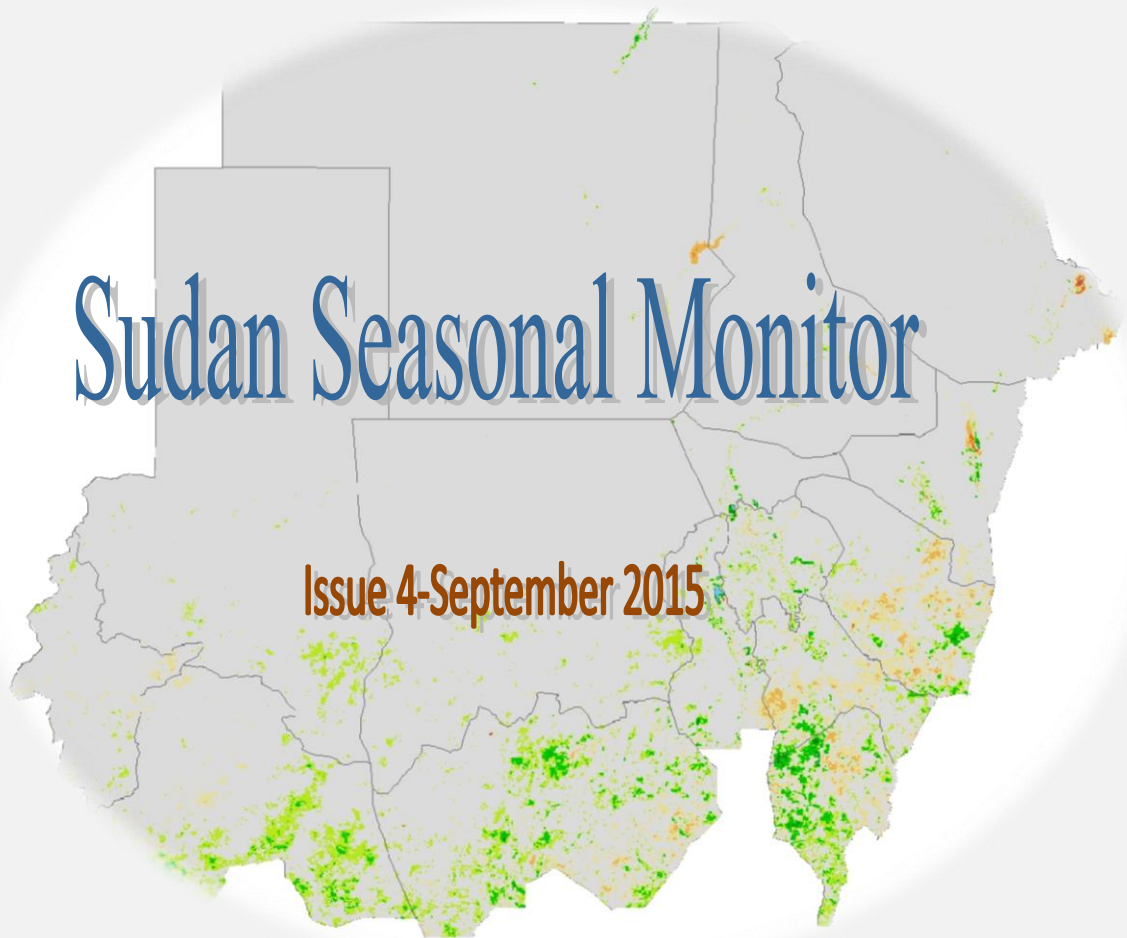


SUDAN METEOROLOGICAL AUTHORITY



## Agrometeorology Division



Prepared by: Agromet Team

# Sudan Seasonal Monitor



Sudan  
Meteorological  
Authority-SMA

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## Summary

- Near normal position of ITF during early August associated with high rainfall amount in some south westerly, south easterly and northern parts of the country. but it was Below its average positions during mid and late August associated with low rainfall amount in some of middle and south westerly parts of the country. *See pages 2, 3.*
- Above average rainfall, amounts registered in August over the Southerly, some of easterly areas, while below average rainfall amounts registered across the central parts of the country. *See pages 3,4.*
- Total amounts of rainfall exceeding (200mm) registered in most of Southern Kordofan, middle and south of southern and Western Darfur, southeasterly parts of Gadaref and Sennar, and Blue Nile states. *See page 4.*
- Slight vegetation development noticed in south of western and southern Darfur, southern Kordofan and farther easterly parts of Sennar states, also noticed in scattered areas in south and east of Blue Nile, north of southern Darfur and southerly parts of Northern Kordofan states. *See page 5.*
- Extended Water requirement satisfaction index calculated to specific rain feed crops. *See page 5,6.*
- Forecasts for June-August, rainfall from different sources have become more pessimistic (IRI and ECMWF) consistent, expectations for this period of the rainy season to be on average to below average rainfall. SMA forecast JJAS rainfall to be from average to above average over the westernise. *See pages6,7.*

## ITF movement

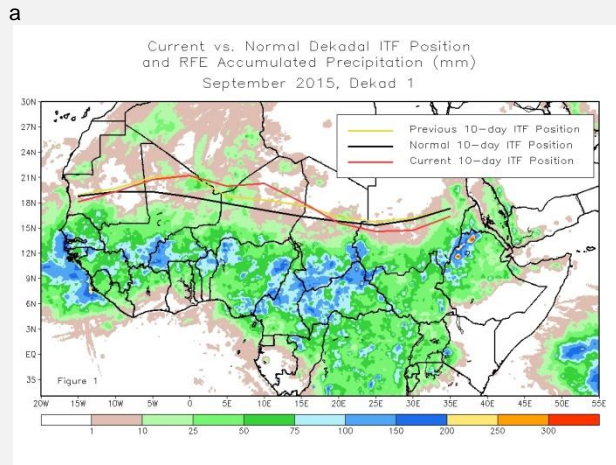


Fig 1a – Position of the ITF over Africa in sapt- Dekade 1 2015(red) compared to average position (black). (Source : CPC).

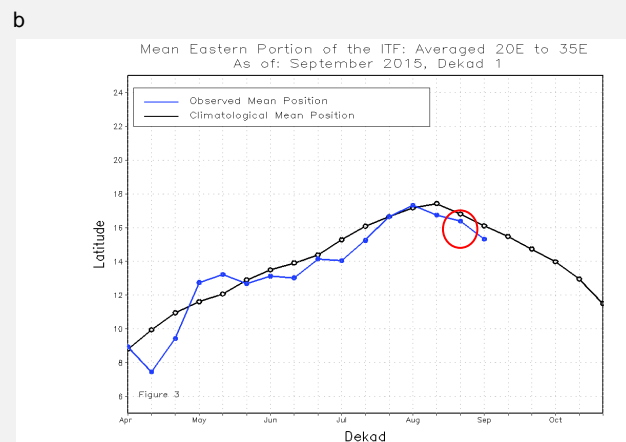


Fig 1b – Average position of the ITF over Sudan along the current season compared to a 20-year average. (Source: CPC). Note the retreat in the position in late May (circled).

## 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 below to its average and previous position across the country. Fig (1b) shows a graph with the ITCZ mean position which is above of

its average position during early August and below its average position during mid, late of August early September.

## August Rainfall in Sudan

**Early August** associated with high rainfall amounts over south of White Nile, south parts of Northern Darfur, middle to south of River Nile, all most of Blue Nile, Southern and Western Darfur and eastern parts of Southern Kordofan States, unlike the areas of South of El Gadaref and Al Gezira states, mid of Khartoum and mid of Northern and Southern Kordofan which registered low rainfall amount. (Fig 2a,2b).

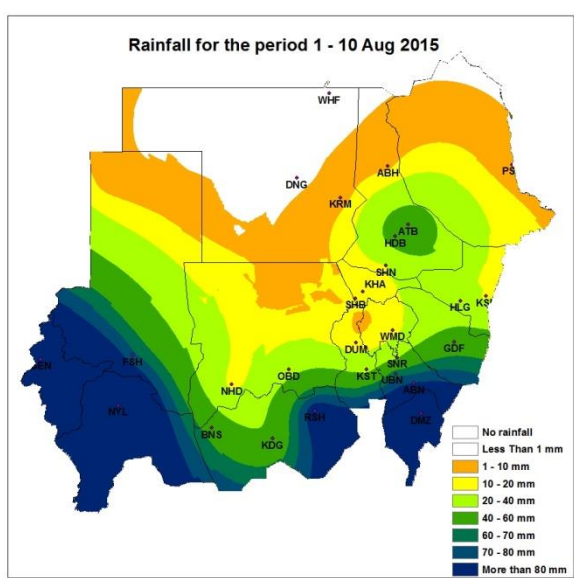
In **mid August** the low rainfall amount registered in El Gezira, east of Khartoum, west of El Gadaref, all most of White Nile and southern Darfur, south east of Northern Darfur, west of Blue Nile, south east and north west of Southern Kordofan and south of Northern Kordofan. But it was with average to Above average in other parts of the country. (Fig 2c,2d).

**Late August** showed low rainfall amounts in south of Western and Northern Darfur, south west of Southern Darfur, north of white Nile and Northern Kordofan, middle toward north of Kassala, west of El Gadaref and all most of El Gezira states. While it showed high rainfall amount in east of El Gadaref, west of Blue Nile, south west of Sennar, south of white Nile, south of Northern Kordofan, south of Kassala and all most of Southern Kordofan. (Fig 2e,2f).

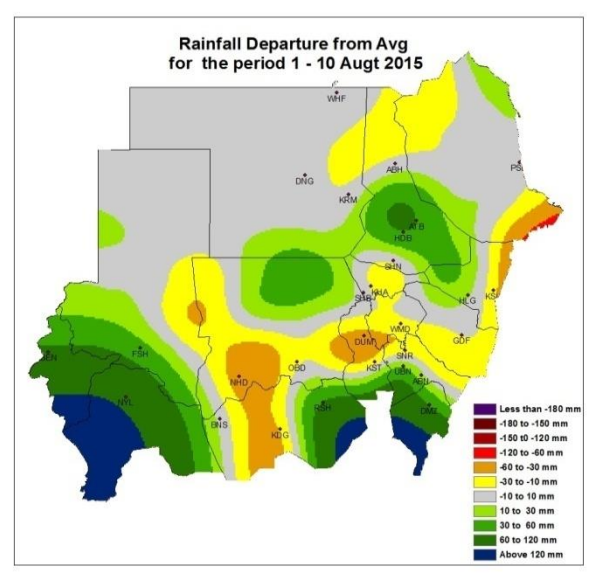
**the total amounts of rainfall in August** exceeding (200 mm) in south of El Gadaref, middle toward south of Sennar, farther south of white Nile, Blue Nile, south of Southern Kordofan and south west of southern and western Darfur states. and it exceeding (100 mm) in south of Kassala, middle of El Gadaref, farther south of El Gezira, middle toward south of White Nile, north of Sennar south of Northern Kordofan and Northern Darfur, middle toward east of southern Darfur and middle and west of Southern Kordofan. in other parts of the country August rainfall was below (100 mm). (Fig 2g,2h).

By end of August the **cumulative rainfall** amount between (100 - 200 mm) registered in north of Kassala, north of El Gadaref, all most of El Gezira, north of white Nile and middle parts of Southern Kordofan and Southern Darfur. while it exceeding (200 mm) in south of Kassala and El Gadaref, south of White Nile, south of Northern Kordofan, farther south of Northern Darfur, Sennar, Blue Nile, Southern Kordofan and Western and Southern Darfur. (Fig 2i).

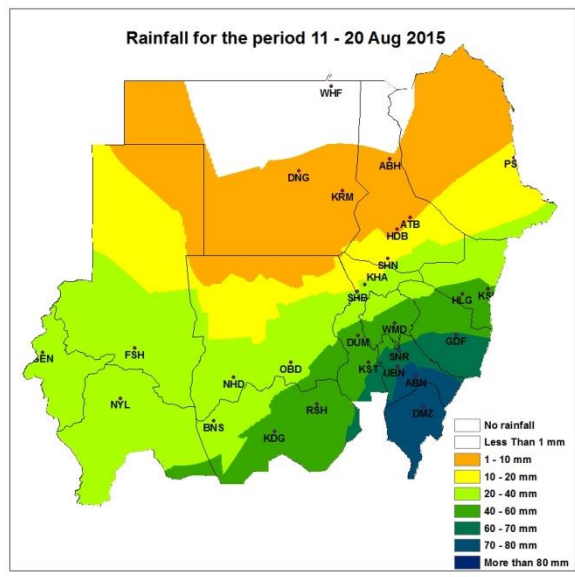
**Above average** cumulative rainfall registered in each of east of El Gadaref, all most of Blue Nile except the farther north which registered near average cumulative rainfall, south west of Sennar, South of white Nile, east of Southern Kordofan, Western Darfur, east of Southern Darfur, middle of River Nile and South of Red Sea states. unlike south east of Northern Darfur, west of Northern Kordofan, middle and west of Southern Kordofan, east of Southern Darfur, west of Kassala and El Gadaref, east of Khartoum, and all most of El Gezira states, which registered **below average** cumulative rainfall since the beginning of May. The cumulative rainfall in other regions was **near average**. (Fig 2j).



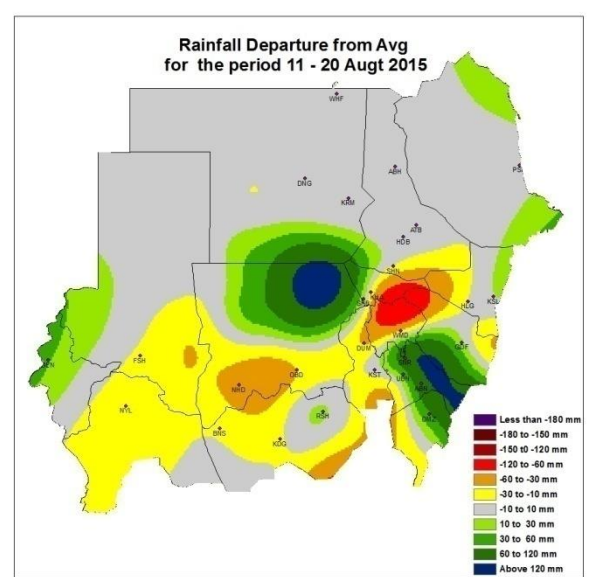
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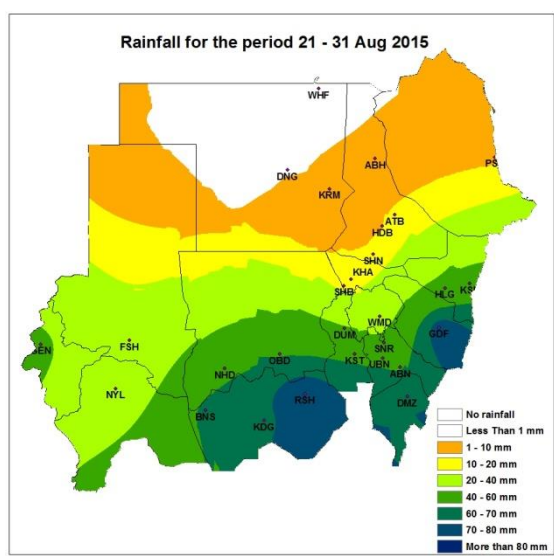
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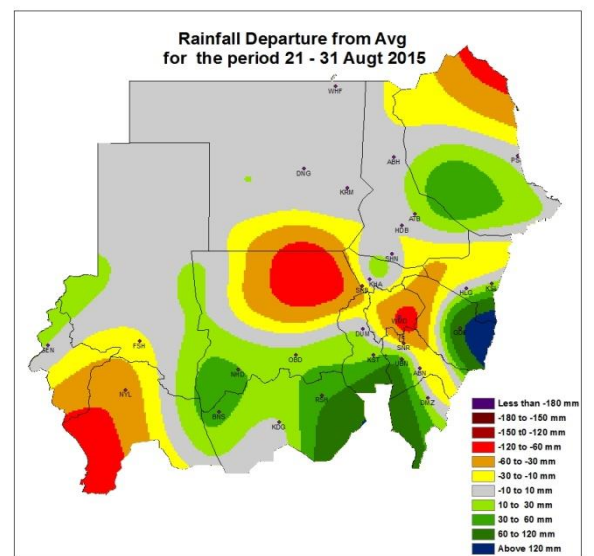
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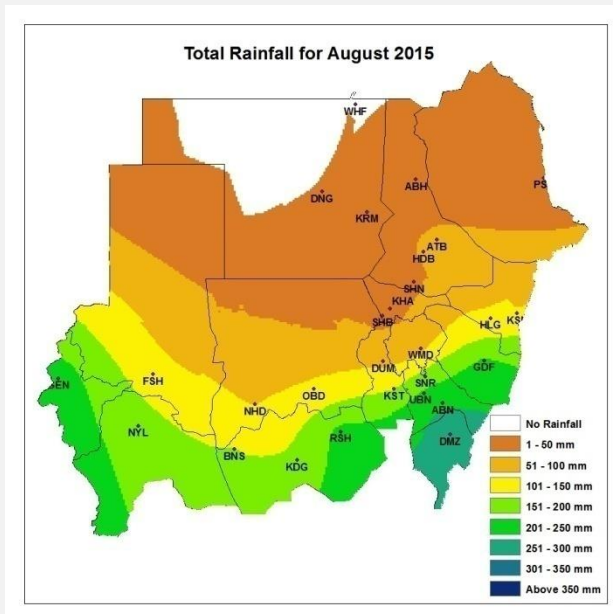


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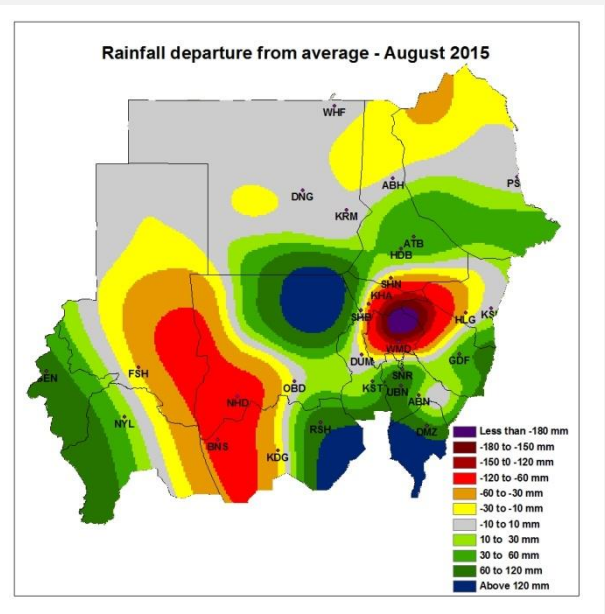


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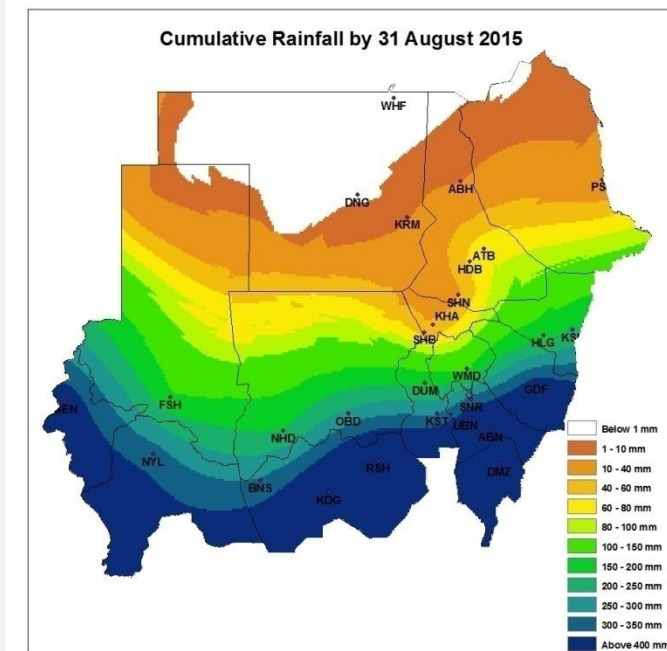




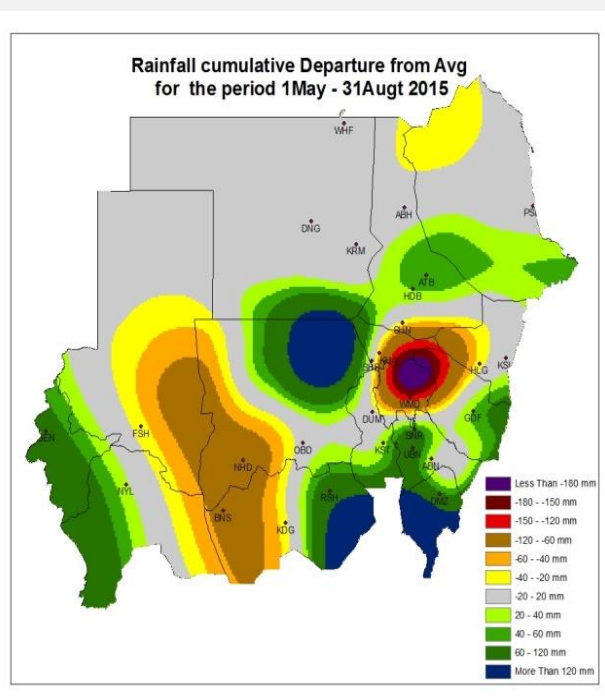
g



h



i



j

Fig 2: a ,c,e dekad 1,2,3 August 2015 rainfall. B,d,f dekad 1,2,3 August 2015 rainfall departure , g August Rainfall , h August rainfall departure from average , i cumulative rainfall , j cumulative departure

## 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 day.

By the end of August the vegetation development noticed in some farther eastern parts of Sennar, middle and South of Blue Nile, All most of Southern Kordofan and Southern Darfur, scattered areas in western Darfur, small spots in south east of Northern Kordofan, and south east of white Nile. See fig (3a).

Above average condition noticed in scattered areas in Southern Kordofan, Southern Darfur, south west of Northern Darfur and North west of Darfur. See fig (3b).

Below average condition noticed in farther south of Kassala, El Gadaref, all most of Sennar and white Nile, scattered in Northern Kordofan, south east of Darfur, middel and south of Western Darfur, southern Darfur and Southern Kordofan and Blue Nile states.

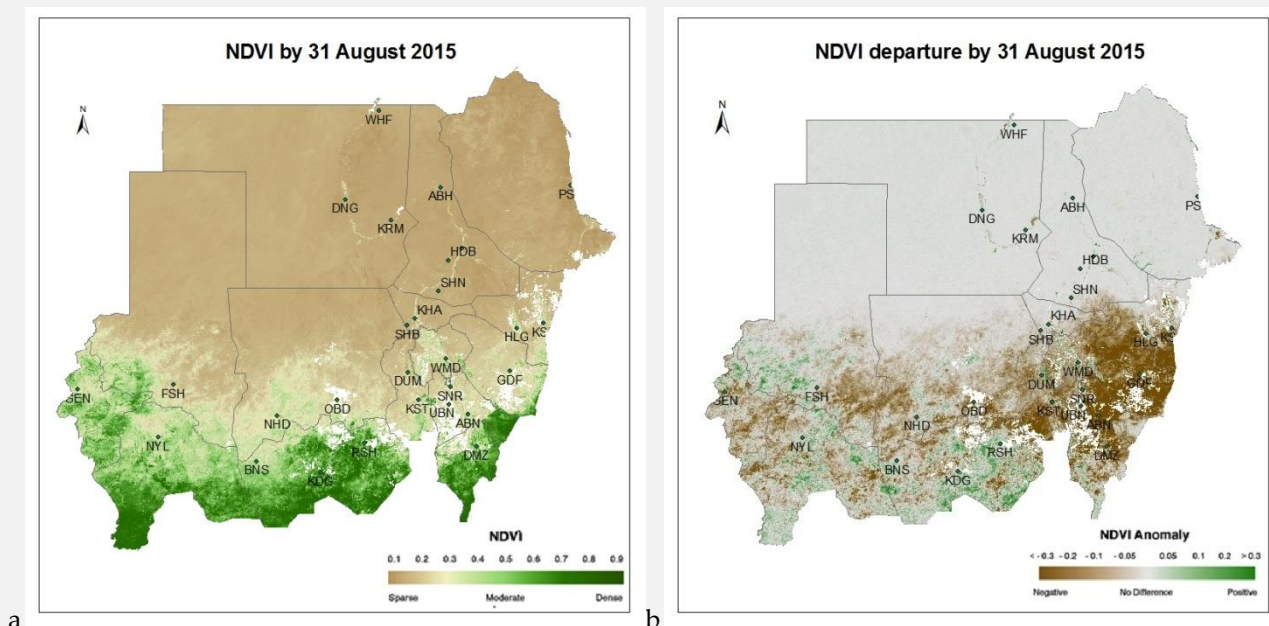


Fig 3a – NDVI progress for late May, Fig 3b – NDVI difference from average in late May 2015. Brown represents below average vegetation development, greens represents above average vegetation development.

### The crop yield estimate according to Water Requirement Satisfaction Index (WRSI)

The spatially explicit water requirement satisfaction index (WRSI) is an indicator of crop performance based on the availability of water to the crop during a growing season. FAO studies have shown that WRSI can be related to crop production using a linear yield-reduction function specific to a crop (FAO, 1977; FAO, 1979; FAO, 1986)AO, 1979; FAO, 1986).

Table (1.1) shows the yield estimation of Sorghum (120, 90), Sesame and Millet depending on extended WRSI which It vary from failure to Very good due to avilability of water.

Sorghum 90			
Station	SD1 SD2	Extended WRSI	Estimated Crop yield
GDF	May1 Jul1	67 100	Mediocer V.Good
DMZ	Jun1 Jul1	98 97	Good Good
FSH	Aug1	30	Failure
SNR	Jun1	86	Average
OBD	Jul3	65	Modiocer
KDG	May2	87	Average
DUM	May3	61	mediocer
NYL	Jun3	100	V.good
GEN	Jun3	97	Good
KSL	May3 Jul2	46 60	Failure Modiocer
WMD	No SEASON FOR RAINFEED AGRICULTURE		

Sorghum 120			
Station	SD1 SD2	Extended WRSI	Estimated Crop yield
GDF	May1 Jul1	80 42	Average failure
DMZ	Jun1 Jul1	100 97	V.Good Good
FSH	Aug1	34	Failure
SNR	Jun1	92	Good
OBD	Jul3	45	Failure
KDG	May2	94	Average
DUM	May3	53	Poor
KSL	May3 Jul2	56 48	Poor Failure
WMD	No SEASON FOR RAINFEED AGRICULTURE		

Millet			
Station	SD1 SD2	Extended WRSI	Estimated Crop yield
GDF	May1 Jul1	87 80	Average Average
DMZ	Jun1 Jul1	100 97	V.Good Good
FSH	Aug1	29	Failure
OBD	Jul3	53	Poor
KDG	May2	98	Good
DUM	May3	61	mediocer
NYL	Jun3	91	Good
GEN	Jun3	93	Average
KSL	May3 Jul2	63 45	Modiocer Failure
WMD	No SEASON FOR RAINFEED AGRICULTURE		

Sesame			
Station	SD1 SD2	Extended WRSI	Estimated Crop yield
GDF	May1 Jul1	82 87	Average Average
DMZ	Jun1 Jul1	97 100	Good V.Good
SNR	Aug1	83	Average
OBD	Jun1	75	mediocer
DUM	Jul3	68	mediocer
KSL	May3 Jul2	63 45	Modiocer Failure
WMD	No SEASON FOR RAINFEED AGRICULTURE		

**Notes:**

SD1: earliest Starting date  
of growing season

SD2: latest Starting date of  
growing season

**Table(1.1)** extended Water Requirement Satisfaction Index.

## Seasonal Perspectives

El Niño (and La Niña) events are disruptions of the ocean-atmosphere system in the Inter tropical 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 June –July- August (JJA) season, there is an approximately 90% of El Niño conditions and 68% probability of prevailing dry conditions.

## 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 months) 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 two main sources: IRI, International Research Institute (USA), ECMWF, European Centre for Weather Forecasts (Europe).

## June- August 2015 Rainfall Forecasts

June-September (JJAS) is the crucial period for most crops in Sudan, in particular for the central regions. Forecasts for JJAS rainfall have been prepared in May 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 June- September (JJAS) 2015. According to this forecast, JJAS rainfall is expected to be on average to below average over zone3, on average to above average over zone4 and with averages over both zone1 & zone2.

### June- August 2015 Seasonal Rainfall Forecasts

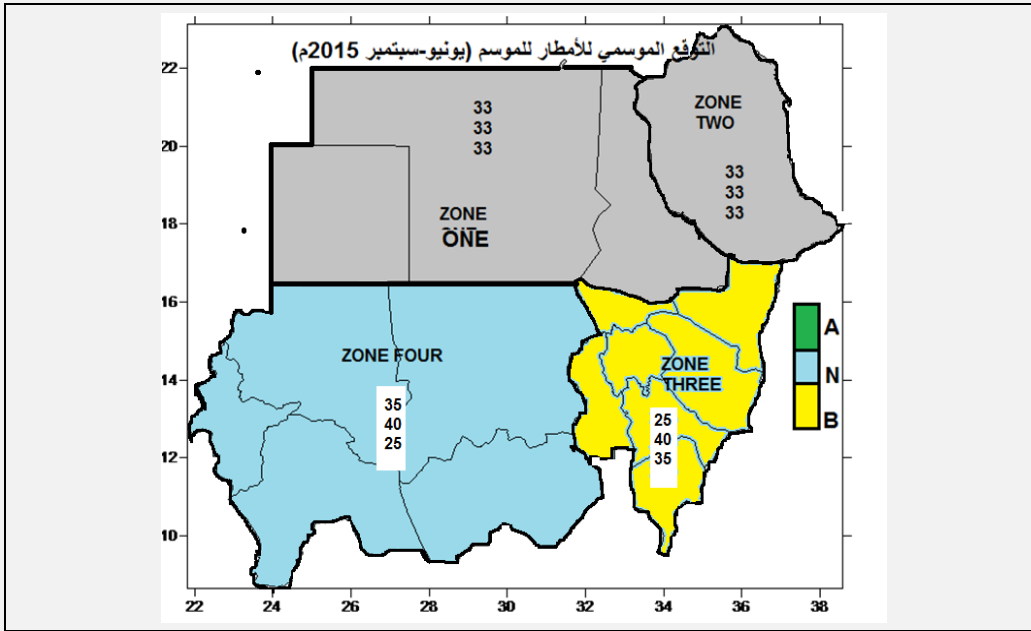


Fig 4 – SMA forecasts of June-September rainfall. 2015. Boxes indicate likelihood of above (top), on (middle) and below (bottom) average conditions. Zones represent homogeneous climatic rainfall.

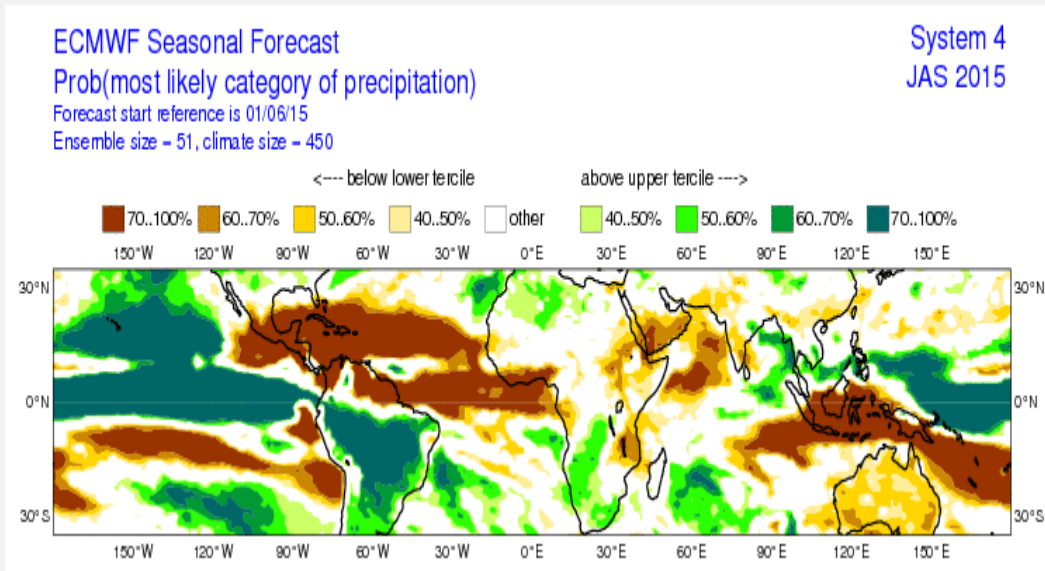


Fig 6b – Forecast for July-September (JAS 2015) rainfall for Africa. Probability of exceeding median rainfall, usual scenarios). Yellow to red for less rainfall than usual, greens and dark green for more rainfall than usual. (Source: ECMWF)

International centres produces seasonal forecast for June - August for this period from the sources above. Fig 6a – Probabilistic forecast for July-September (JAS 2015) rainfall for Africa, ECMWF shows a more moderate outlook and forecasts below normal to normal conditions for the most regions of Sudan. (Fig6 b),

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.

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For further information: please contact:

*Agrometeorology Division – Sudan Meteorological Authority (SMA):*

E-mail (s): [Agromet@ersad.gov.sd](mailto:Agromet@ersad.gov.sd).

P.O.Box 574 Khartoum Sudan.

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**Agromet Team:**

- 1. Mrs. Amel Mohammed Abedalla..... Agro-meteorologist
- 2. Mrs. Safa Abdelhameed Babiker..... Agro-meteorologist

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