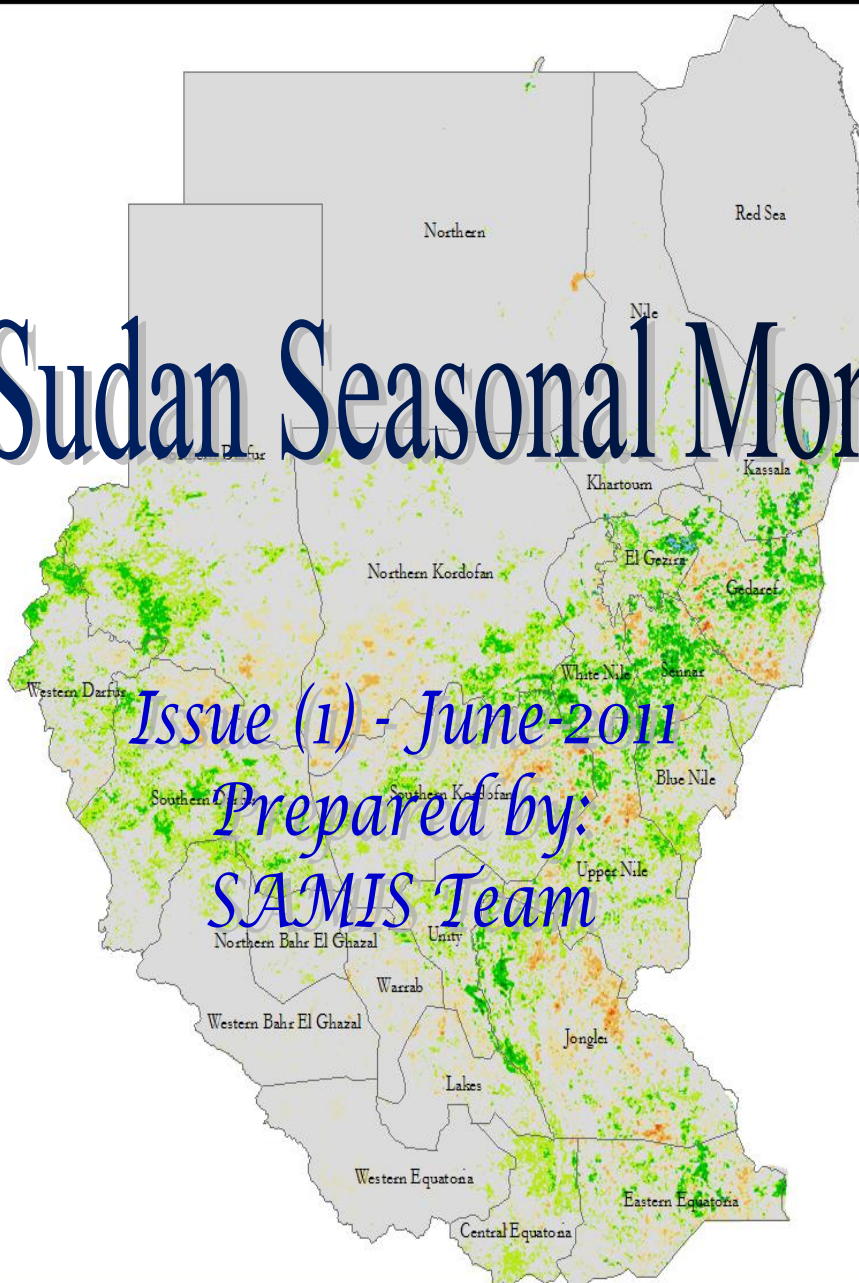


Sudan Seasonal Monitor

Issue (1) - June-2011

*Prepared by:
SAMIS Team*



Sudan Seasonal Monitor



Sudan Meteorological Authority
Federal Ministry of Agriculture and Forestry

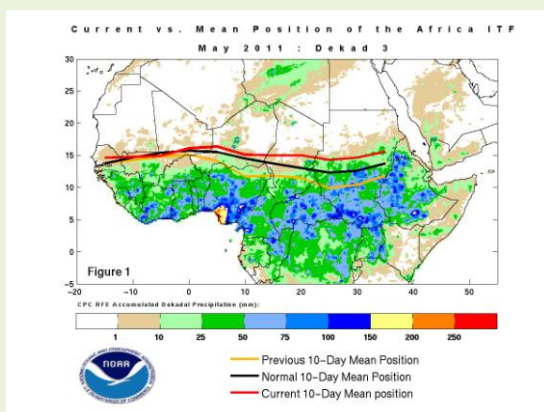


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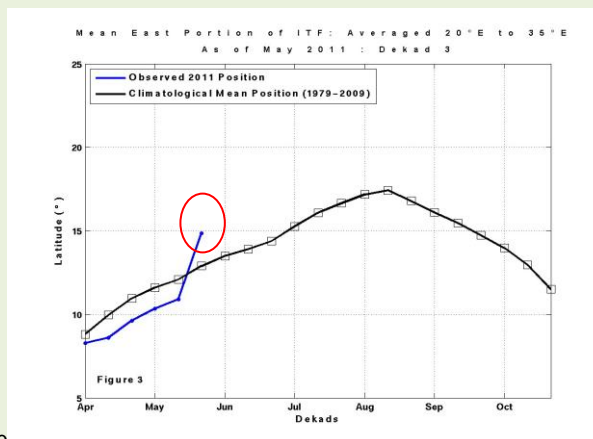
Summary

- **Early and advanced movement of IFT northward, implied significant rainfall over the north part of Sudan with high rainfall amounts registered in the Southern and western part of Sudan during late May. See Page 1**
- **Good late May rainfall will support the agricultural situations in the southern Sudan and provide favorable situation for early growing in the southern Kordofan and Southern Darfur. See page 2**
- **Favorable conditions of growing seasons and replanting are maintained by late May good rainfall , especially in the southern and western parts of Sudan.**
- **Vegetation has significantly developed to average levels in the areas of Warab, Jonglei, Bahr Eljabal, Unity, Western Bahr Elghazal, Western Equatoria and Eastern Equatoria after the March and April dryness. See Page 4.**
- **Forecasts for July-August-September rainfall from different sources (IRI and ECMWF) have become more consistent. Considering forecasts from SMA and from other institutions, expectations for this key period of the rainy season are of on average to above average rainfall. See Pages 5-7.**



a

Fig 1a – Position of the IFT over Africa in May21-31-2011(red) compared to average position (black). (Source : CPC)



b

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 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 (ITCZ). Since the rains 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 north to its average

position and north of the previous dekad. fig 1b shows the decadal progress of the ITCZ in late May where it is north to its average position.

May and Early June Rainfall in Sudan

During May, rainfall situation in the Southern part of Sudan was promising especially during late May, where above to average rainfall registered in Upper Nile, Unity, Northern Bahr El Ghazal, Warab, Bahr Eljabal and Jonglei. As usual the eastern part of East Equatoria showed dryness condition associated with the northern fast movement of the ITCZ during late May. (see Fig 2a)

In the northern Sudan, above average rainfall is registered in South Kordofan State and the southern part of North Kordofan in late May (Kadoglei, Babanusa), southern Darfur state also experienced above average rainfall (Rashad and Fasher). In addition, on average rainfall registered in White Nile and Blue Nile States. Kassala state also showed above average rainfall as percentage of average. In contrast, dryness conditions are prevailing during May in Sennar and Gedaref State and most of the northern part. (see Fig 2b)..

During early May, significant rainfall amounts was registered in the Southern part (Bahr Eljabal, Warab, West Equatoria, Upper Nile), the rainfall extended to the north with little amounts in South Kordufan, Blue Nile, Gedarif, Kassala and Gezira.

Late May the rainfall was spread to the northern parts of Sudan, on average rainfall amounts was registered in southern part of the country and also in the South Kordufan, Blue Nile and Sennar. The Eastern Region of the country (Kassala, Gedarif, and Sennar) and also Gezira state experienced below average rainfall amounts during late May. (See Fig 2a)

Above average rainfall are registered during late May in; Damazine (57.7mm), Renk (109.4mm), Malkal (84.1mm) and Juba (95.1mm). Also, this good rains extended western wards; Fasher (41.6), Rashad (61.6mm), Kadoglei (51.5mm). (see Fig 2a).

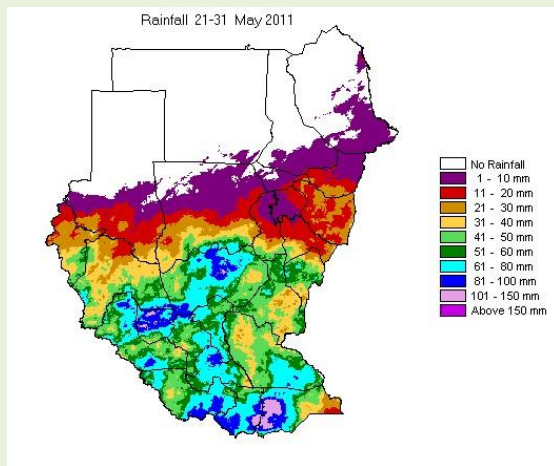
In term of total rainfall amounts, May shows a wide distribution of the rainfall over Sudan, with above average amounts in Bahr Eljabal and West Bahr Elghazal and East Equatoria. Western, central and Eastern parts of the country received below average rainfall amounts

In general, the situation was improved in Behr El jabal and east equatorial, as a result of May good rainfall.

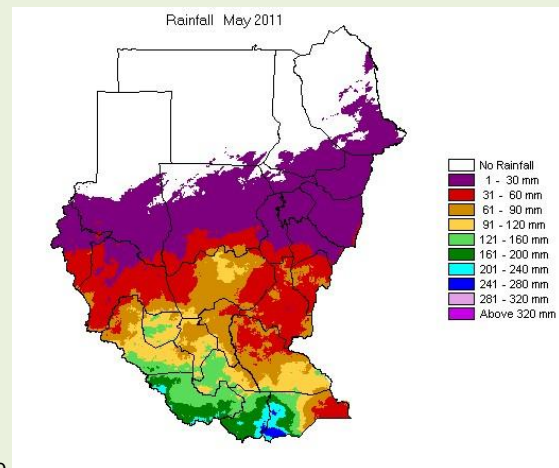
Late May, good rainfall supported the agriculture situation in the southern Sudan and provide a favourable conditions for starting the growing season in the southern Kordofan and southern Darfur states. The significant amounts of rainfall that registered in the wide region in the north part in May but it is not sufficient for sowing the crops and may follows by long dry spells during June.

During late June, the rainfall was concentrated in the southern part of Sudan (Upper Nile, Warab, Western Bahr Elghazal and Unity), with significant amounts; Renk 53.4mm, Malakal 41mm. South Kordofan also showed significant rainfall (Kadoglei 40.2mm). (see Fig 2e).

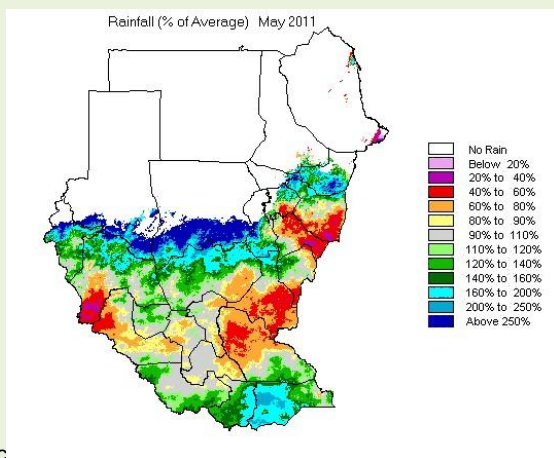
In terms to total rainfall , during early June, rainfall amounts are sufficient to support the Agriculture in the southern part of Sudan. The situation in the north part is under dry condition during early June. State of southern Kordofan and Darfur gain from wet conditions during this period, in order to support the agriculture situations. (see Fig 2f).



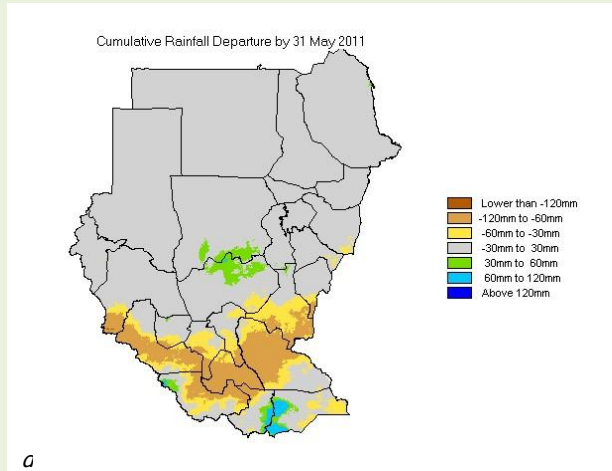
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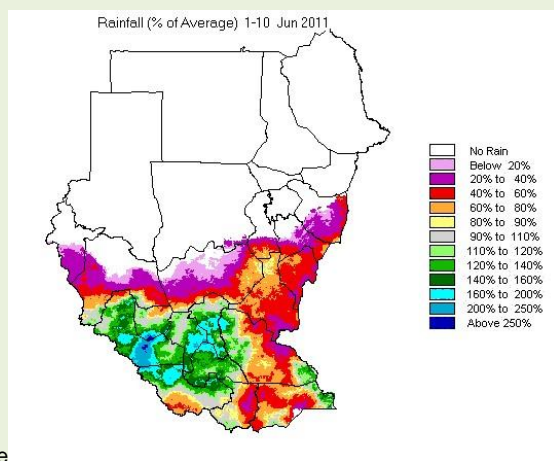
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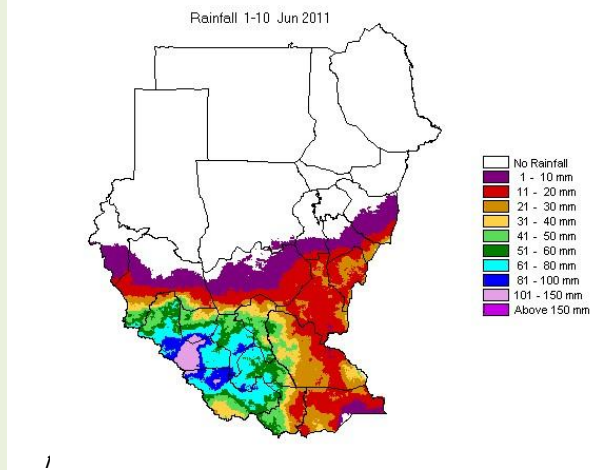
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d



e



f

Fig 2:a – Rainfall amounts in May 2011, b – Rainfall in 21-30 MAY2011,c –Total rainfall from early March – late May as a percentage of the average, d- cumulative rainfall departure by late May, e- Rainfall as percentage of average in early June, and f- total rainfall for early June.

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 insolation 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 Southern Sudan, suitable conditions for planting and early crop development took place in early May, reflecting the good 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.

In late May, there was northwards progress of the rainfall and this is reflected in the occurrence of planting conditions across remaining areas of Southern Sudan and in parts of South Kordofan, South Darfur. Some areas in the South (northern Jonglei, Upper Nile) have not yet registered a growing season indicating very poor conditions for agriculture in this area.

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.

The dryness and lack of rainfall during early April, early and mid April led to below average vegetation development. As a consequence, this led to significant change in vegetation conditions, when compared with average situation. These worst situations are maintained by late May good rainfall, which results in on average vegetation development in Warab, Jonglei, Bahr Eljabal, Unity, Western Bahr Elghazal, Western Equatoria and Eastern Equatoria along the borders with Kenya, Uganda, Congo and Central African Republic. The situation is developed as results of early June rainfall especially in the southern part and southern Kordofan and Darfur regions.

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 June - August season there is an approximately 57% probability of maintaining neutral conditions, and that is predicted to be the most likely situation through the second half of 2011 and into early 2012. The likelihood of returning to El Niño or La Niña conditions is now very low.

Note that El Niño – La Niña effects on the climate of Sudan are not known in detail but are judged to be weaker than in other areas such as Southern Africa and Kenya-Tanzania.

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).

June – September 2011 Rainfall Forecasts

July-August-September (JAS) 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 published its seasonal forecast for the rainfall for June-July-August-September (JJAS) 2011 (Fig 5). According to this forecast, JJAS rainfall is expected to be on average to above average in eastern region (Zone3), with probabilities of 50-35%, western region (Zone 4) is expected to be above average to average with probabilities of 40-35%. In contrast, in Southern Sudan rainfall expectation is varied, southern west part (Zone 5) is expected to be on average to below average with probabilities of (45%-30%). The southern east part (Zone 6) is expected to be above to average with probabilities of (45%-30%). SMA will regularly update it seasonal forecast according to the sea surface temperature situations..

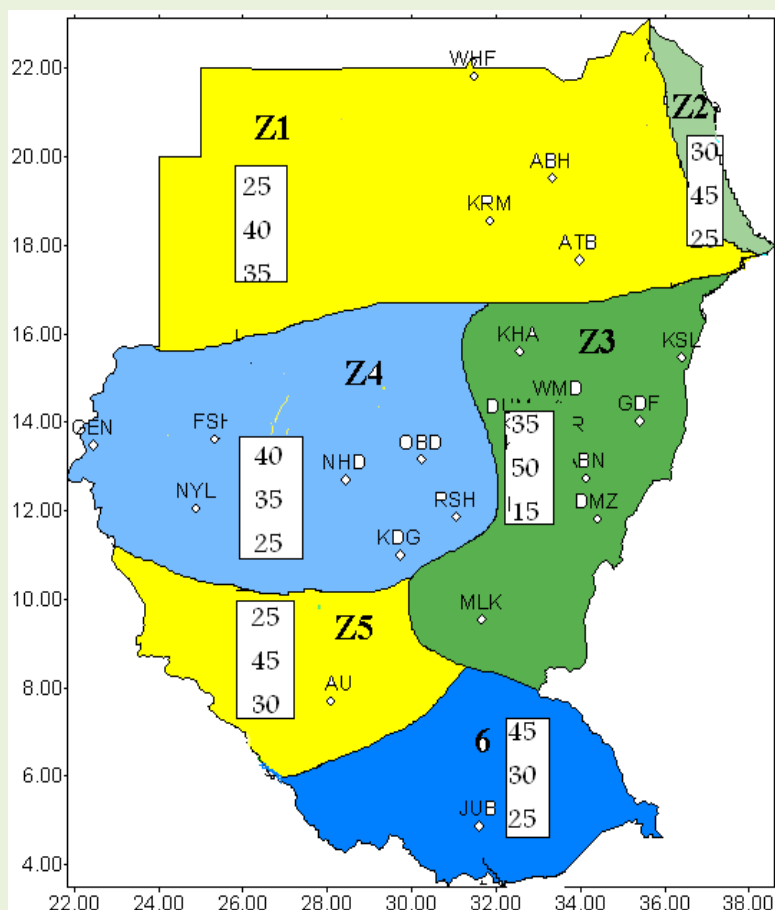


Fig 5 – SMA forecasts of June - September rainfall. 2011). Boxes indicate likelihood of above (top), on (middle) and below (bottom) average conditions. Zones represent homogeneous climatic rainfall.

June- July -August-September 2011 Rainfall Forecasts

This period is crucial one of most crops in the northern regions of Sudan. International centres produces seasonal forecast for June/August for this period from the sources above. However, forecasts made at such long ranges have low skill and provide only general guidance. As a result, it is frequent to find conflicting information and this is case this season.

IRI and ECMWF forecast (Fig6a, c) outlook – above normal to normal rainfall, mainly in across the centre of Sudan and dry season in the southern west regions with probabilities of 40-35% and 80 – 70%. CCA shows pessimistic outlook and forecast below normal across the central Sudan and normal to above normal in the most west and south parts of the country. See Fig 6b

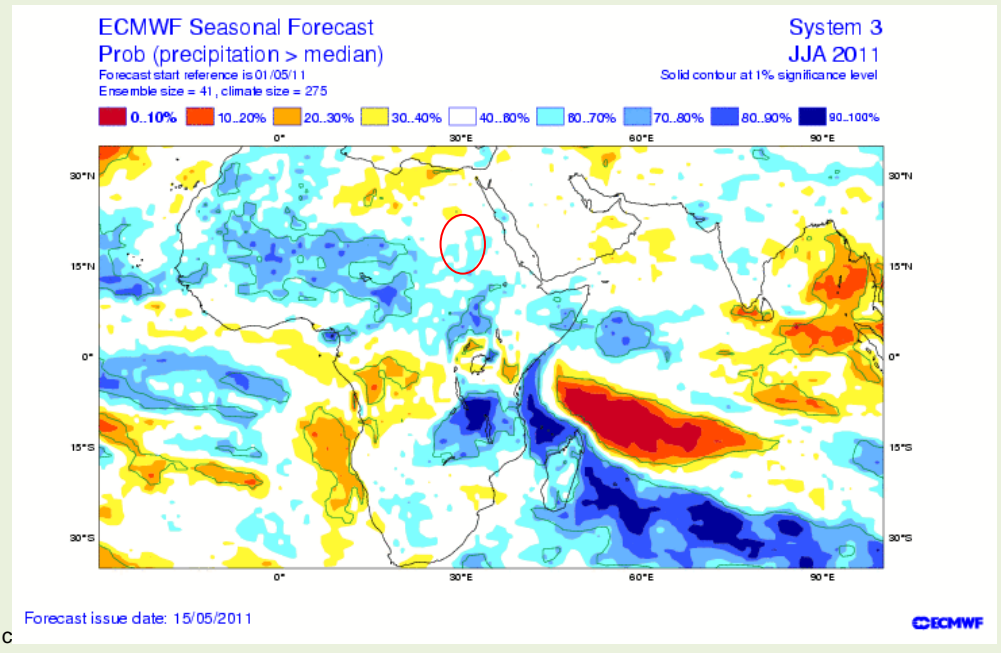
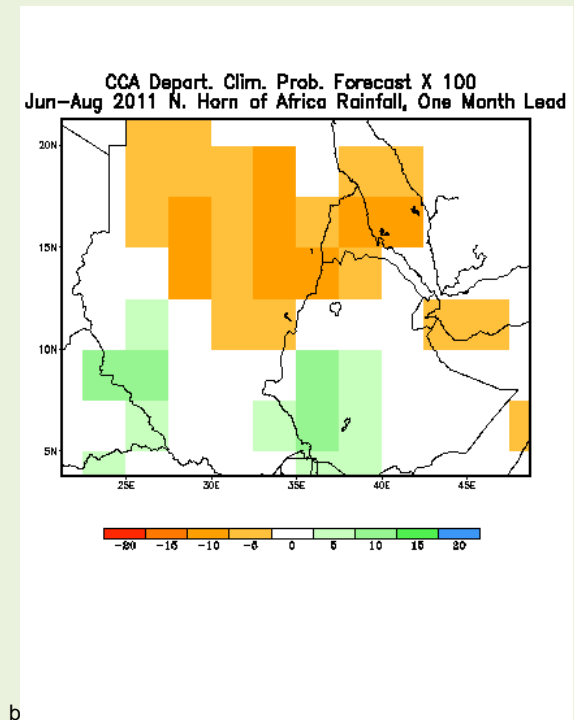
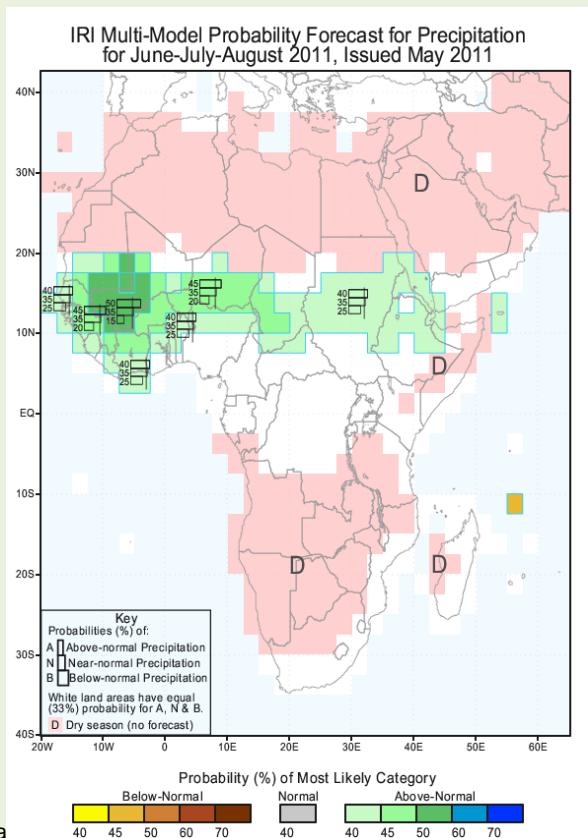


Fig 6a – Probabilistic forecast for June-July-August (JJA) 2011 rainfall for Africa. Boxes indicate likelihood of above (top), on (middle) and below (bottom) average conditions. Green to blue indicate areas of increasingly more likely above average conditions (source: IRI).

Fig 6b – Forecast for June-July-August (JJA) 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 June-July-August (JJA) 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)

IRI, ECMWF and SMA are in consensus of forecasting above normal to normal condition across the central Sudan, this is agree with SMA forecast of normal to above normal to normal rainfall across the central Sudan, while they disagree with CPC which shows below normal conditions across central of Sudan. There is no sure way to decide which forecast is better. Inconsistencies like this may result in a middle way (average conditions).

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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