA/NCEP**

Current/Forecast (05 October 2024 to 03 January 2025):

- The SPI forecast suggests that drier-than-average conditions will cover much of South Sudan, while near-average to wetter-than-average conditions will cover northwestern Jonglei and Unity states.

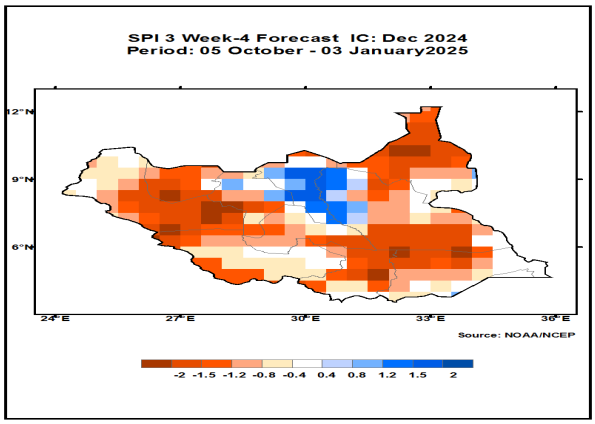


Figure 10: Spatial structure of SPI constructed from observations for 5 October to 5 December 2024 and 4 weeks forecast ending on 3 January 2025. **Source: NOAA/NCEP**

Water Requirement Satisfaction Index (WRSI)

- WRSI values during the 3rd Dekad of November indicated *very good* crop conditions in south-eastern part of Eastern Equatoria state.

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:

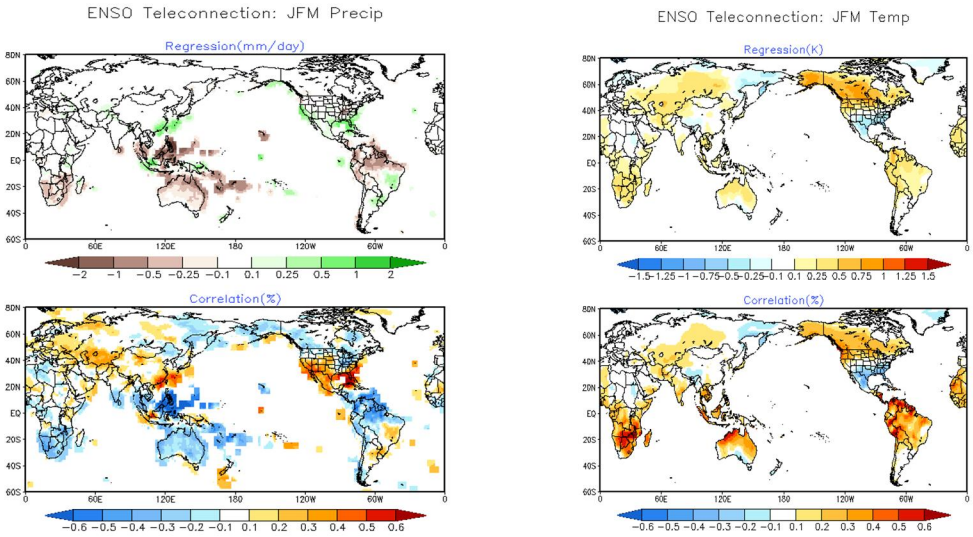
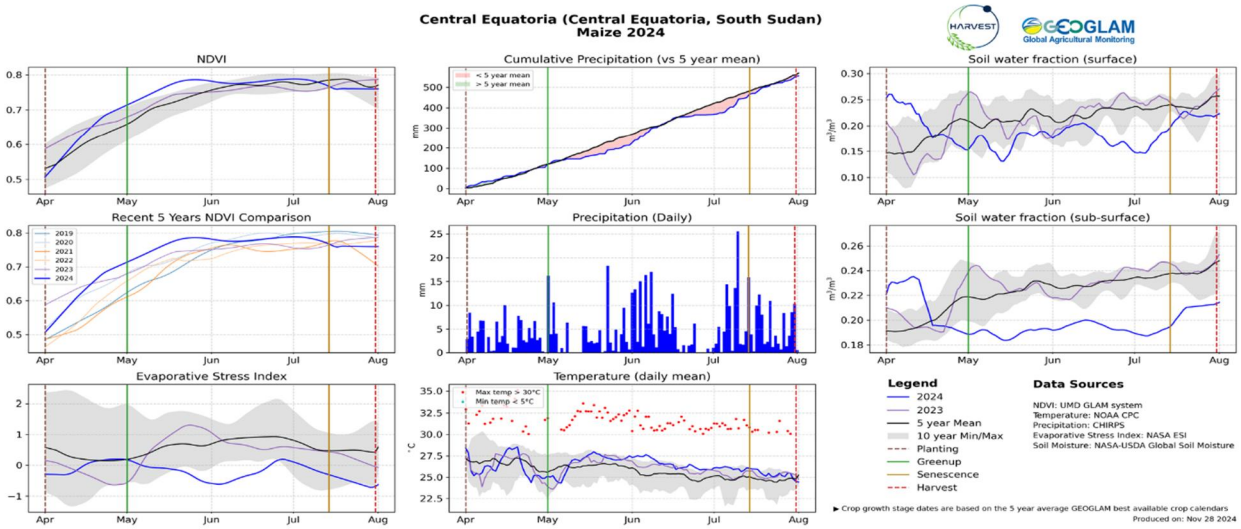


Figure S1: For three month season (JFM), precipitation and temperature anomalies are regressed onto the standardized Niño-3.4 index (upper panel). In the bottom panel, the correlation is calculated between Nino-3.4 and the anomalies.

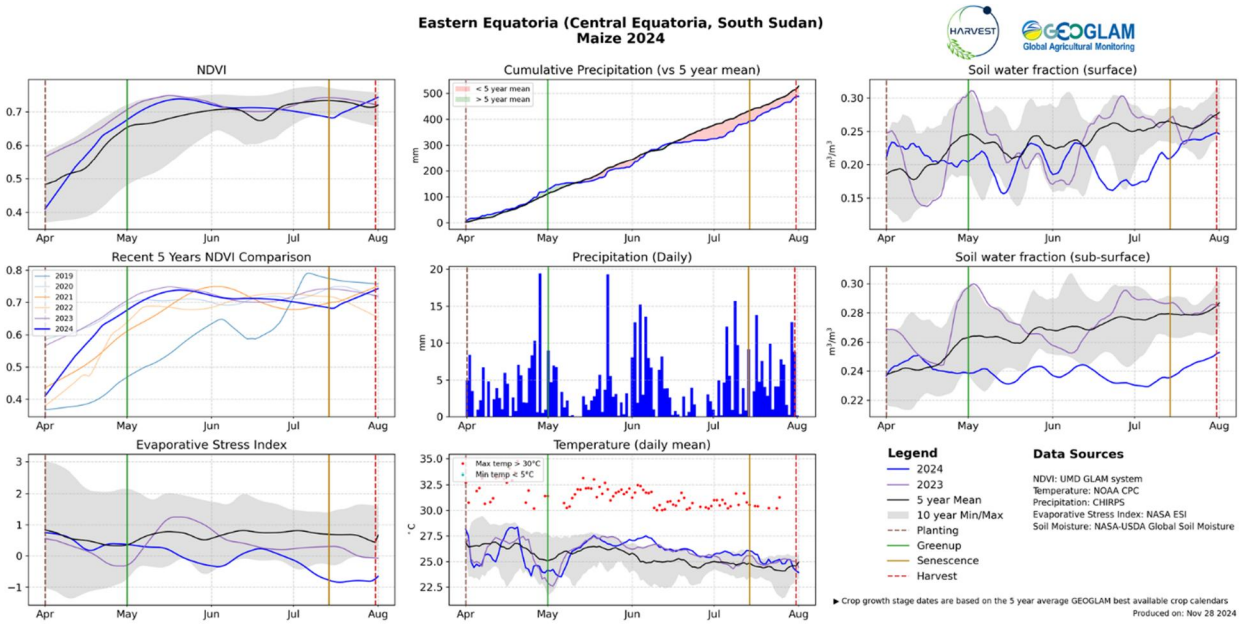
GEOGLAM Agro-meteorological Earth Observation Indicators:

Second-Season Maize

Central Equatoria:



Eastern Equatoria:



Western Equatoria: