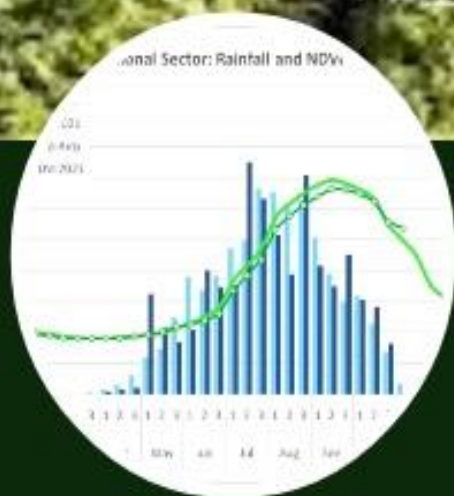


# Sudan

# Agromet Bulletin



## Early Warning For Early Action

AgroMet Bulletin is a monthly report to monitor the rainfall and vegetation development over Sudan. For further information please contact AgroMet team through email provided below. Please feel free to distribute it through your network to who is interested in.

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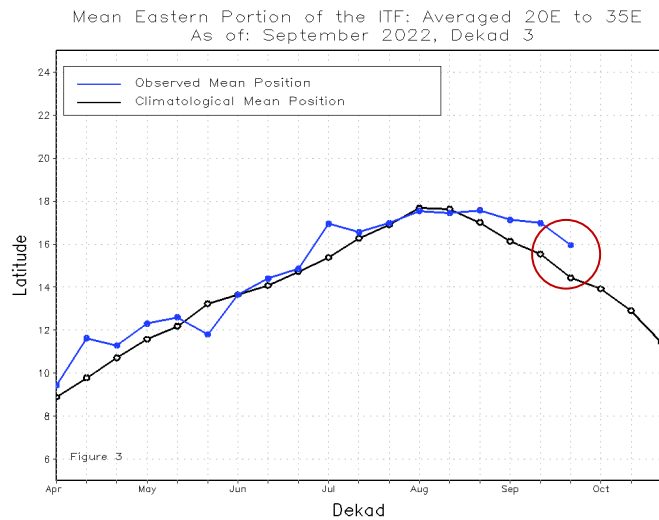
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## Highlights...

- ❖ The stability of the ITCZ during the three decades of Sept 2022, in it's higher than normal position, allowed rain to continue throughout the country in varying amounts.
- ❖ By the end of Sep, above normal total rainfall registered over most parts of the country, the highest total rainfall percentage of averages observed over the northern parts of the rainfall belt.
- ❖ During September, considerable rainfall registered across the southern part of the country while adequate rains observed northerly and normal to wetter than normal conditions noticed everywhere.
- ❖ Long dry spells during Sep was restricted over the northern parts of the rainfall belt while dry spells not exceeding 6 days spread along the centrals and the southern areas.
- ❖ Growing season secession is about to be realized along the northern part of the rainfall belt, as longest dry spells of more than 15 days was experienced over some areas west of the country.
- ❖ The appreciable dekadal rainfall during Sep over some states and the modest rains elsewhere enhanced the vegetation development across the country to confine the scattered stressed areas in the central part of the country while perfect vegetation condition prevailed within the agricultural and pastoral sectors and excellent production is expected.

## ITCZ Movement:

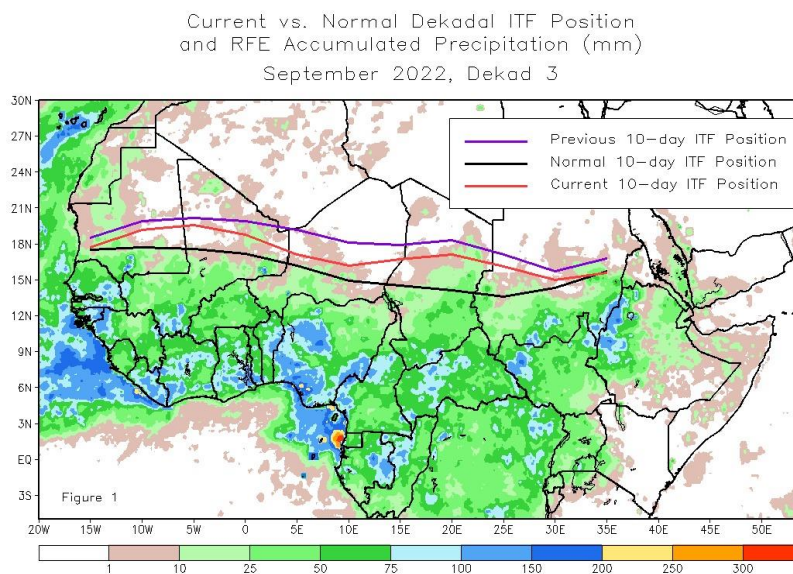
- (Fig 1a) is a time series, illustrating the latitudinal values of the eastern portions of the ITCZ, and its seasonal evolutions since April, 2022.
- (Fig 1b) shows the current position of the ITCZ compared to the climatological position during the 3rd dekad of September, and its previous position during the 2nd dekad of September.



- From 21-30 September, the ITCZ moved south relative to its previous position across the country. The western portion of the ITCZ was located above the climatology position while the eastern position of the ITCZ coincides with its climatology position. (Fig 1a);

Fig 1a: Observed ITCZ Positions and the climatological mean positions by late of Sep 2022

Source: Climate Prediction Centre (CPC)



- The IITCZ is still in place despite of an anomalous northerly position of the ITCZ relative to the long-term average position during the 3rd dekad of September. Scarce rains registered across the country and drier than normal conditions prevailed unlike the behaviour during the first and the second dekad of Sep (Fig 1b);

Figure 1b: ITCZ position during the last dekad of Sep 2022 compared to the previous and the long-term average position. Source: Climate Prediction Centre (CPC)

## 2022 Rainfall:

The following is the analysis of 2022 rainfall season by the end of September; situation assessment in terms of rainfall amounts, rainfall as percentage of averages, start of growing season and dry spells during September.

### Total Rainfall Amounts:

Considerable total rains by late September observed all over the country with rainfall amounts ranging from 200 mm to more than 800 mm. Higher rains registered along the south-eastern borders, the southern and the western borders of the country (600 – 1000) mm. Significant rains (300 – 600) mm received by the central and southern part of the rainfall belt across the country decreasing northward. The northern part experienced lower rainfall amounts (150 – 300) mm which considered good rains (Fig 2).

- Highest rainfall amounts (more than 600 mm) observed south of Gedarif, east of Blue Nile and Sennar states, south of Kordufan states and west and south of Darfur state with rainfall amounts (600 – 1000) mm (Fig 2);
- Moderate rainfall received by the southern parts of Kassala and Northern Darfur states and most of Gedarif, Gazzeira, Sennar and White Nile states and through the southern parts of the western states with rainfall amounts (300-600) mm (Fig 2);
- Lower rains (150 - 300) mm registered north of Kassala, North Kordofan, Gezira, North Darfur states and south east of Khartoum states (Fig 2);

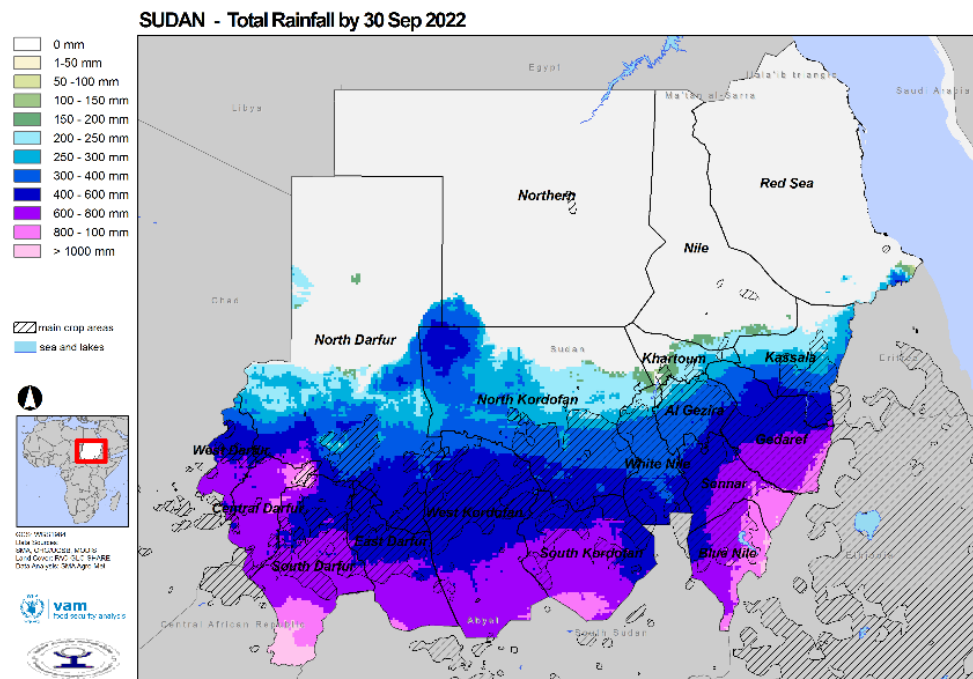


Figure 2: Total rainfall over Sudan by Sep 2022. **Source:** Sudan Agromet Information System (SAMIS).

## Total Rainfall as Percentage of Average:

The rains of this season 2022, coincided with the forecasts on the regional and national scale were normal to higher than the normal rains registered everywhere. The northern part of the rainfall belt registered higher percentage of total rainfall by the end of September 2022 exceeding 140% and extremely wetter than normal conditions noticed. Rainfall percent of average less than 140% recorded across the southern parts of the country and normal to slightly wetter than normal conditions observed (Fig 3).

- By late September, above normal total rainfall registered over most parts of the country especially over the northern parts of the rain belt (Fig 3);
- The highest total rainfall percentage of average observed in Kassala, Gezira, Khartoum states and north of Gedarif, White Nile and Northern Kordofan states and over wide area in Northern Darfur state (Fig 3);
- On average to slightly above average total rainfall amounts observed elsewhere (Fig 3);

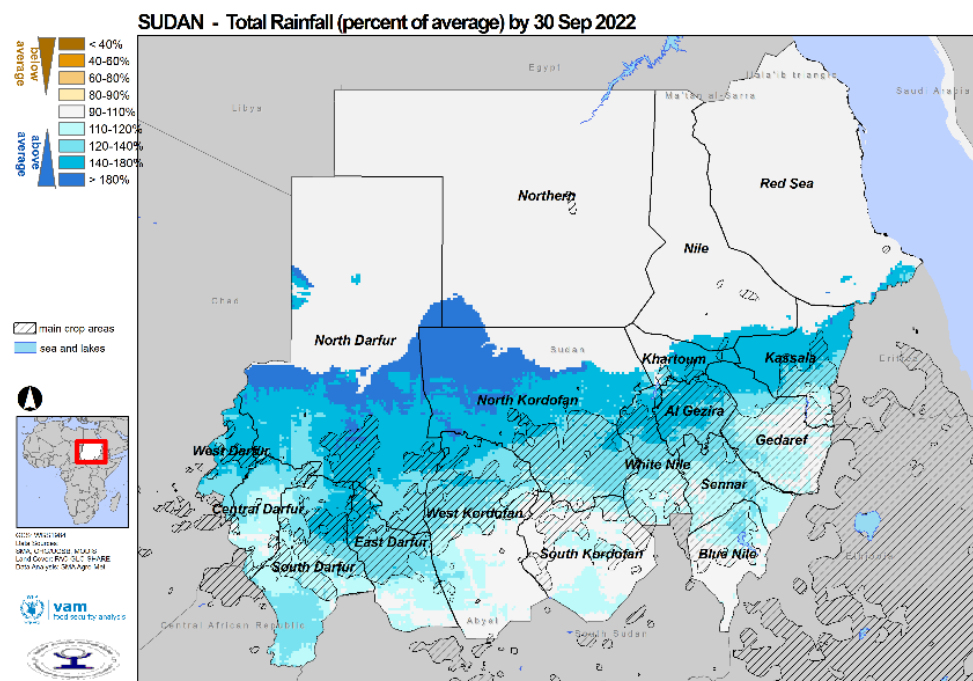
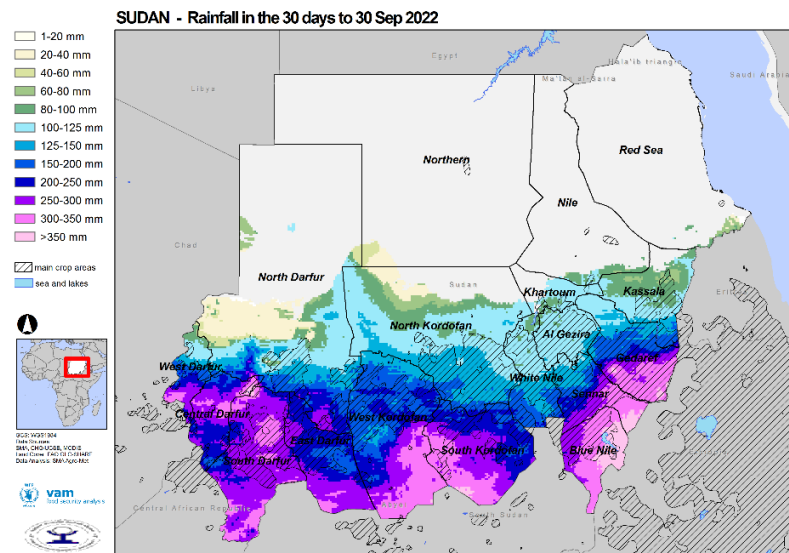


Figure 3: Total rainfall percentage from average by September 2022 over Sudan. **Source:** (SAMIS)

## September Rainfall Amounts:

Appreciable rainfall during September 2022 across the southern part of the country with rainfall amounts exceeding 250 mm, ensuring the stability of the growing season even all over the rainfall belt with adequate rains (100-250) mm (Fig 4).

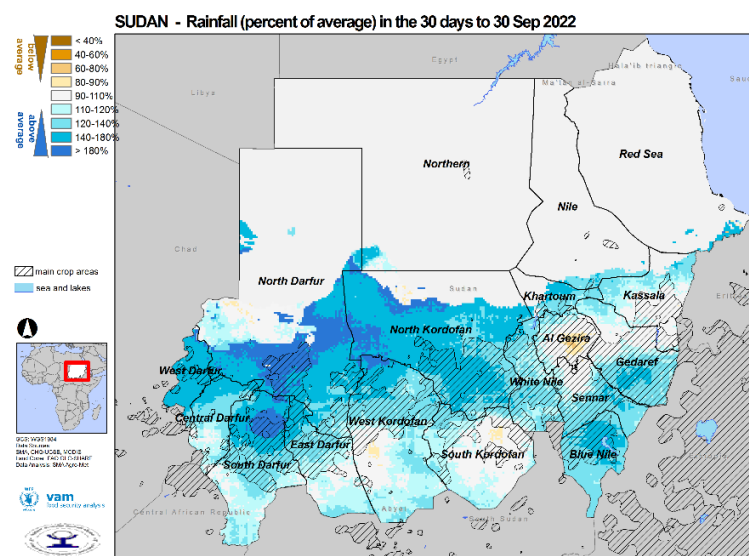


- High rains exceeding 250 mm registered in Blue Nile, south of Gedaref, east of Sennar states, south of Kordufan region and west and south of Darfur region (Fig 4);
- Moderate rains (100-250) observed across the central parts of the rainfall belt, while rains less than 100 mm observed northerly (Fig 4);

Figure 4: September 2022 rainfall amounts over Sudan. (SAMIS)

## September Rainfall as Percentage of Average:

Good rains during September 2022 resulted in slight to moderate wetter than average conditions over most of the country except the extremely wetter than average conditions noticed over wide areas south of North Darfur and small area in Central Darfur, and small areas showed normal to slightly drier than normal conditions in Gezira, north of South Kordufan and east of West Kordufan (Fig 5).



- High rainfall percentages of average occurred over wide areas southeast and west of the country, in Northern Kordufan, Northern and Western Darfur and the northern part of Southern Darfur states (Fig 5);
- Moderate percentages prevailed south easterly and over the centrals, while, low percentage of average rainfall amounts occurred in Gezira, north of Southern Kordufan and east of Western Kordufan states (Fig 5);

Figure 5: Sep 2022 rainfall as percentage of average over Sudan. **Source:** Sudan Agromet Information System

## September Dekadal Rainfall & Percentage of Average:

### Dekad 1\_ Sep 2022

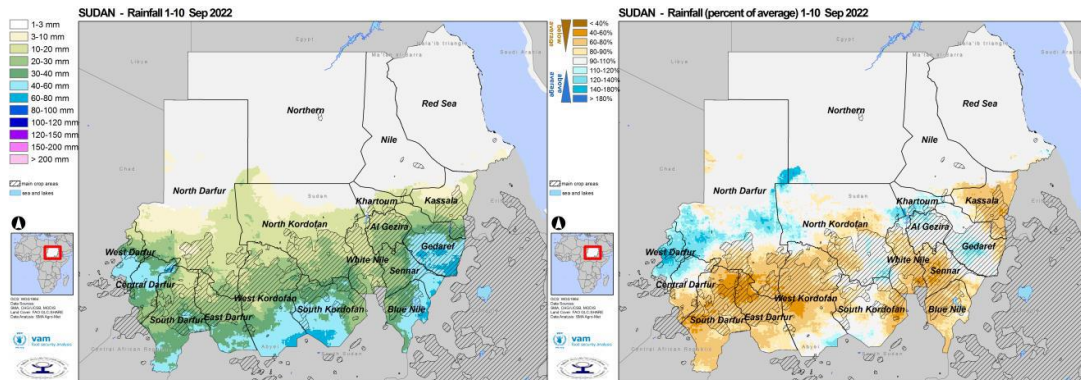


Figure 6a: Early-Sep 2022 rainfall

Figure 6b: Early-Sep 2022 rainfall percentage of average.

Source: (SAMIS)

In early Sep, more than 60 mm rainfall records registered over scattered areas in Gedarin, and Central Darfur states and (40-60) mm registered across the southern part of Kordufan region, along the south-eastern borders of the country and over some areas in Central and Western Darfur (Fig 6a); A dry spell experienced all through the country during early Sep causing moderately drier than average conditions in Kassala, Sennar, Western Kordufan and across the southern part of Darfur region and slightly drier than average condition observed in Blue Nile, White Nile, in the centre of Northern Kordufan and south east of Northern Kordufan, while normal to slightly wetter than normal conditions observed elsewhere (Fig 6b);

### Dekad 2\_ Sep 2022

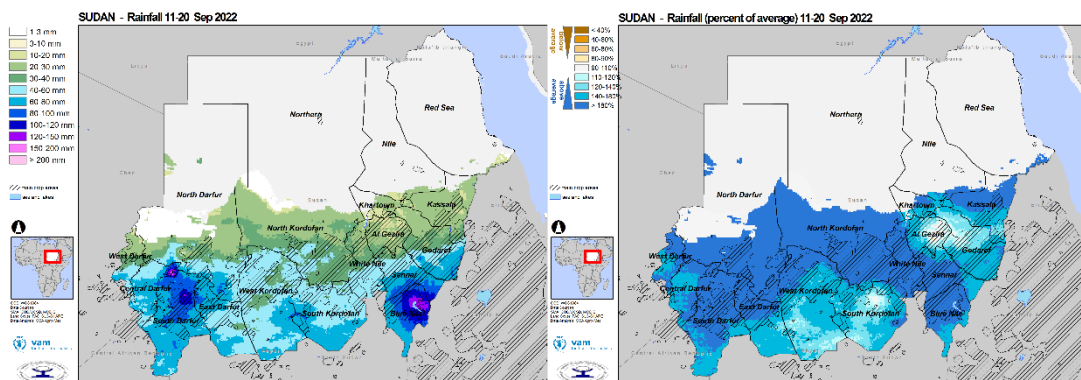


Figure 7a: Mid-Sep 2022 rainfall

Figure 7b: Mid-Sep 2022 rainfall percentage of average.

Source: (SAMIS)

During the second dekad of Sep, moderate rains received by the southern parts of the country (60-100) mm with some areas south east of the country and in the northern part of South Darfur where higher rainfall registered (100-150) mm, unlike the northern parts of the rainfall belt and lower rains with records not exceeding 40 mm (Fig 7a); The best wetness conditions during mid Sep showed by the central and western parts of the country, while, relatively good conditions prevailed south and east of the country, the exception was the eastern part of Gezira state, small areas north-east of South Kordufan state where normal wetness conditions observed (Fig 7b);

- During mid-Sep 2022, good rains observed in Blue Nile state and in the southern part of Gedarif Sennar and South Kordufan states and over wide area south of Darfur region (Fig 7a);
- Medium rains experienced across the southern areas while, Considerable rains relative to this time of the year observed over the northern parts of Gedrif, White Nile and North Darfur states and across Gezira, Kassala and North Kordufan states (Fig 7a);
- Extremely higher than average rains during mid Sep received by North Kordufan & Darfur, White Nile and Sennar states, and over most parts of Blue Nile, north of Kassala, East & South Darfur states and over scattered areas in Khartoum, West Kordufan and over Central and West Darfur states (Fig 7b);
- Moderately above average rains observed south of Gedarif, Kassala, East Darfur states, west of Gezira, east and west of South Kordufan states and over the central parts of West Kordufan, West Darfur and Central Darfur states (Fig 7b);
- Scattered areas in the southern part of Kordufan region, east of Gezira and north of Gedarif states recorded normal to slightly above normal rains during this promising dekad (Fig 7b);

### Dekad 3\_Sep 2022

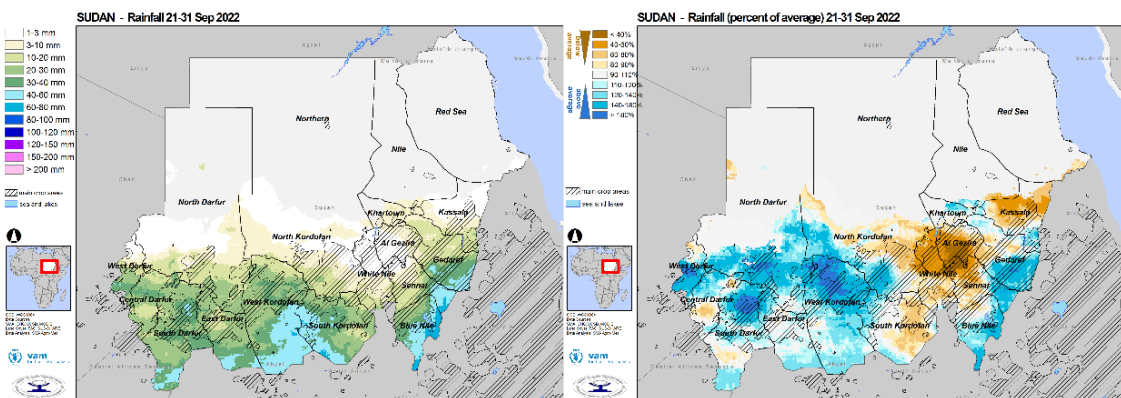


Figure8a: Late-Sep 2022 rainfall

Figure 8b: Late-Sep 2022 rainfall percentage of average.

Source: (SAMIS)

Scarce rainfall observed over the northern and the central parts of the country during late September exceeding 40 mm, while higher rainfall (40-80) mm recorded along the south eastern borders and south of Kordufan region (Fig 8a); Despite of low rains registered, the western part of the country showed normal to moderately wetter than normal conditions unlike the centrals and the north eastern part of the rainfall belt where extremely drier than average conditions observed (Fig 8b);

- Good rains observed east of Sennar and Blue Nile and Gedarif states and along the borders of South and West Kordufan states (Fig 8a);
- Lower rains registered across the western states and north of Gedarif and Blue Nile states unlike the centrals where inadequate rains observed (Fig 8a);
- North Kordufan, North Darfur and the southern part of Gedarif and Blue Nile states registered higher than average rainfall (Fig 8b);
- Unlike Kassala, Gezira east of North & South Kordufan states where slight to extreme lower than average rains recorded (Fig 8b);
- Scattered areas received normal rainfall amounts ensuring the extension of the season there (Fig 8b);



## Start of Growing Season 2022:

(Figure 9a,b) shows the start of the growing season 2022 by late August relative to average dates and dates of onset in Sudan relatively.

Normal to earlier than normal start of the growing season all over the centrals and the southern parts of the country, unlike the south eastern parts of the country and small area in eastern Darfur which showed slight delay during this season 2022 (Fig 9a). Early May is the onset date over most of the southern parts. Gedaref, Kassala state and the central parts of Kordufan and Darfur regions had their onset during June while early and mid-July are the onset dates over the northern parts of the rainfall belt across the centrals and western parts of it (Fig 9b).

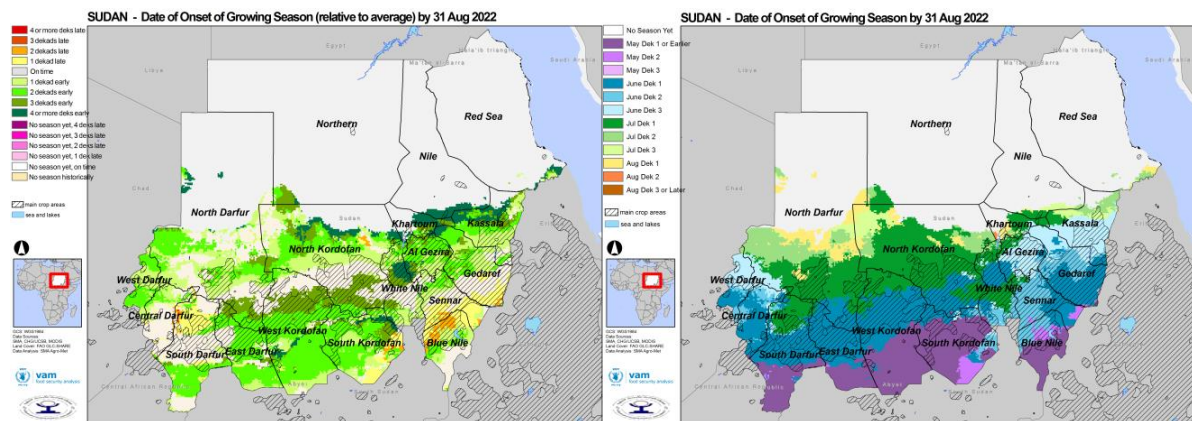


Figure (9a)

Figure (9b)

Figure 9(a, b): Dates of Onset by late Aug. **Source:** Sudan Agromet Information System (SAMIS)

## Maximum Length of Dry Spell Sep\_2022:

The agricultural season is nearing its end along the northern part of the rain belt, as these areas experienced dry spells during September that ranged from 10 to more than 15 days, and ITCZ has receded to the south, and forecasts of average rain during October may reduce the chances of significant rains during the coming period. In contrast to the southern half of the country and its successive rains. The longest periods of drought were limited to between 4 and 6 days, what ensures the continuation of the season, especially with the current location of the ITCZ (Fig 10);

- The southern part of Darfur region, West Kordufan, Blue Nile, Sennar and Gedarif states had desirable wetness condition during Sep with longest dry spells of about <4 to 6 days
- South Kordufan and the southern parts of North Kordufan & Darfur experienced relatively longer dry spells extending to 8 days (Fig 10);
- More dryness conditions prevailed across the northern states; Kassala, Khartoum, Gezira, White Nile states and north of North Kordufan state, Darfur state and Gedarif, with longest dry spell from 8 to more than 15 days (Fig 10);
- Longer dry spells occurred in most parts of North Darfur, North Kordofan, Jazira, Kassala, Blue Nile and Khartoum states (Fig 10);

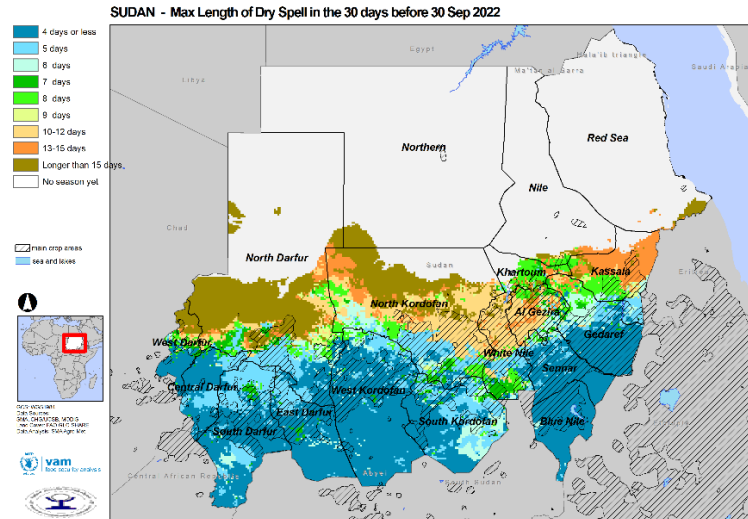


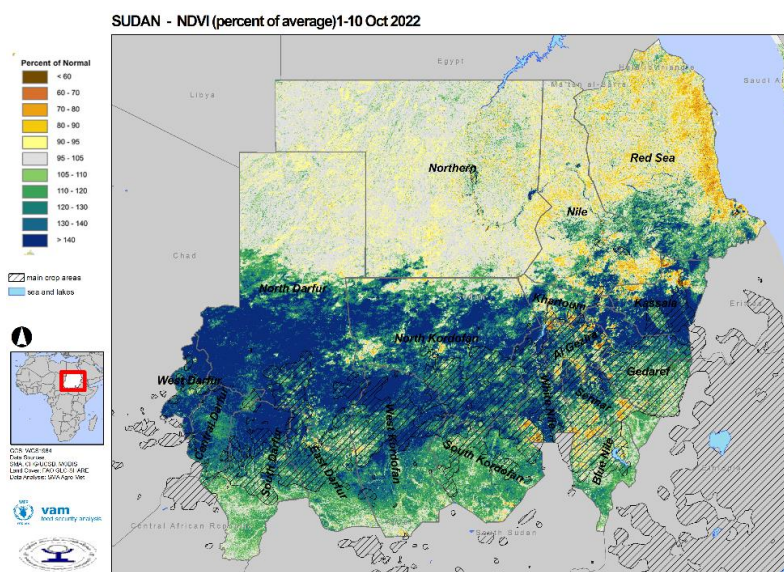
Figure 10: Maximum Length of Dry Spells in Sep\_2022. Source: (SAMIS)

## Normalized Difference Vegetation Index (NDVI):

Normalized Different Vegetation Index (NDVI) is a widely used index to assess the crops development during the rainy season. Normalized Different Vegetation Index (NDVI) percent of average is used to assess the vegetation cover progress compared to the average.

## NDVI as Percent of Average by Late September 2022:

The most perfect vegetation conditions noticed northward and southward all through the western part of the country due to the stability of the intra-seasonal rainfall. Kordufan and Darfur regions has exposed the most preferable vegetation development and high productivity is expected and so White Nile state except the southern areas where some vegetation stress has experienced (Figure 11); Kassala state showed the best vegetation cover appearance along the eastern part of the country while the rest of it suffered from moderate deterioration in vegetation development as a result of the hydro-met extremes experienced by that states (Figure 11);



*A successful season and an excellent appearance of the vegetation cover in the agricultural and pastoral sectors, and a promising situation for food security despite the exposure of large parts of the country to rains that exceeded the normal, which caused high runoff and floods, and affected some large agricultural projects, as in Gezira state, and the overflow of some agricultural areas, as in the southern villages of White Nile and Sennar States (Figure 11);*

Figure 11: NDVI as percentage of average 1-10 Oct 2022. Source: Suomi NPP VIIRS (eVIIRS).