FAMINE EARLY WARNING SYSTEMS NETWORK

South Sudan

Monthly Climate and Weather

17 October 2024

Highlights

- El Niño Southern Oscillation (ENSO)-neutral conditions continued during September 2024, with near-average Sea Surface Temperatures (SSTs) observed across most of the central and eastern Pacific Ocean. According to the NOAA CPC outlook, La Niña is favored to emerge during September-November 2024 with a 60% 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 during November- January season. The La Niña-precipitation teleconnection pattern can be found here, and the pattern for temperature can be found here.

- During September 2024, rainfall was 25-100 mm above average over most parts of the country. However, rainfall deficits of 10-50 mm were recoded over eastern parts of Western Bahr el Ghazal, western parts of Central Equatoria state, and across the cross-border regions of Jonglei and Eastern Equatoria states.

- The North American Multi-Model Ensemble (NMME) models predict below-average rainfall over western parts of Western Equatoria and above-average rainfall in the eastern Western Equatoria and southern Central Equatoria states during November 2024.

- Maximum temperatures were 1–3°C above-average over much of South Sudan during September 2024, with the highest anomalies of 3°C occurring in the far western parts of Western Equatoria State. Minimum temperatures were 1-2°C above average in the southern half 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.

- The NMME models forecast above-average mean temperatures over most parts of South Sudan during November 2024. However, probabilities for above-average temperatures exceed 50% at only a few locations.

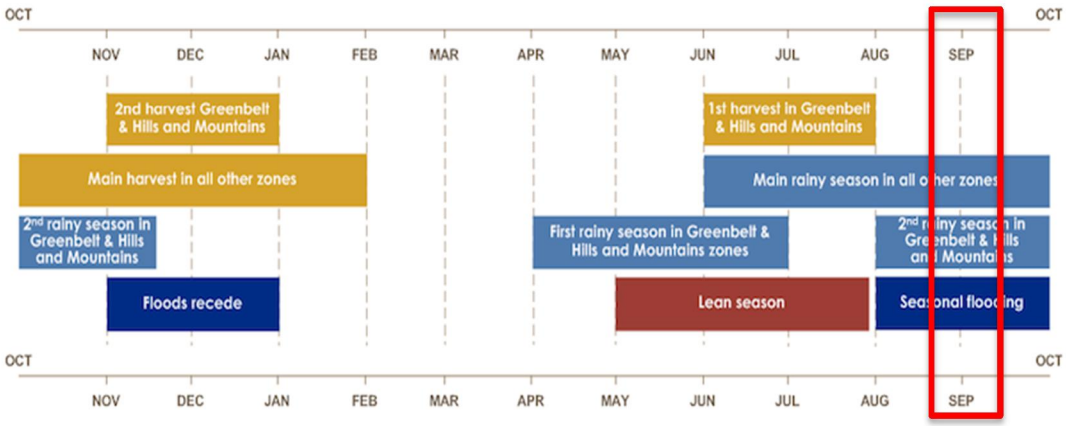

Figure 1: Seasonal calendar for South Sudan. **Source: FEWS NET**

Current Climate Modes and Teleconnections

- During September 2024, ENSO-neutral continued with near-average sea surface temperatures (SSTs) observed across most of the central and eastern equatorial Pacific Ocean. Below-average subsurface temperatures persisted across the east-central and eastern equatorial Pacific Ocean. Low-level wind anomalies were easterly over the east-central equatorial Pacific, and upper-level wind anomalies were westerly over the eastern Pacific. Convection was near average over Indonesia and was slightly suppressed over the Date Line. Collectively, the coupled ocean-atmosphere system reflected ENSO-neutral.

- The latest outlook indicates that La Niña is favored to emerge in September-November 2024 with a 60% 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.

- La Niña conditions are typically associated with above-average rainfall and below average mean temperature in South Sudan during the November-December-January (NDJ) season. (**Fig. S1**).

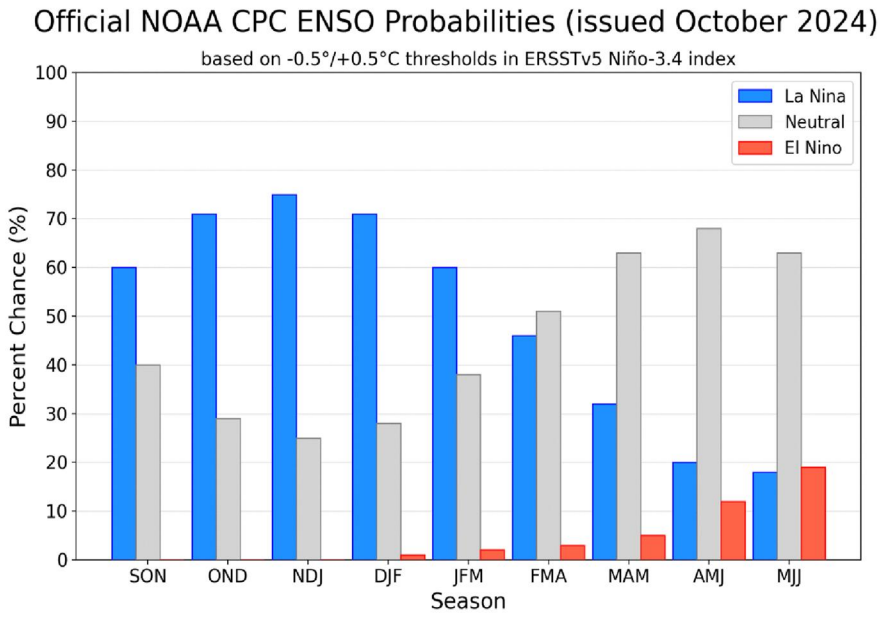

Figure 2: Official CPC ENSO probabilities outlook. **Source: NOAA/NCEP**

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 (July 2024 to September 2024):

- **Totals:** Much of South Sudan received 100-500 mm rainfall over the last 3 months, with the lowest rainfall (50-100 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 surpluses of more than 300 mm occurring across the region bordering Jonglei and Upper Nile states. On the other hand, eastern Upper Nile, southeastern parts of Jonglei, southern Western Equatoria, and Western Bahr el Ghazal experienced below-average rainfall (25-100 mm). The highest deficits (50-100 mm) were recorded in eastern parts of Western Bahr el Ghazal **(Fig. 3b)**.

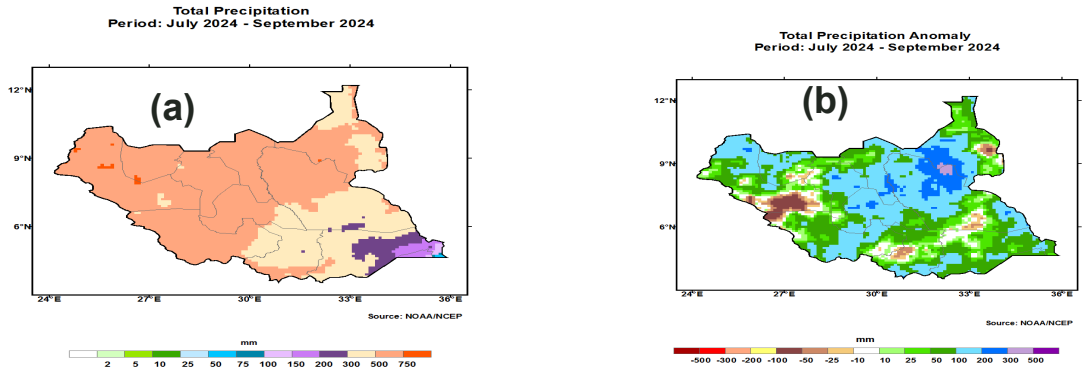

Figure 3: Spatial distribution for July-September 2024: (a) total precipitation and (b) total precipitation anomaly. **Source: NOAA/NCEP**

Past 1 Month (September 2024):

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

- **Anomalies:** Rainfall was 25-100 mm above average over Western Bahr el Ghazal, Northern Bahr el Ghazal, central and northern Jonglei, central and western Upper Nile, Lakes, Warrap, Unity, Western Equatoria, southeastern Central Equatoria and southern parts of Eastern Equatoria (**Fig. 4b**). On the other hand, rainfall deficits of 10-50 mm were recoded over southeastern parts of Western Bahr el Ghazal, southeastern parts of Jonglei, and central parts of Eastern Equatoria states.

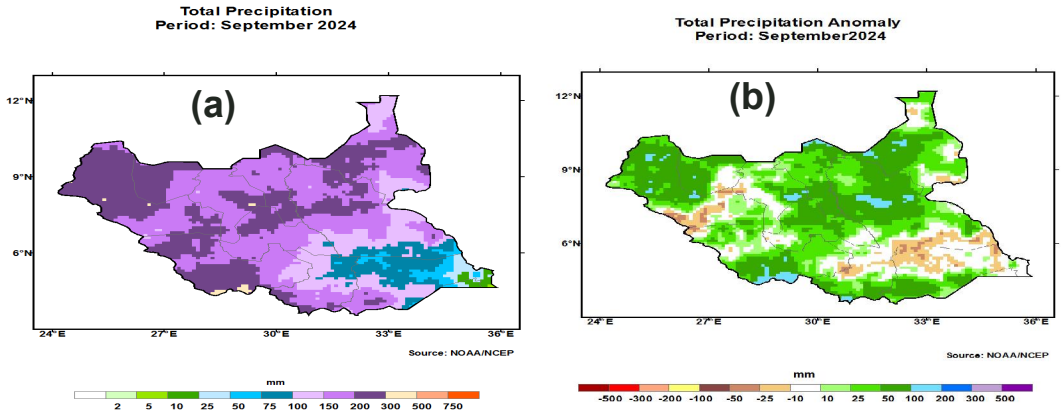

Figure 4: Spatial distribution for September 2024: (a) total precipitation and (b) total precipitation anomaly. **Source: NOAA/NCEP**

Monthly and Seasonal Forecasts (November 2024 and Nov 2024-Jan 2025):

- **Monthly:** The NMME model forecast indicates above-normal monthly rainfall in the southern areas of Western and Central Equatoria states, while below-normal rainfall is expected in the western regions of Western Equatoria (**Fig. 5a**).
- **Seasonal:** The NMME seasonal forecast calls for below-normal rainfall in parts of the southern regions, including Western, Central, and Eastern Equatoria states (**Fig. 5b**).

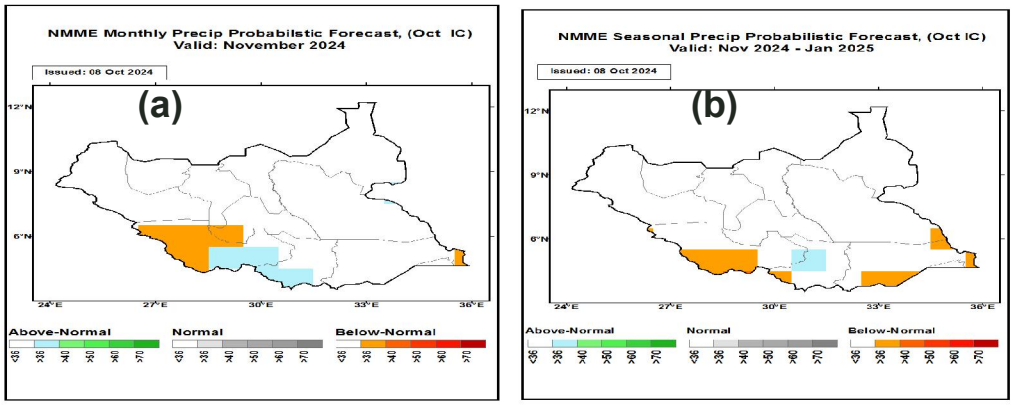

Figure 5: Rainfall forecast for (a) November 2024 and (b) November 2024 – January 2025. **Source: NOAA/NCEP**

Temperature

Past 3 months (July 2024 – September 2024):

- **Maximums:** Most places in South Sudan experienced above-average maximum temperatures during July–September 2024. Temperature anomalies exceeded 2°C over Western Bahr el Ghazal and western boarder of Western Equatoria states (**Fig. 6a**).
- **Minimums:** During July–September 2024, mean minimum temperature anomalies were 1-3ºC above-average in southern Jonglei, southeastern Upper Nile, northern Eastern Equatoria, Central Equatoria, Western Equatoria and Western Bahr el Ghazal (**Fig. 6b**).

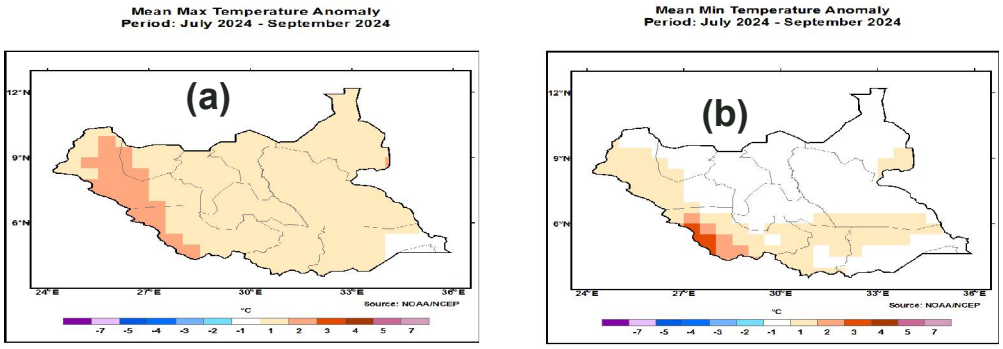

Figure 6: Spatial map for July –September 2024: (a) mean maximum temperature anomaly and (b) mean minimum temperature anomaly. **Source: NOAA/NCEP**

Past 1 month (September 2024):

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

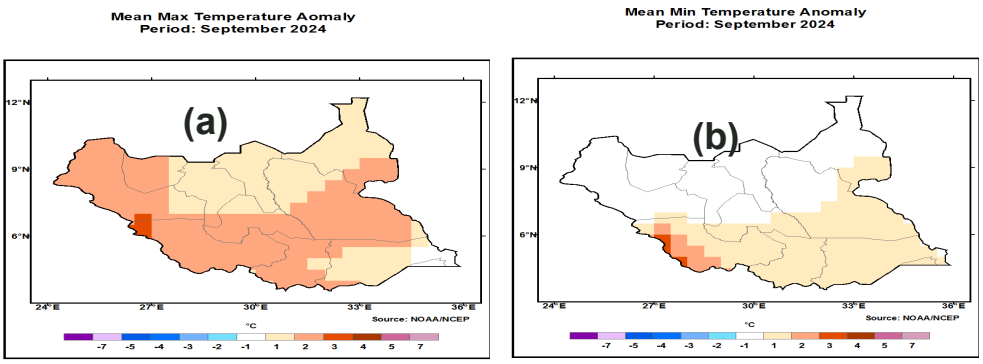

Figure 7: Spatial map for September 2024: (a) maximum temperature anomaly and (b) mean minimum temperature anomaly. **Source: NOAA/NCEP**

Monthly and Seasonal Forecasts (November and November 2024– January 2025):

- **Monthly:** Above-average mean temperatures are forecasted over most parts of South Sudan during November 2024 (**Fig. 8a**). Probabilities for above-average temperatures are greater than 50% across eastern boarder of Jonglei, eastern Lakes and southern Central Equatoria.
- **Seasonal:** Above-average mean temperatures are expected over the western, central, and eastern parts of the country during November 2024 – January 2025 (**Fig. 8b**). However, probabilities for above average temperatures are moderate (40-50%).

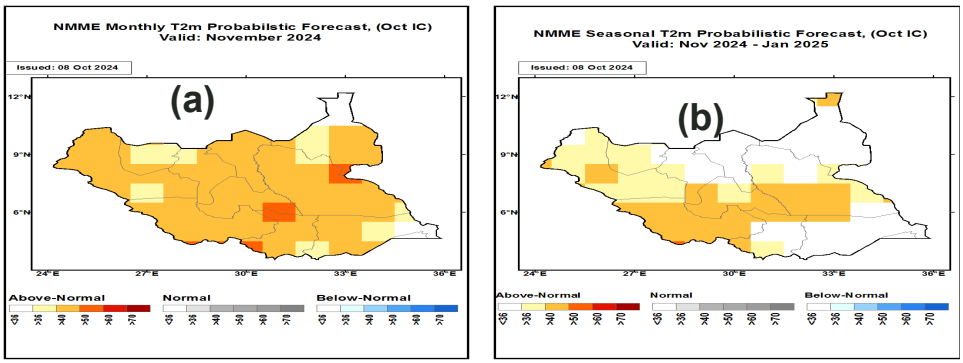

Figure 8: Spatial map for (a) November 2024 mean temperatures forecast and (b) November 2024 – January 2025 mean temperatures forecast. **Source: NOAA/NCEP**

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.

- Flooding continues to affect and displace people across the country. About 893,000 people are flood-affected in 42 counties and the Abyei Administrative Area, with Unity and Warrap states accounting for over 40 per cent of the affected population. More than 241,000 people are flood displaced in 16 counties and the Abyei Administrative Area, seeking shelter on higher ground. Heavy rainfall and floods have rendered 15 main supply routes impassable, restricting physical access.

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 (July-September 2024):

- The SPI analysis for July-September 2024 showed near-average to wetter than average conditions over southern, eastern, and central parts of the country. On the other hand, eastern Upper Nile, Western Equatoria, and Southern Western Bahr el Ghazal recorded drier-than-average conditions.

Past 1 month (September 2024):

- The SPI analysis for September 2024 indicates that near-average to drier-than- average conditions prevailed over eastern and northern parts of the country. Wetter than average conditions were indicated over few areas of central Jonglei, central Lakes, northwestern Western Bahr el Ghazal, and central Western Equatoria.

Current/Forecast (11 July – 25 October 2024):

- The SPI forecast suggests that near-average to wetter-than-average conditions will cover much of South Sudan, while drier than average conditions are indicated over the eastern parts of Upper Nile and small area of northwestern parts of Western Equatoria.

Water Requirement Satisfaction Index (WRSI)

- WRSI values during the 3rd Dekad of September indicated *very good* crop conditions across much of South Sudan.

GEOGLAM Crop Monitor

In **South Sudan**, first season cereals are in vegetative to reproductive stage, and conditions have worsened in central and northern areas that have been impacted by persistent flooding since

May, particularly in Jonglei, Unity, and Warrap states along the Sudd Wetlands. In Bahr El Ghazal region located in the northwest, yields are expected to be below-average, and a millipede infestation is currently impacting crop growth in Northern Bahr El Ghazal. Cumulative June to September seasonal rainfall is generally average in most areas, with pockets of below-average rains received, particularly in the west. Moderate to high rainfall received in August benefited crop growth in some areas but also resulted in severe flooding in low-lying areas with subsequent damage to fields and infrastructure. Additionally, in bimodal Equatoria regions located in the southwest and south-center of the country, planting of second season maize and sorghum continues under favorable conditions. Above-average rains are forecast to continue through early October with the expected onset of La Niña

Additional Resources

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

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

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

Annex:

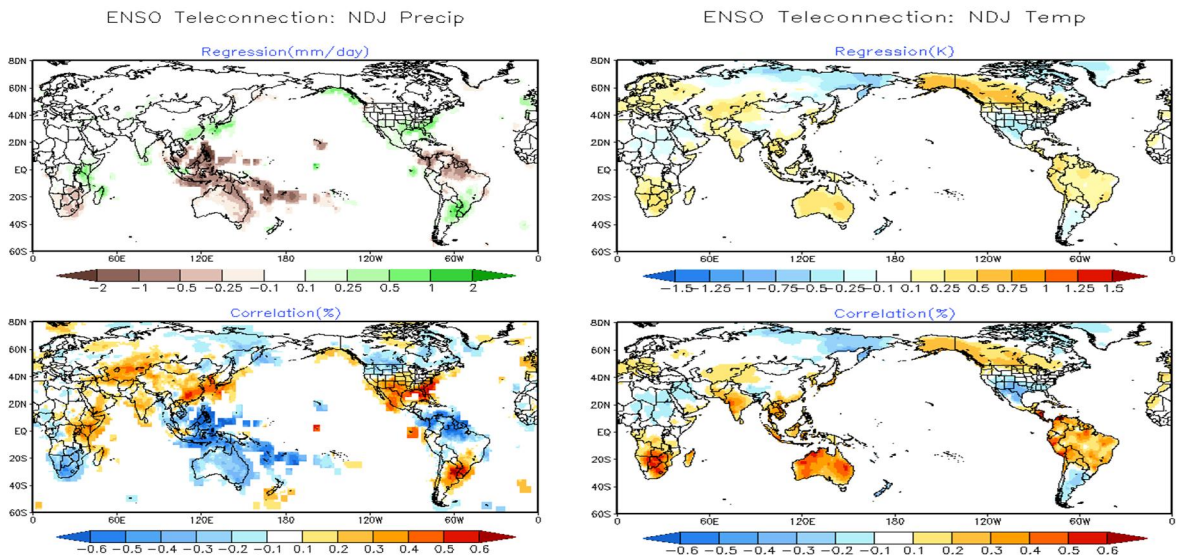

Figure S1: For three month season (NDJ), temperature and precipitation anomalies are regressed onto the standardized Niño-3.4 index (upper panel). In the bottom panel, the correlation is calculated between Nino-3.4 and the anomalies.

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

[Location]: