FAMINE EARLY WARNING SYSTEMS NETWORK

# *South Sudan*

# Monthly Climate and Weather

**13 September 2024**

## Highlights

- El Niño Southern Oscillation (ENSO)-neutral conditions continued during August 2024, with near-to-below average Sea Surface Temperatures (SSTs) were evident in the east-central and eastern Pacific Ocean and equatorial SSTs were above average across the western Pacific Ocean. According to the NOAA CPC outlook La Niña favored to emerge during September-November 2024 with a 71% chance and expected to persist through January-March 2025. The latest CPC ENSO Alert System Status can be found here.

- Based on historical records, La Niña conditions are associated with above-average rainfall and below-average mean temperatures in South Sudan from October to December. The La Niña-precipitation teleconnection pattern can be found here, and the pattern for temperature can be found here.

- Rainfall in excess of 50-200 mm was recoded over central and northern Jonglei, Upper Nile, Lakes, southern Warrap, southern Unity, northeastern Western Equatoria, southeastern Central Equatoria and southeastern parts of Eastern Equatora. The rainfall deficits of 25-100 mm were recoded over Western Bahr el Ghazal, Northern Bahr el Ghazal, northern Unity, southeastern parts of Jonglei and southwestern parts of Western Equatoria states.

- The North American Multi-Model Ensemble (NMME) models predict above-average rainfall during October 2024, with greater than 50% for above-average rainfall in

*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.*

central, southern and eastern parts of country. Likewise, the seasonal rainfall outlook for October – December 2024 over most parts of the country are expected to receive above-average rainfall, with higher probability (>50%) for above-average rainfall in the central, western and southern parts of the county

- During August 2024, maximum temperatures were 1–2°C above-average over much of South Sudan. The highest anomalies of 2°C were observed in the western parts of Western Equatoria. The mean minimum temperature observed was 1-3°C above average over western parts of the country, with the highest anomalies of 2-3°C above-average being observed over the western parts of Western Equatoria state.

- Above-average mean temperatures are forecasted over western, central and northern South Sudan and near-normal temperature are predicted over eastern South Sudan during October 2024. Likewise, above-average mean temperatures are expected over the western, Central and eastern parts of South Sudan during October – December 2024 and near-normal temperature are predicted over northern parts Upper Nile, Unity and Eastern Equatoria.

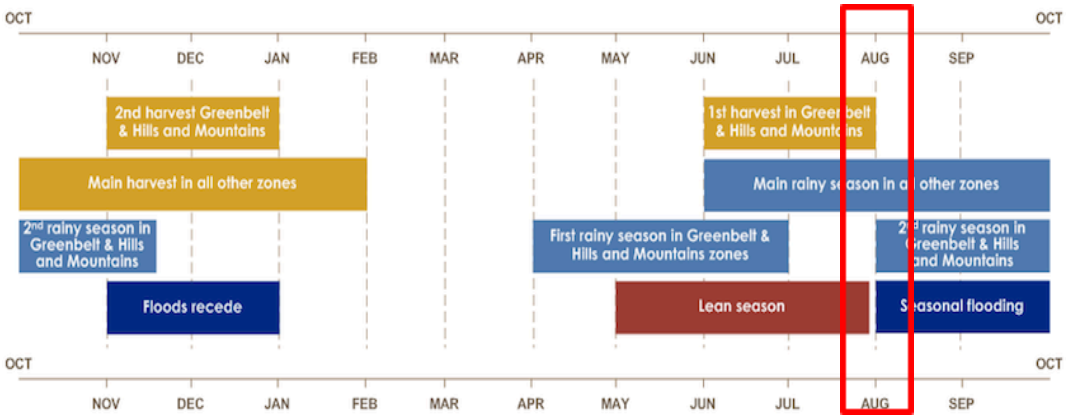


**Figure 1:** Seasonal calendar for South Sudan. **Source: FEWS NET**

## Current Climate Modes and Teleconnections

- As of early to mid-September, ENSO-neutral conditions continued over the equatorial Pacific Ocean. While equatorial SSTs were above-average in the western Pacific and near- to-below average SSTs were observed across the east-central and eastern Pacific regions. Low-level wind anomalies were easterly over most of the equatorial Pacific, and

upper-level wind anomalies were easterly over the east-central Pacific. Collectively, ocean-atmosphere system predicted ENSO-neutral condition.

- The latest outlook indicates, La Niña favored to emerge in September-November with a 71% chance and is expected to persist through January – March 2025 **(Fig. 2).** The latest update of the NOAA Climate Prediction Center's El Niño/Southern Oscillation diagnostic discussion can be found here.

- Based on historical record, El Niño conditions are associated with above-average rainfall and above-average mean temperatures in South Sudan during October-December 2024. The current model forecast suggests above-average rainfall are likely through October **(Fig. S1**).

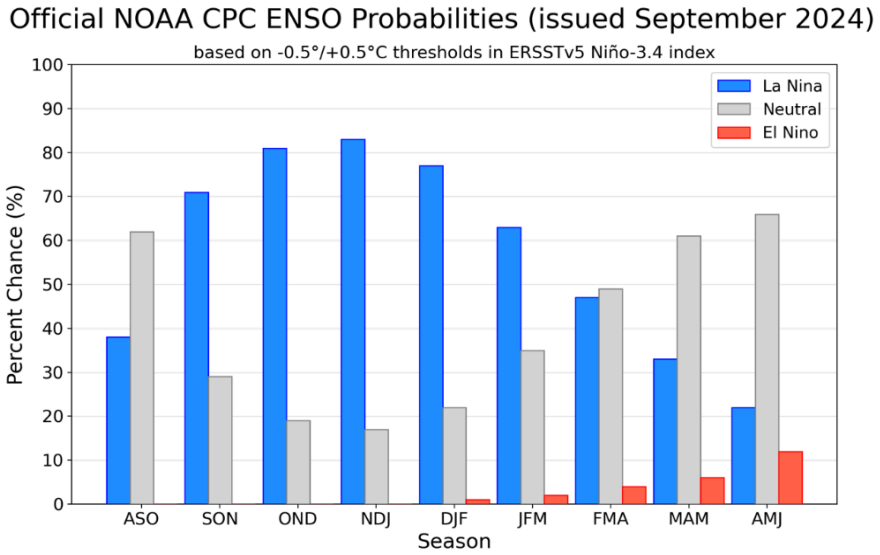


**Figure 2:** Official CPC ENSO probabilities outlook. **Source: NOAA/NCEP**

## Extreme Events

- Inundation has increased in the Sudd wetlands of South Sudan.
- 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 (June 2024 to August 2024):

- **Totals:** Much of South Sudan received 100-500 mm rainfall over the last 3 months, with the lowest rainfall (50-70 mm) occurring in the southeastern boarder of Eastern Equatoria. **(Fig. 3a)**.

- **Anomalies:** Rainfall was above average in most places over much of the country, with highest rainfall (100-300 mm) over central, northern and northwestern parts of the country, except over the southeastern parts of Jonglei, southern parts of Lakes, southern Western Equatoria and Western Bahr el Ghazal, which experienced below-average rainfall (25-100 mm). The highest deficits (100-200 mm) were recorded in central and western parts of Western Bahr el Ghazal **(Fig. 3b)**.

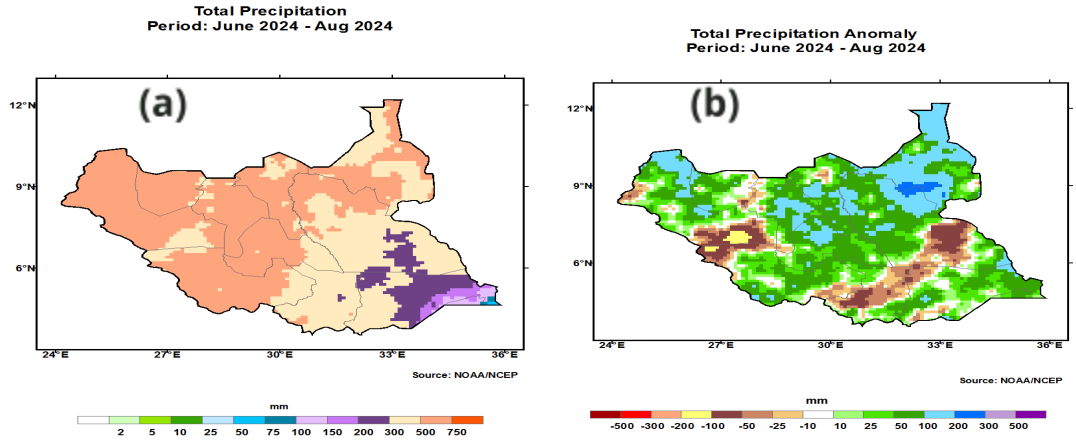


**Figure 3:** Spatial distribution for June-August 2024: (a) total precipitation and (b) total precipitation anomaly. **Source: NOAA/NCEP**

## Past 1 Month (August 2024):

- **Totals:** Abundant rainfall in excess of 100 mm was recorded during July 2024 over most parts of the country. Heaviest rainfall in excess of 200 mm was observed over northern and central parts of Jonglei, Central parts of Lakes, southern Western Equatoria, and northern parts of Western Bahr el Ghazal states (**Fig. 4a**). The Eastern Equatoria, southern Jonglei and Central Equatoria states recorded less than 100 mm rainfall during the same period.

- **Anomalies:** Rainfall was 50-100 mm above average over central and northern Jonglei, Upper Nile, Lakes, southern Warrap, southern Unity, northeastern Western Equatoria, southeastern Central Equatoria and southeastern parts of Eastern Equatora. Rainfall in excess of 200 mm was registered over central and northern parts of Jonglei (**Fig. 4b**). On the other hand, rainfall deficits of 25-100 mm were recoded over Western Bahr el Ghazal, Northern Bahr el Ghazal, northern Unity, southeastern parts of Jonglei and southwestern parts of Western Equatoria states.

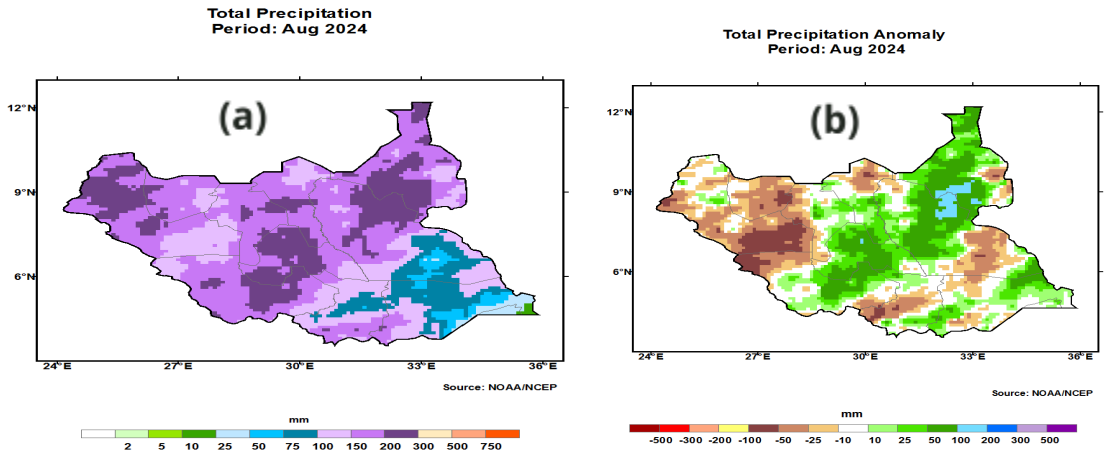


**Figure 4:** Spatial distribution for August 2024: (a) total precipitation and (b) total precipitation anomaly. **Source: NOAA/NCEP**

## Monthly and Seasonal Forecasts (October 2024 and Oct-Dec 2024):

- **Monthly:** The most parts of the South Sudan are expected to experience above-average rainfall. There is a probability of greater than 50% for above-average rainfall in central, southern and eastern parts of country (**Fig. 5a**).
- **Seasonal:** The most parts of the country are expected to receive above-average rainfall, with higher probability (>50%) for above-average rainfall in the central, western and southern parts of the county (**Fig. 5b**).

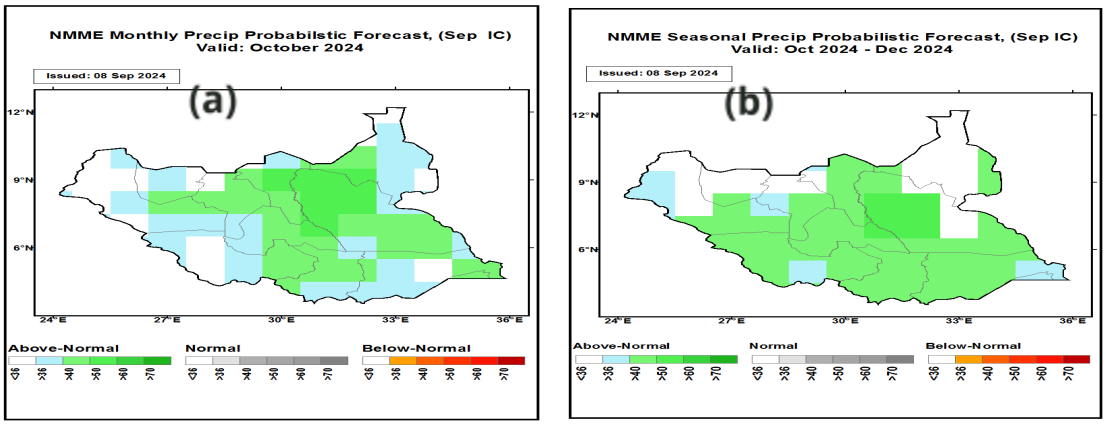


**Figure 5:** Rainfall forecast for (a) October 2024 and (b) October – December 2024.
**Source: NOAA/NCEP**

## Temperature

**Past 3 months (June 2024 – August 2024):**

- **Maximums:** Most places in South Sudan experienced above-average maximum temperatures during June – August 2024. Temperature anomalies exceeded 2°C over western parts of Western Bahr el Ghazal and small parts of southeastern Upper Nile (**Fig. 6a**).
- **Minimums:** During June–August 2024, minimum temperatures were generally near-average over northern and central parts of South Sudan. Mean minimum temperature anomalies were 1-3°C above-average in Jonglei, southern Upper Nile, Eastern Equatoria, Central Equatoria, Western Equatoria and Western Bahr el Ghazal state (**Fig. 6b**).

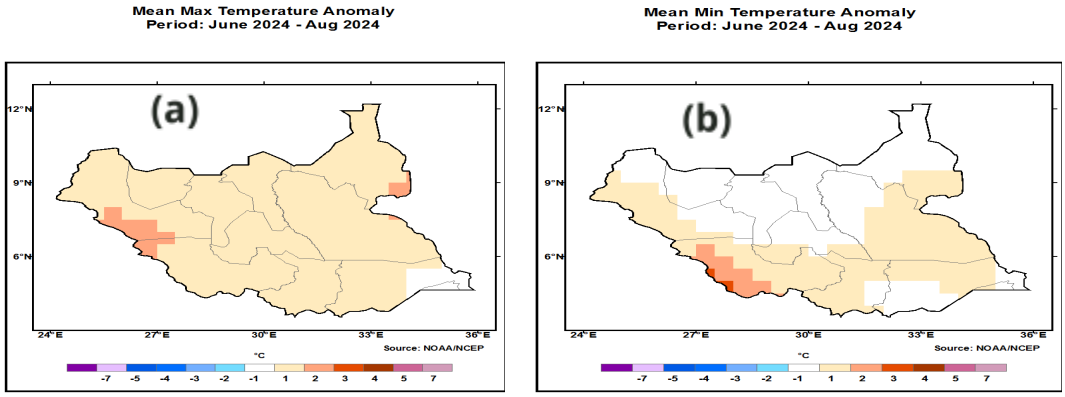


**Figure 6:** Spatial map for June –August 2024: (a) mean maximum temperature anomaly and (b) mean minimum temperature anomaly. **Source: NOAA/NCEP**

**Past 1 month (August 2024):**

- **Maximums:** During August 2024, maximum temperatures were 1 –2°C above-average over much of South Sudan. The highest anomalies of 2°C were observed in the western parts of Western Equatoria (**Fig. 7a**).
- **Minimums:** During August 2024, minimum temperatures were 1-3°C above average over the western parts of the country. The highest anomalies were between 2-3°C over the western parts of Western Equatoria state (**Fig. 7b**).

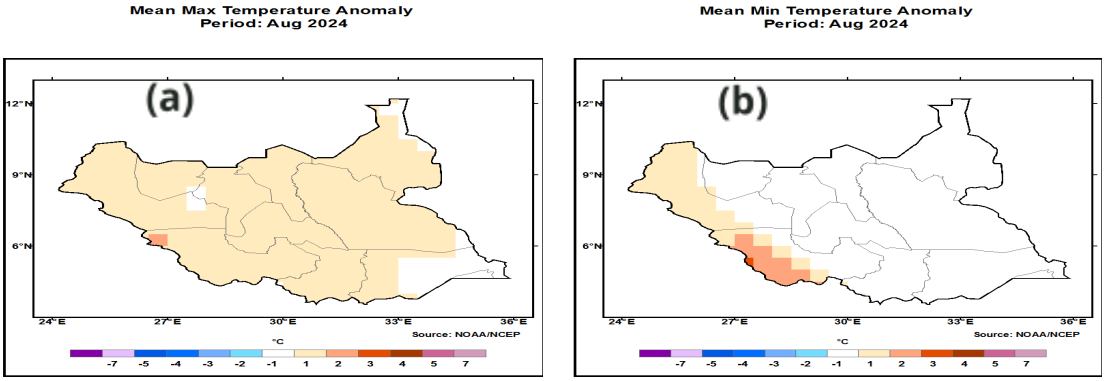

**Figure 7:** Spatial map for August 2024: (a) maximum temperature anomaly and (b) mean minimum temperature anomaly. **Source: NOAA/NCEP**

**Monthly and Seasonal Forecasts (October and October – December 2024):**

- **Monthly:** Above-average mean temperatures are forecasted over western, central and northern parts of South Sudan during October 2024 (**Fig. 8a**). Probabilities for above average temperatures are greater than 50% across most of the Western Bahr el Ghazal, Northern Bahr el Ghazal, northern Warrap and northern Jonglei.
- **Seasonal:** Above-average mean temperatures are expected over the western, central and eastern parts of the country during October – December 2024 (**Fig. 8b**). The above temperature greater than 50% is forecasted over western boarder of Western Bahr el Ghazal.

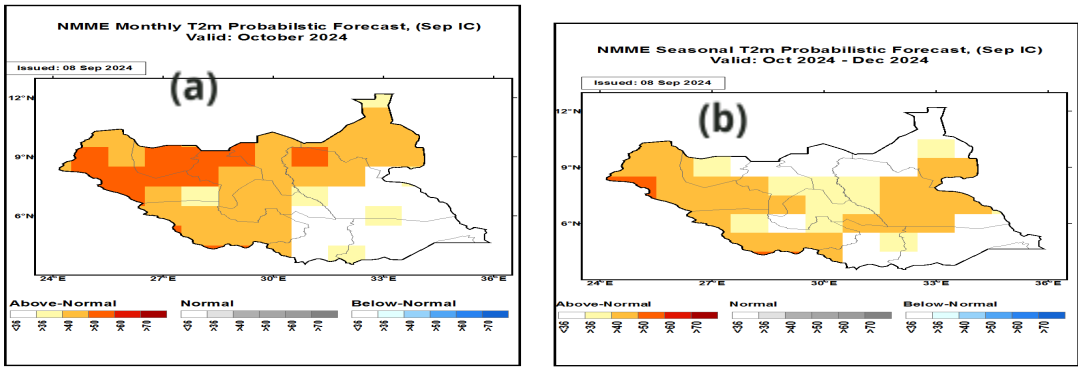


**Figure 8:** Spatial map for (a) October 2024 mean temperatures forecast and (b) October – December 2024 mean temperatures forecast. **Source: NOAA/NCEP**

## Flooding and Areas of Inundation

- Inundation has increased in the Sudd wetlands of South Sudan. The Nile River has risen to record-high water levels this year, negatively impacting livelihoods, infrastructure, and displacement along the Sudd Wetlands located in the central-north of the country

## 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 (June-August 2024):

- During June–August 2024, drier-than-average conditions dominated over much of South Sudan, except southern Eastern Equatoria states, which recorded wetter-than-average conditions (**Fig. 9**).

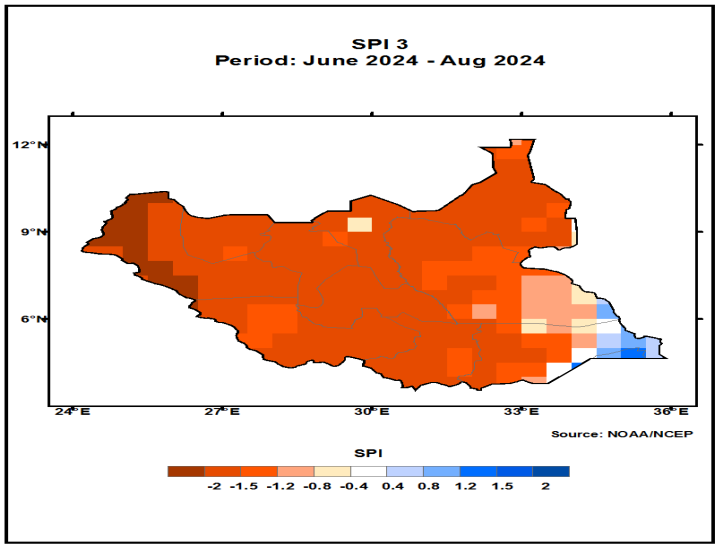


**Figure 9:** Spatial structure of June – August 2024 Standardized Precipitation Index (SPI). **Source: NOAA/NCEP**

### Past 1 month (August 2024):

- During August, drier-than-average conditions were observed in much of South Sudan, with near-average to wetter-than-average conditions over few areas in the Northern Bahr el Ghazal, southeastern Jonglei, southeastern Central Equatoria and southeastern Eastern Equatoria states (**Fig. 10**).

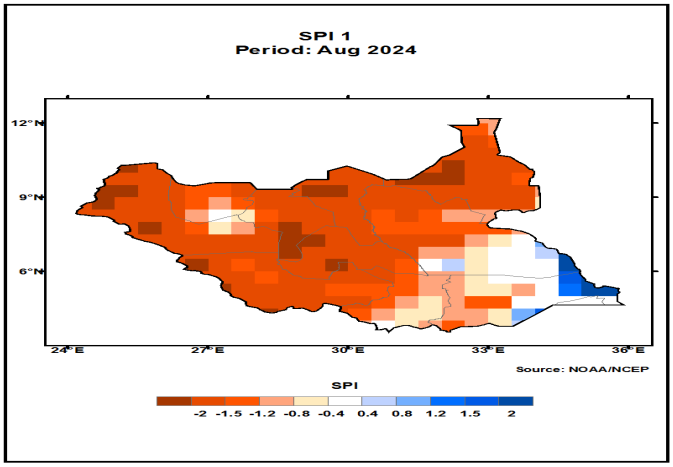


**Figure 10:** Spatial structure of August 2024 Standardized Precipitation Index (SPI). **Source: NOAA/NCEP**

**Current/Forecast (6 July – 3 October 2024):**

- SPI forecast, which is constructed from observed precipitation from 6 July 2024 through 6 September 2024 and forecast rainfall data from 7 September to 3 October 2024 suggests that drier-than-average conditions will occur over much of South Sudan. The southern parts of Northern Bahr el Ghazal, southeastern Eastern Equatoria and southeastern boarder of Jongeli states will experience near-normal to wetter-than-average conditions (**Fig. 11**).

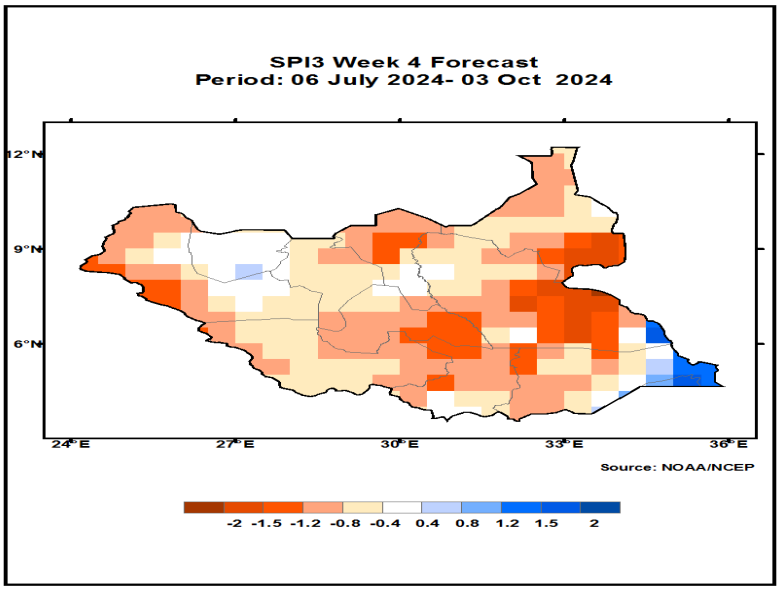


**Figure 11:** Spatial structure of SPI constructed from observations for 6 July to 6 September 2024 and 4 weeks forecast ending on 3 October 2024. **Source: NOAA/NCEP**

## Water Requirement Satisfaction Index (WRSI)

- Not applicable ( WRSI)

## GEOGLAM Crop Monitor

In **South Sudan**, harvesting of first season maize and sorghum finalized in the Central and Western Equatoria regions located in the south of the country while crops continue to develop in other regions. Despite a delayed start to the June to September seasonal rains, precipitation improved by mid-July with most areas receiving near to above-normal levels. Most crops are in early to late vegetative stages under favorable conditions, except in parts of the northwest where erratic rains delayed planting activities at the beginning of the season. Unprecedented flooding is expected across large areas of the country through the remainder of the year, particularly from September to December when the levels of the Eastern Nile Lakes peak. This is due to a combination of several factors, including river overflows and runoff from the La Niña induced above-average rainfall levels this season, controlled water releases from Lake Victoria, and forecast wetter than normal conditions for the remainder of the rainy season The Nile River has risen to record-high water levels

this year, negatively impacting livelihoods, infrastructure, and displacement along the Sudd Wetlands located in the central-north of the country. Lake Victoria has also reached the highest ever recorded water levels, increasing water pressure at the Jinja Dam in Uganda. The release of water is contributing to residual floodwater on fields along the Sudd Wetlands.

## Additional Resources

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

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

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

# Annex:

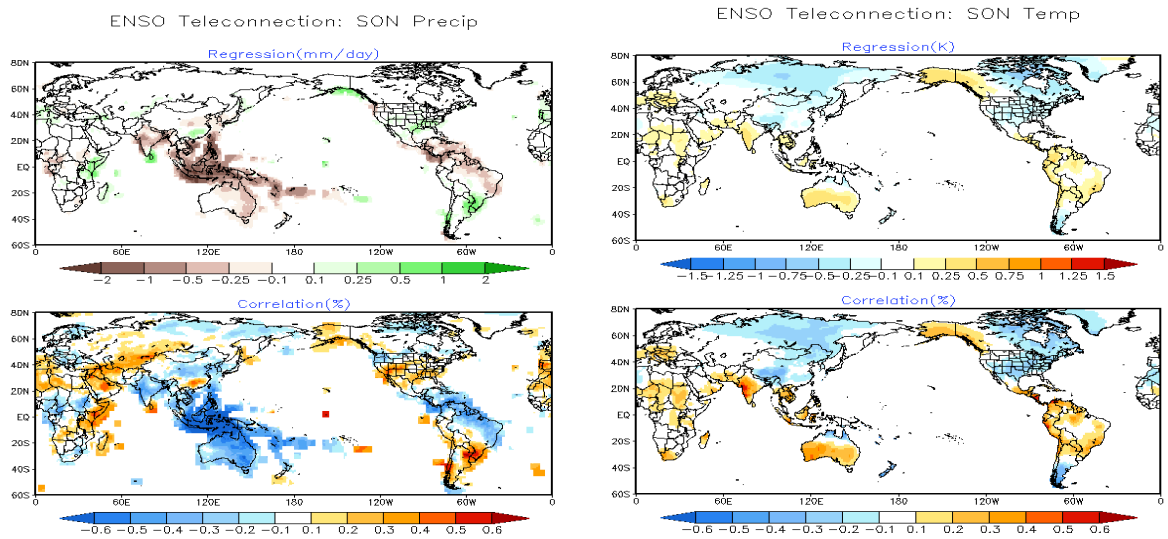


**Figure S1:** For three month season (SON), temperature and precipitation anomalies are regressed onto the standardized Niño-3.4 index (upper panel). In the bottom panel, the correlation is calculated between Nino-3.4 and the anomalies.

## GEOGLAM Agro-meteorological Earth Observation Indicators: [Crop Type]

**[Location]:**