



Agrometeorology Division

***Sudan Seasonal Monitor
Issue (4) September 2011***

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Sudan Seasonal Monitor



Sudan Meteorological Authority
Federal Ministry of Agriculture and Forestry



Issue 4

September 2011

Summary

- On average positioning of the IFT during early and mid August associated with above average rainfall in areas of Gedaref, Sennar, White Nile and Northern Kordofan, followed by below average positioning in late August.
- Rainfall amounts exceeding 81mm registered in Sennar, White Nile, Southern Kordofan and Western Darfur during early and mid August. *See pages 1 & 4.*
- Cumulative rainfall amounts reflect the mal performance of rainfall during the season except areas of southern parts of Northern Kordofan and Western Darfur *See page 4*
- On average vegetation development level in the most part of the Country as a consequences of dryness conditions prevailed during July.
- Vegetation has significantly developed to near average levels in the areas of Gedaref, Gezera, Sennar, and Blue Nile after the June dryness and it is likely to be on average with August rainfall support. *See pages 7-11.*
- Forecasts for September-November rainfall from different sources have become more pessimistic (IRI, CPC and ECMWF) consistent, expectations for this period of the rainy season are of on average to below average rainfall. *See pages 11-13.*

IFT movement

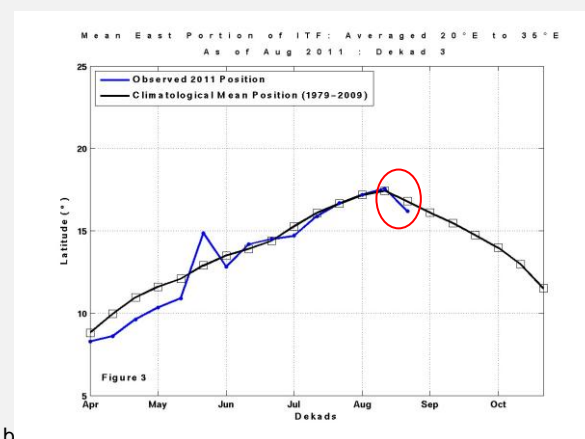
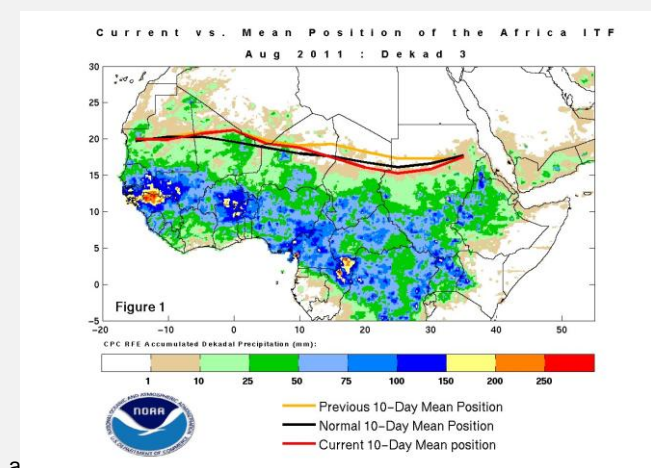


Fig 1a – Position of the IFT over Africa in August 21-31-2011(red) compared to average position (black). (Source : CPC)

Fig 1b – Average position of the IFT over Sudan along the current season compared to a 20-year average. (Source: CPC).Note the retreat in the position in early July (circled)

Seasonal Progress

Rainfall in Sudan mostly results from a northwards movement of humid air masses from March to August and their southwards retreat from September to November. At their northernmost reach, these humid air masses meet with drier and warmer air to form the Inter tropical convergence zone (ITCZ). Since the rain follow south of the ITCZ, tracking the ITCZ through the season provides a quick evaluation of the seasonal

progress of the rainy season and of its quality.

Fig (1a) shows a map with the latest ITCZ position. Current position of the ITCZ is south of the previous dekad and below to its average position across the country.

Fig 1b, showing the latitudinal means of the eastern portions of the ITCZ, and the evolutions since the start of April. The Dekadal progress of ITCZ, shows below average position in late August.

August Rainfall in Sudan

Early August brought above average rainfall in areas of *southern and southern west of Gedaref, east and north of Sennar, parts of Southern Kordofan, southern parts of Southern Darfur and Western Darfur*. Elsewhere, rainfall was on average to below average amounts. Noticeable dryness occurred in Kassala, Khartoum and Northern Darfur state, *see Fig (2a)*.

Southern part of Damazine also, showed have below average rainfall amounts during early August as a result of advanced northwards movement of ITCZ

The scenario of above average rainfall is repeated during mid-August almost in the same areas (*South of Gedaref, Sennar, White Nile, Southern Kordofan, Southern Darfur and Western Darfur*), except Gazira state, *see Fig(2a,b)*, which consolidated the planting conditions in these areas.

Significant rainfall amounts (81-100mm) registered in *Sennar, White Nile, Southern Kordofan and Western Darfur*. In contrast, areas of Kassala, Gazira, Khartoum, Northern Kordofan and Northern Darfur encountered below average rainfall during mid August.

Dryness conditions were prevailed during late August across the Sudan except areas along the borders with Ethiopia, Government of Southern Sudan and Chad.

Below average rainfall amounts shown all over the country during late August, which maximize the chances of negative impacts on crops and pasture, *see Fig (2c)*.

In terms of monthly total rainfall, August brought above average rainfall amounts over the areas of southern and central Sudan. Compare to this, Kassala, Gazira, Khartoum, Northern Kordofan, Northern Darfur and northern parts of Southern Darfur have below average rainfall during August, *see Fig (2d)*.

As a difference from average, August total rainfall amounts showed above average amounts in areas of Sennar, western Parts of Gedaref, southern parts of Gazira, Northern and Southern Kordofan, Western Darfur and southern parts of Southern Darfur. Elsewhere, below average performance is prevailed, *see Fig (2e)*.

Cumulative rainfall amounts reflect the mal performance of rainfall during the season except areas of southern parts of Northern Kordofan and Western Darfur, *see Fig (2f)*.

From crop water satisfaction point of view, more rainfall is needed to maintain the crop development and to reach the maturity stage before the end of the rain season. As a consequences, the situation will worsen if September rainfall are below average.

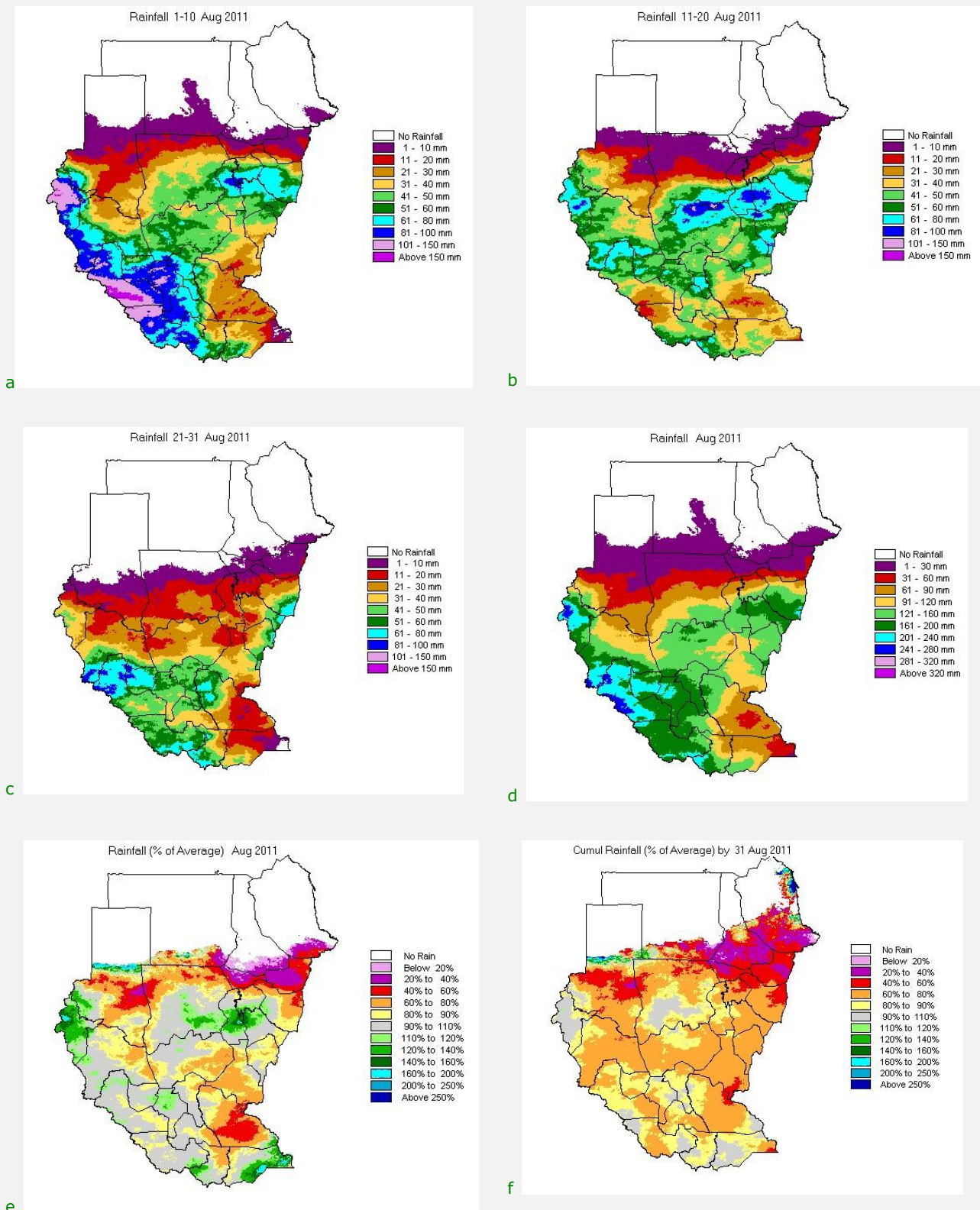


Fig 2: a – Rainfall in early August 2011. b – Rainfall in mid August 2011, c- Rainfall in late August 2011. d– August 2011 total rainfall , e- August total rainfall as % of average . f– Cumulative rainfall as % of Average by late August 2011.

Start of Growing Season

A better evaluation of the effect of rainfall on crops can be made by comparing rainfall to a measure of the water demand imposed on crops by the environmental conditions (i.e. temperature, humidity, solar

insulation and wind levels).

We can detect when rainfall is enough to meet the estimated water demands of planting and early crop development – the start of the growing season is taken as the date when these demands are met for at least two 10 day periods. Fig 3 displays the dates on which the growing season started across Sudan.

The map (Fig3) of start of season dates shows that across most of northern Sudan, suitable conditions for planting and early crop development took place in late July, reflecting the occurring of planting rainfall in this period. There is no start of season detected in mid May in accordance with the very dry situation during this month; this means that areas where the season has started may have faced poor early moisture conditions.

Occurrence of Growing season conditions were delayed till mid July – early August in the states of Gedaref, Sennar, White Nile, Gazira, Northern Kordofan, Northern Darfur, northern parts of Southern Darfur and northern parts of Western Darfur. This is due to the dryness conditions associated July and early August. Growing season did not start yet in Khartoum and Kassala states.

Significant delay of suitable conditions of crop growth shown in the most parts of Sudan due to the dryness that associated by July.

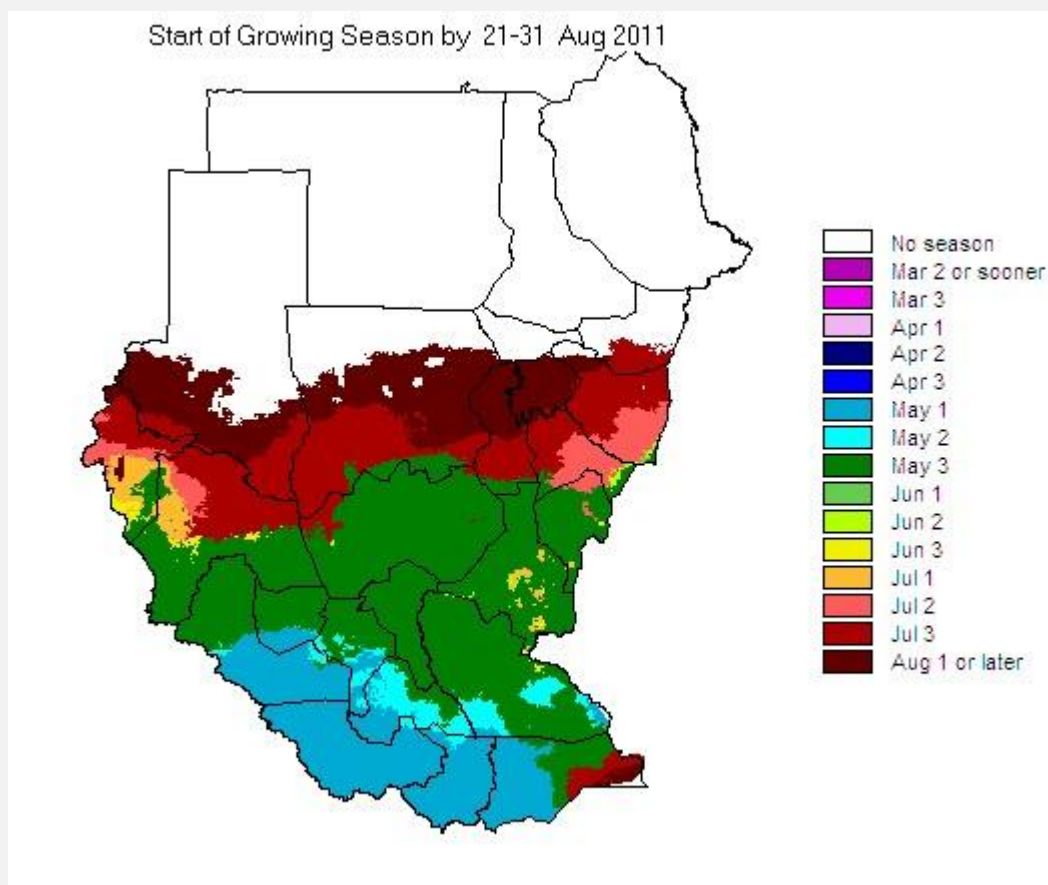


Fig 3 – Dates of Start of Growing Season till late August 2011. Each colour represents a different 10 day period of a given month (1 = 1 to 10, 2 = 11 to 20, 3 = 21 to 30 or 31).

Vegetation Status

Vegetation condition and development are assessed by means of the NDVI (Normalized Difference Vegetation Index) – this is a satellite derived parameter which responds (almost) uniquely to vegetation and is available on a global scale every ten days.

Slight vegetation development noticeable in Blue Nile, southern Kordofan, Southern Darfur and West Darfur as a result of the August good rainfall, *see Fig(4a)*. Elsewhere, the vegetation development level still below

average.

The situation is worsening as the season is passing its peak, vegetation development level still below average in most parts of Sudan. This is contributing positively in widening hunger gap in the coming months, especially in the borders state and conflict areas.

Gedaref, Sennar, Northern Kordofan and Northern Darfur showed very low vegetation development in late August. Moderate to on average vegetation development shown in southern parts of Blue Nile, Southern Kordofan, Southern Darfur and West Darfur. Pastoral situation and water resources is negatively affected by the dryness in late August, as a result below average pastoral development were existence from the start of the season.

Below average vegetation development shown across the country as a result of dry conditions and below average rainfall amounts during July and August, expect the irrigated areas in Gazira, *see Fig(4b)*.

Good rainfall amounts that registered in mid-August may maintain the situation in Gedaref, Sennar, White Nile and Southern Kordofan.

Generally, vegetation development is likely to improve if September brings good rainfall and have a reasonable distribution.

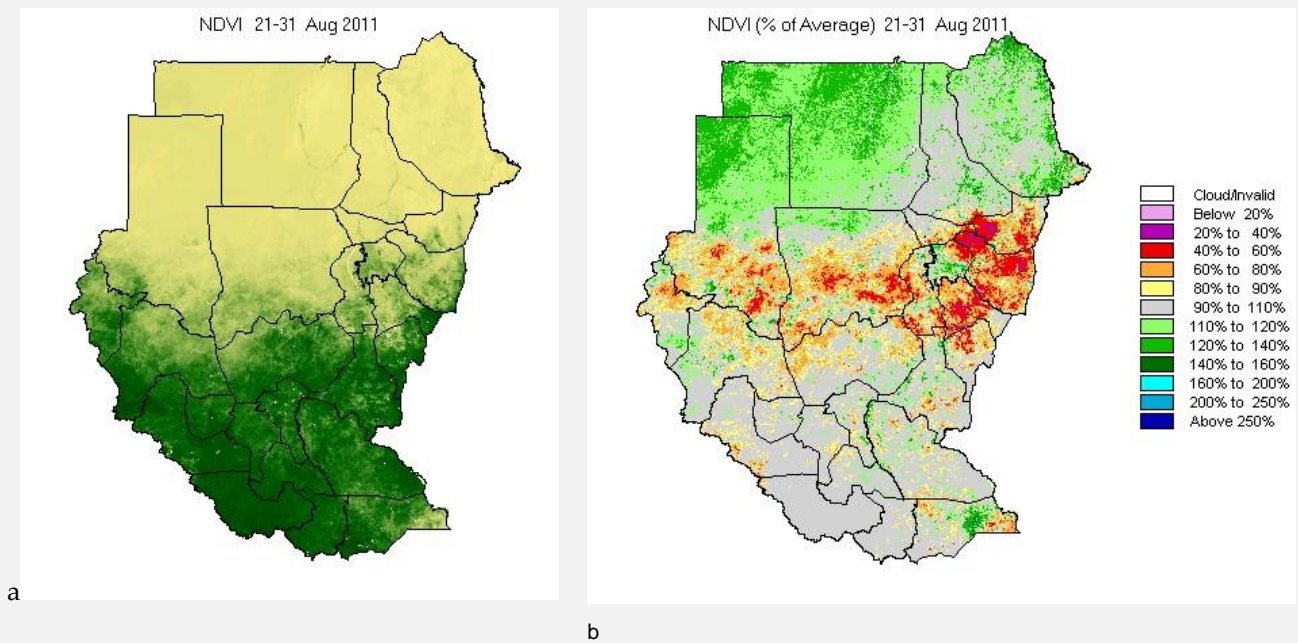
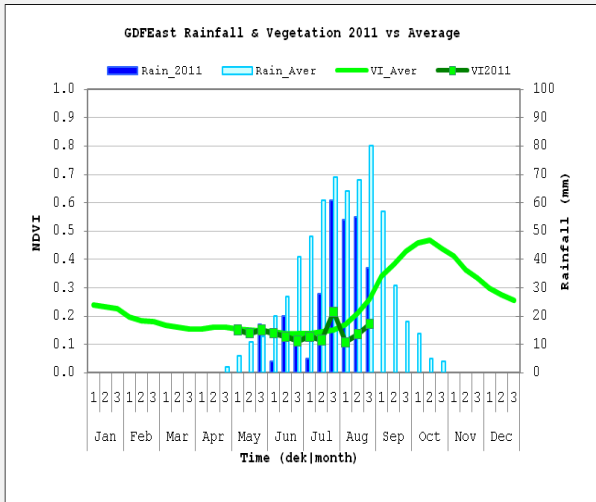


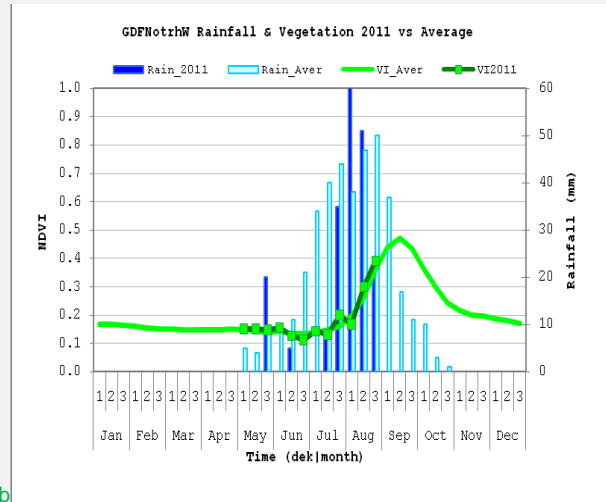
Fig 4a – NDVI progress for late August 2011, Fig 4b – NDVI difference from average in late August 2011 Yellows and reds represent below average vegetation development, greens and blues represent above average vegetation development.

Vegetation & Rainfall Perspectives

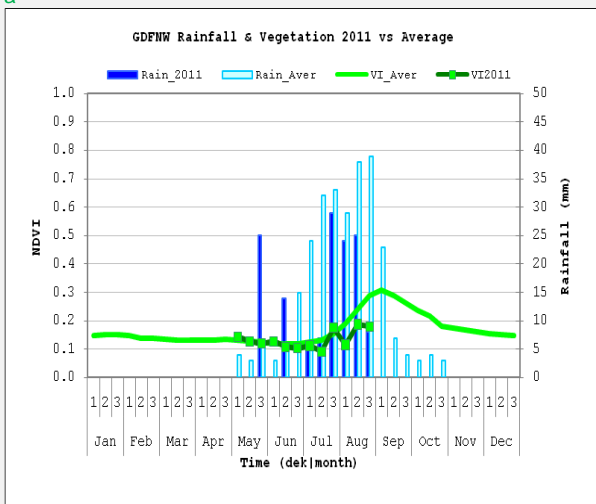
Gedaref State



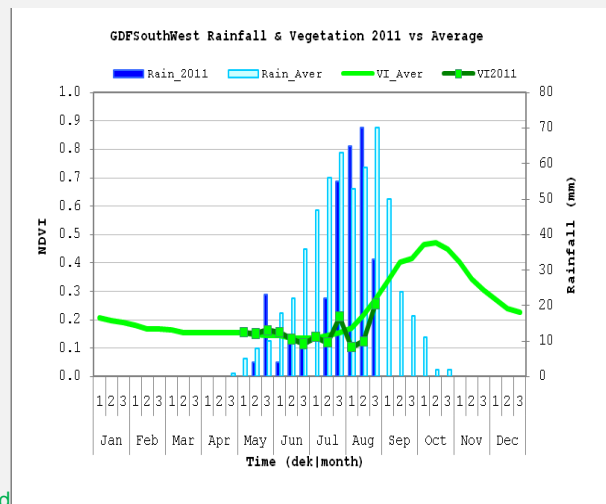
a



b



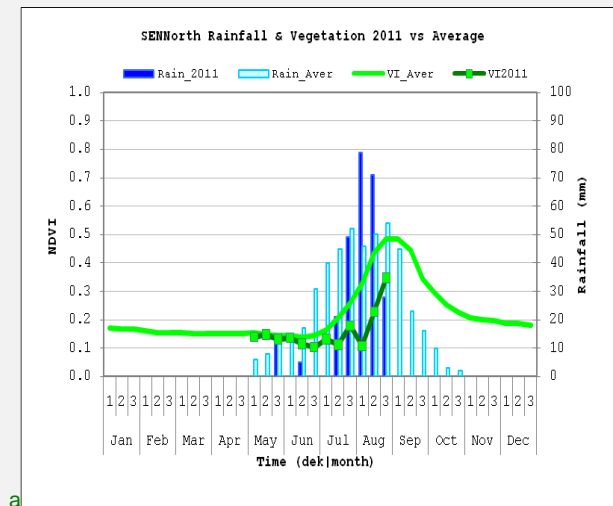
c



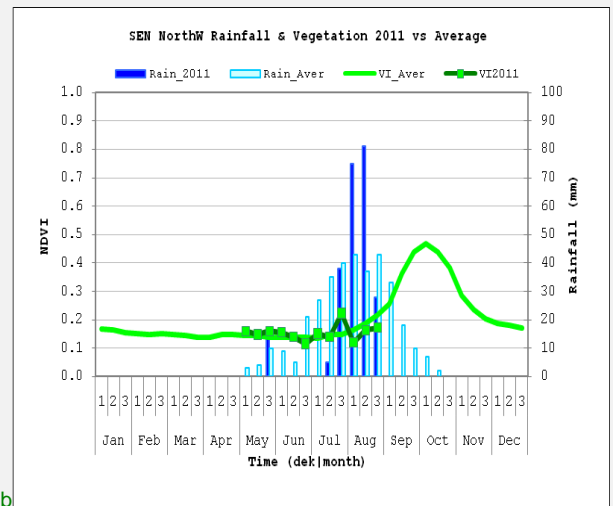
d

Good rainfall during early and mid August in north and south northern parts of the state. Vegetation development levels still below average but it are likely to improve.

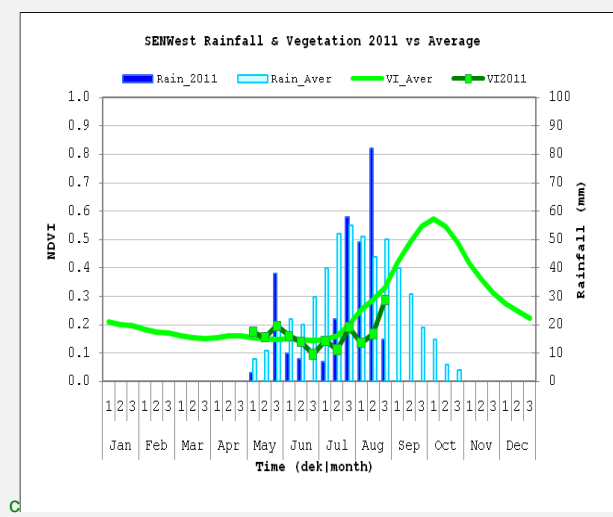
Sennar State: Traditional and semi-mechanize Agriculture



a



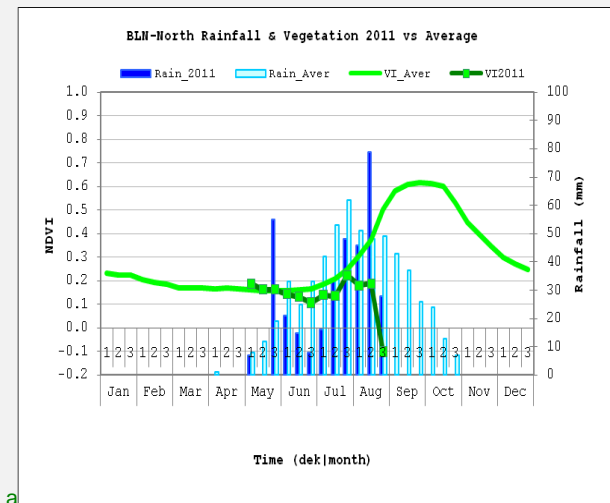
b



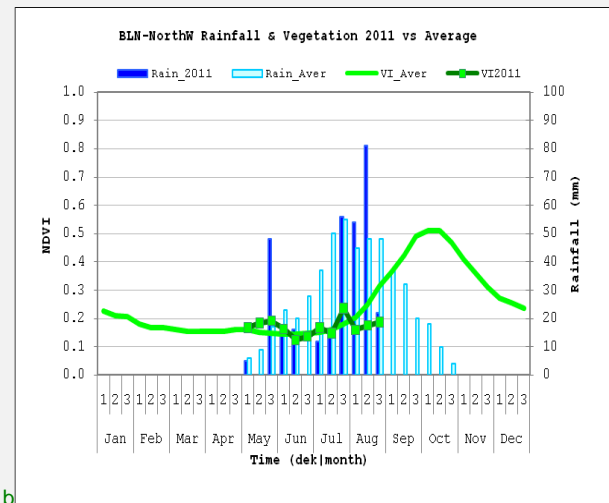
c

On and above average rainfall in early and mid August maintained the vegetation situation and may bring them to the average levels in most parts of the state in the coming dekads.

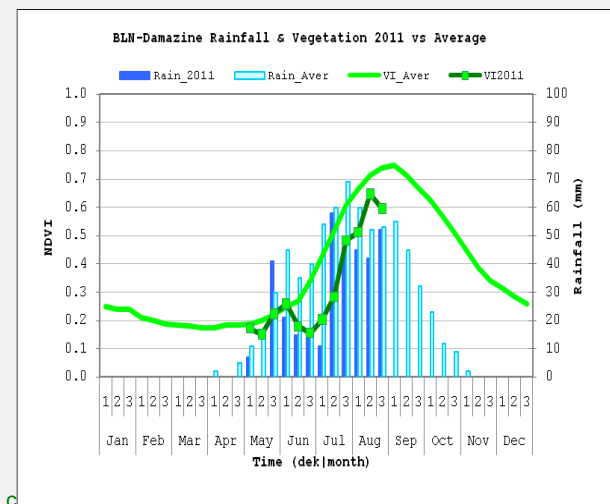
Blue Nile State: Traditional and semi-mechanized Agriculture



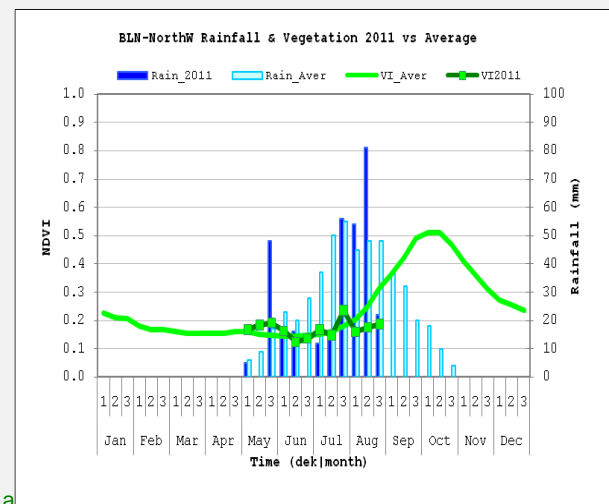
a



b



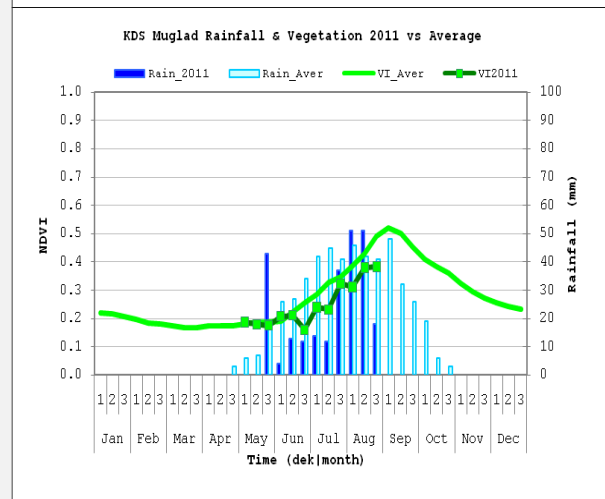
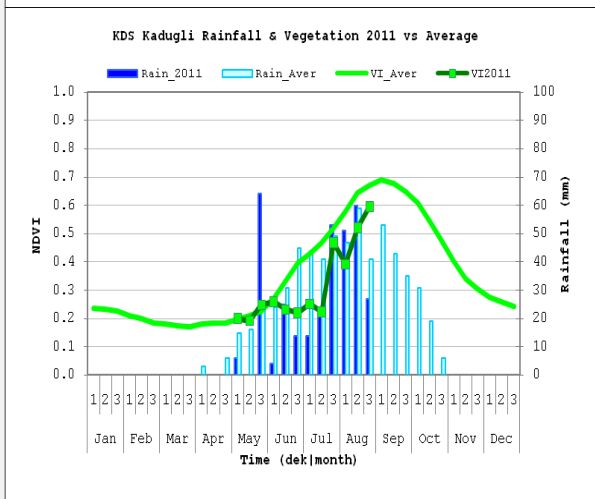
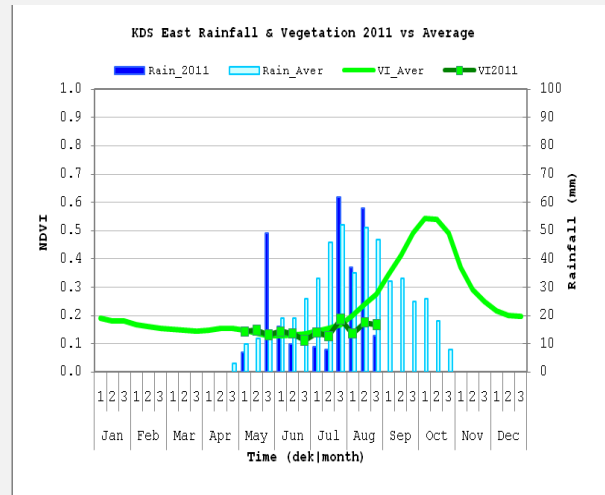
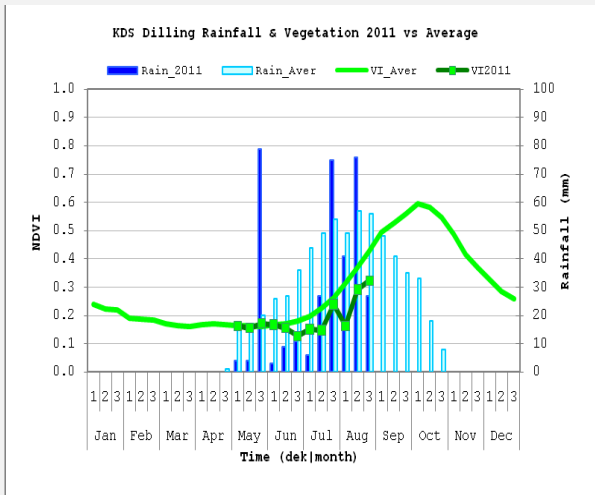
c



a

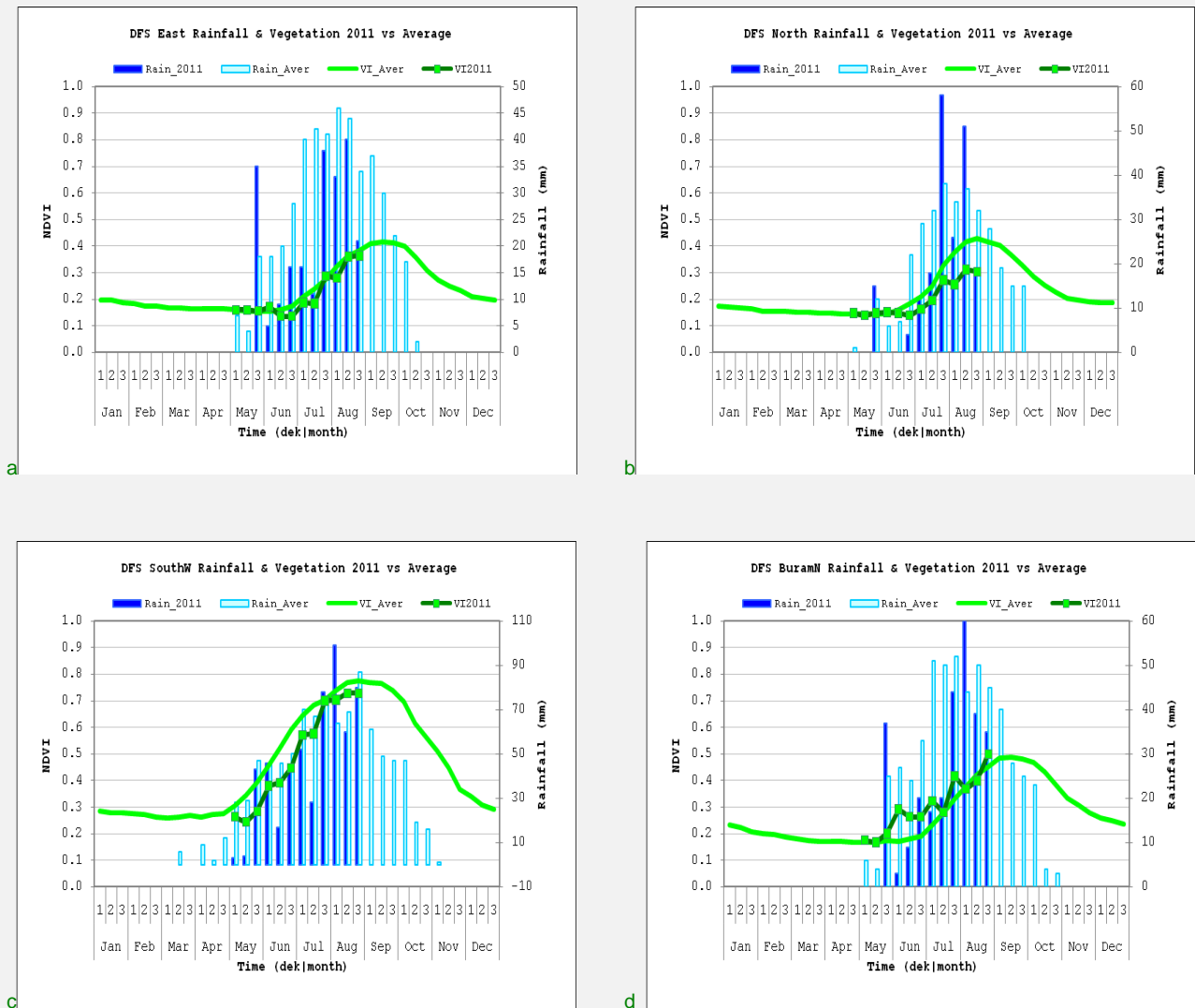
Above average rainfall amounts in early and mid August are noticeable in the most parts of the state. Vegetation and pasture development levels still below average.

South Kordofan State: Traditional Agriculture



On average rainfall in early and mid August in the most parts of the state. Vegetation development levels still below average across all the state.

South Darfur State:



Vegetation development levels on average in north Buram area and southern parts of the state, elsewhere the development levels are below average.

Seasonal Perspectives

El Niño (and La Niña) events are disruptions of the ocean-atmosphere system in the Intertropical Pacific which can cause large scale changes in wind circulation and sea surface temperature, and lead to a variety of impacts on rainfall and temperature distribution across the globe.

During the September – November (SON) season, there is an approximately 40% of La Niña conditions and 58% probability of prevailing neutral conditions, and that is predicted to be the most likely situation through the second half of 2012.

Rainfall Outlook

There are a variety of methodologies and models that use tropical east Pacific sea surface temperatures (SSTs) patterns as input to predict/forecast long term (1 to 6 month) changes to rainfall and temperature regimes over wide areas of the globe.

SMA uses seasonal forecast information produced by itself (based on IGAD Climate prediction and

Application Centre) and information publicly available on the Web from three main sources: IRI, International Research Institute (USA), CPC, Climate Prediction Centre (NASA, USA), ECMWF, European Centre for Weather Forecasts (Europe).

September- November 2011 Rainfall Forecasts

September- November (SON) is the crucial period for most crops in Sudan, in particular for the northern regions. Forecasts for JAS rainfall have been prepared in May and June by a variety of sources. Forecasts made at such long time ranges can provide only general guidance and it is possible to find conflicting information.

SMA updated its seasonal forecast for the rainfall for September- October- November (SON) 2011. For the coming three months, September, October and November. According to this forecast, SON rainfall is expected to be on average to below average over Sudan.

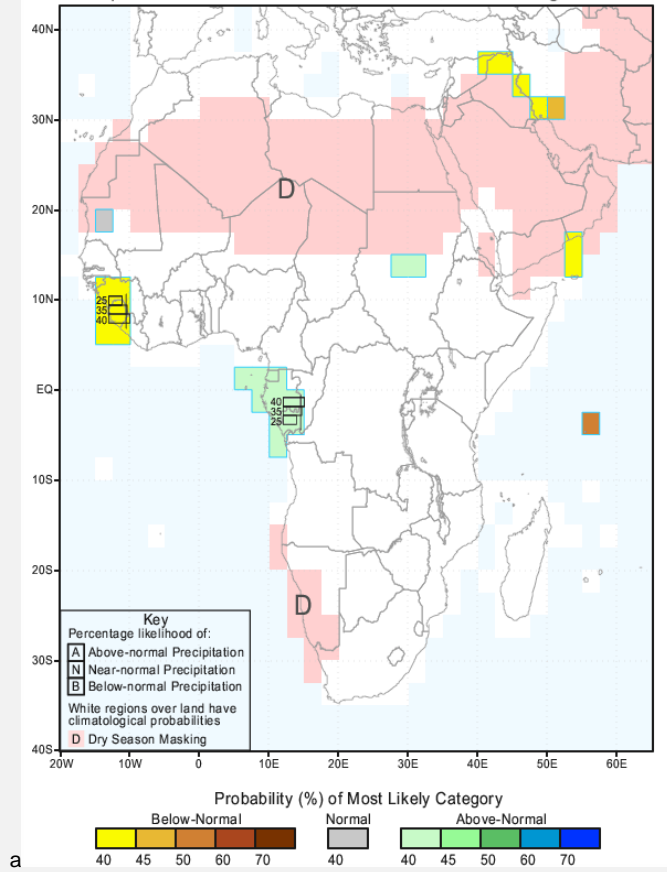
September- November 2011 Rainfall Forecasts

International centres produces seasonal forecast for August/ November for this period from the sources above. IRI and ECMWF forecast (Fig6a, c) outlook – normal rainfall, overall parts of Sudan. CCA outlook and forecast on average to below average rainfall over Sudan. Below average rainfall over the western region of Sudan. See (Fig6b).

IRI and ECMWF are in consensus of forecasting normal condition a cross Sudan, CCA forecast of below normal rainfall across Sudan.

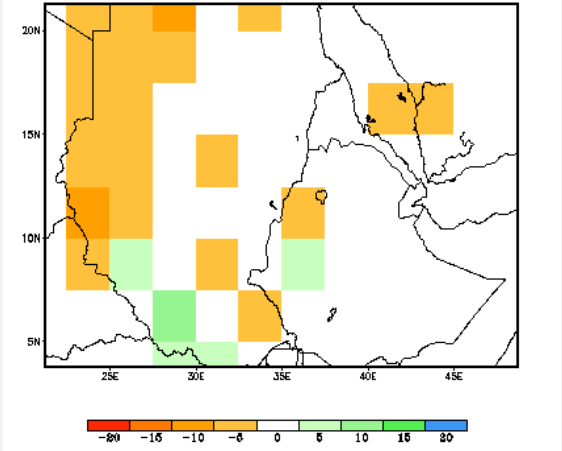
In any case, actual crop-related quality of the rainfall season is influenced by a range of other factors such as the timing and distribution of rainfall amounts through the season, on which these forecasts do not provide information.

IRI Multi-Model Probability Forecast for Precipitation for September-October-November 2011, Issued August 2011



a

CCA Depart. Clim. Prob. Forecast X 100 Aug-Oct 2011 N. Horn of Africa Rainfall, 4 Months Lead



b

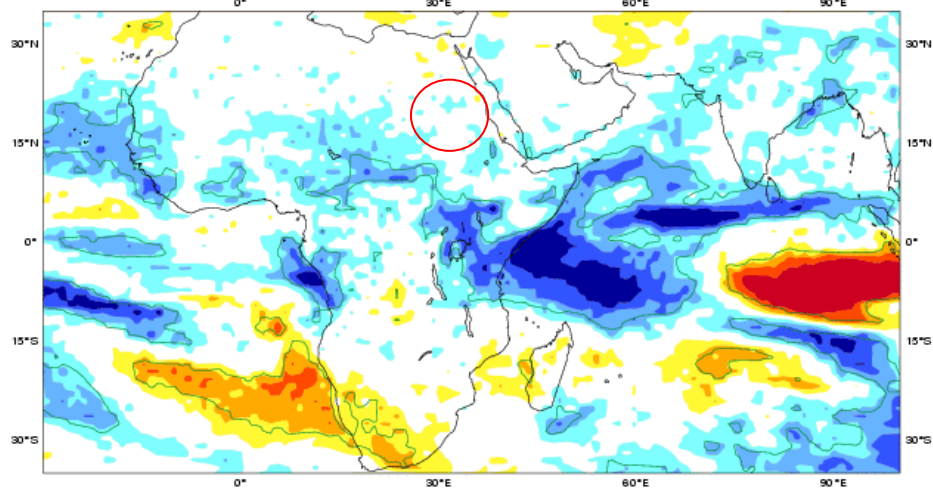
ECMWF Seasonal Forecast Prob (precipitation > median)

Forecast start reference is 01/08/11 Ensemble size = 41, climate size = 275

System 3 SON 2011

Solid contour at 1% significance level

0..10% 10..20% 20..30% 30..40% 40..80% 80..70% 70..80% 80..90% 90..100%



Forecast issue date: 15/08/2011

ECMWF

c

Fig 6a – Probabilistic forecast for September–November (SON) 2011 rainfall for Africa. Boxes indicate likelihood of above (top), on (middle) and below (bottom) average conditions. Green to blue indicate areas of increasingly more likely above average conditions (source: IRI).

Fig 6b – Forecast for August–October (ASO) 2011 rainfall for Africa. Colours indicate departure from climatology (usual scenario), oranges and yellows for below average conditions, blues and green for above average (source CPC).

Fig 6c – Forecast for September–November (SON) 2011 rainfall for Africa. Probability of exceeding median rainfall (usual scenario). Yellow to red for less rainfall than usual, greens and blues for more rainfall than usual. (source : ECMWF)

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