

Sudan Seasonal Monitor



Sudan Meteorological Authority
Federal Ministry of Agriculture and Forestry



Issue 2

May 2009

Summary

- In May, rainfall systems retreated back to their average position, and moved markedly south in the middle of the month, a movement that was accompanied by pronounced dryness across most of Sudan in particular during mid May. See Page 1-2.
- After an initial good progress of the rains across Southern Sudan during most of April, the dry conditions during May are expected to bring delays to the start of the agricultural activities in this region, affecting the planting of early and late maturing sorghum staple varieties. See Page 2-3.
- Vegetation levels are still above average in parts of Southern Sudan (Lakes, southern Jonglei, Eastern Equatoria) as a result of April rainfall. May dryness is expected to bring development more in line with average conditions. See Page 3-4
- Forecasts for the 3 month rainfall amount from May to July all indicate on average conditions across most of Sudan. However, May rainfall is now expected to be below average and Sudan Meteorological Authority new forecast for the June rainfall amounts provides expectations of below average rainfall as well. See Page 4-5
- Forecasts for July-August-September rainfall from different sources are still not fully consistent, but tendencies have changed towards stronger indications of below average rainfall amounts in this key period. On balance, expectations for the main rainy season in (northern) Sudan should now be of moderately below average rainfall. See Pages 6-7

Seasonal Progress

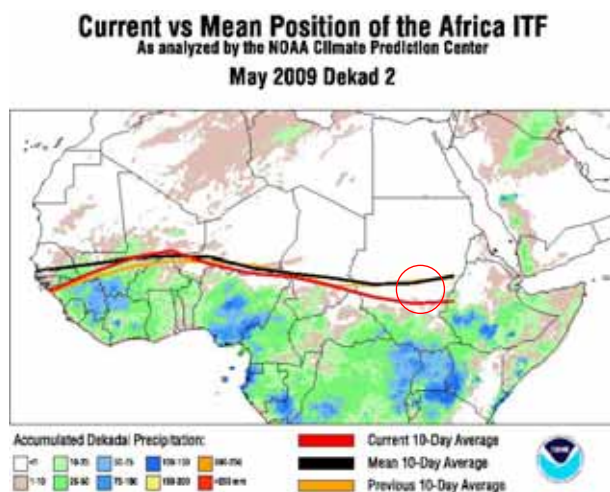


Fig 1a – Position of the ITF over Africa in May 11-20 2009 (red) compared to average position (black) and previous position (orange) (Source : CPC). ITF is very much south of the average

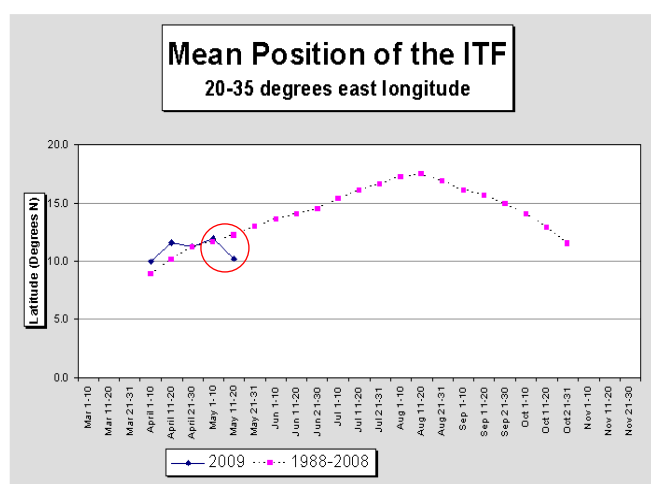


Fig 1b – Average position of the ITF over Sudan along the current season compared to a 20 year average. (Source: CPC). Note the retreat in the position in mid May (circled)

Rainfall in Sudan mostly results from 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 InterTropical Front (ITF). Since the rains follow south of the ITF, the seasonal progress of the rainy season and its quality can be evaluated by tracking the ITF.

Fig 1(a) shows a map with the latest ITF position, the previous position and the usual position, while Fig 1(b) shows a plot of the average position over Sudan from the beginning of the season.

These show that the ITF and the associated rainfall systems retreated southwards in mid May. This is after a faster than average progress until the last week of April, resulting in rainfall moving north earlier than usual, followed by a retreat back to the average position in early May.

This pushing back of the rainfall is shown clearly in the next section by the maps of rainfall for the first two decades of May. Recovery is expected but the delay may remain depending on how quickly rainfall systems return northwards.

April and Early-Mid May Rainfall in Sudan

During April, rainfall moved northwards, covering Southern Sudan. Good rainfall in Central Equatoria, Juba was fairly wet through the month. Higher rainfall in the southwest borders with CAR and extending into South Darfur, with end of April very wet in West Bahr El Ghazal.

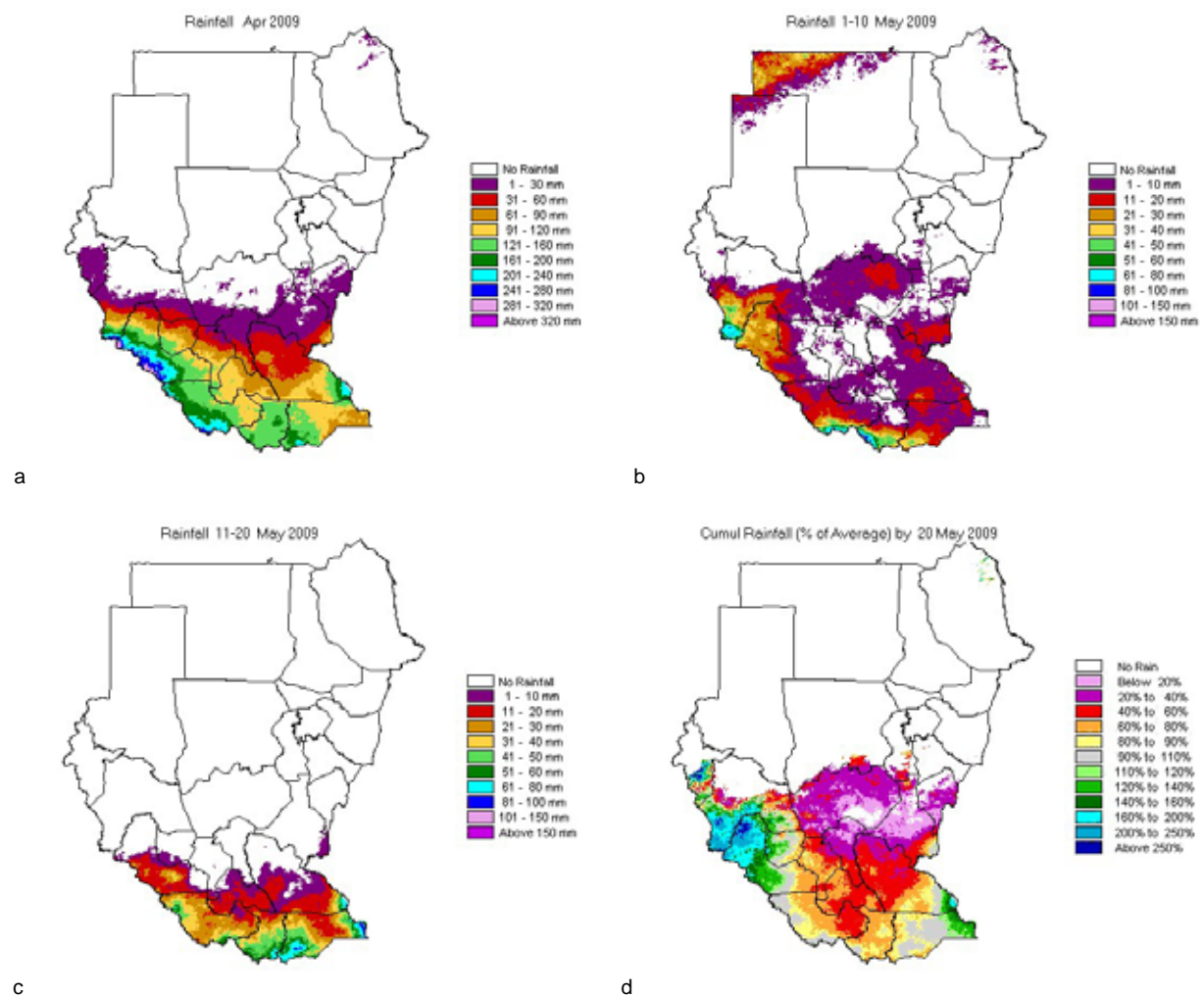


Fig 2 – Rainfall amounts in the month of April (a), in early May (b) and in mid May (c)

Fig 2d – Total rainfall from March until mid May as a percentage of the average

In late April the first rainfall amounts reached South Kordufan, Blue Nile and Sennar. In contrast, rainfall has been fairly poor in Malakal region. In early May, rainfall was low everywhere and this dryness continued and intensified during mid May. Figures 2b,c show clearly how sparse and low rainfall has been for the first three weeks of May, except in border areas of the South.

The total rainfall from the beginning of the season (Fig 2d) has varied in quality across the south of Sudan.

It is noticeable above average rainfall in Great Bahr El Ghazal resulting from heavy storms in the second half of April. In southeastern Jonglei and most Eastern Equatoria rainfall has been on or above average.

As a result of the retreat of the rainfall, a wide area of below average rainfall is evident in South Kordofan and Upper Nile, continuing south across Jonglei, Lakes and Western/Central Equatoria.

At the moment, the lower than average rainfall has caused some delay in the start of planting activities in the northern half of Southern Sudan, a scenario which is likely to last until the end of the month; this affects the planting of the late and early maturing varieties of sorghum. However, rainfall seasons in this region are long and there is time for good recovery. Some delay is also likely in the agricultural season in central Sudan (South Kordofan, Upper Nile and Blue Nile).

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.

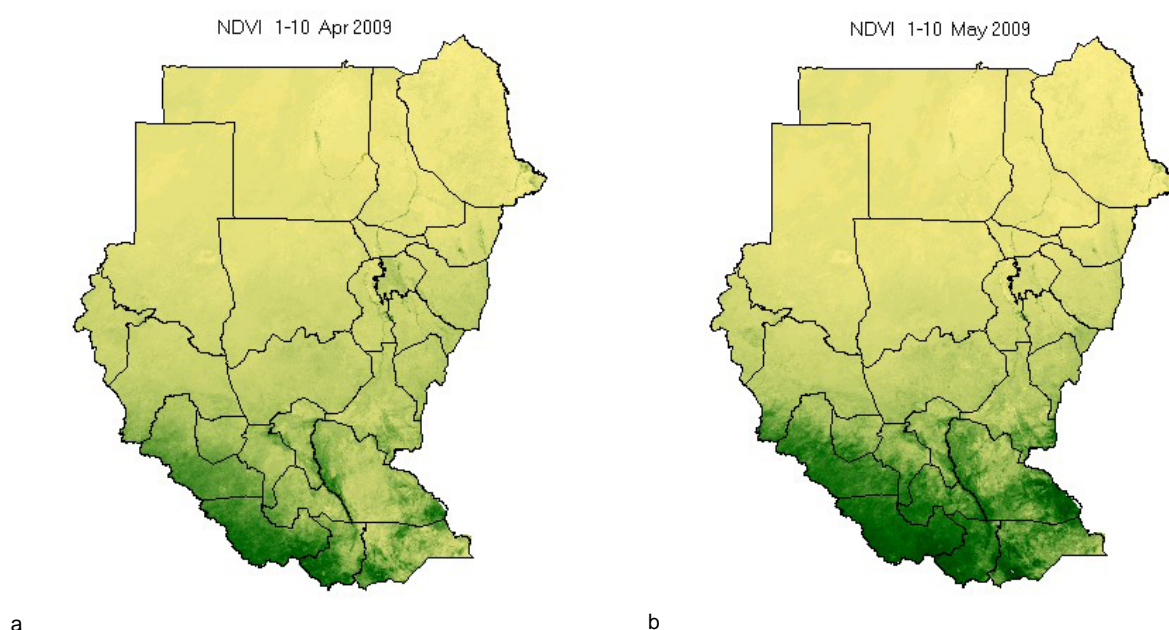


Fig 3 – NDVI in early April (a) and early May (b) 2009. Greener (darker) tones correspond to higher NDVI values. Note significant increases in NDVI (darker shades) in Jonglei, Equatoria and Bahr-el-Ghazal.

Vegetation development has been more noticeable in southern Jonglei, Lakes and the Equatoria region in general. The Bahr-el-Gazal region and southwestern Darfur also show some development due to the significant rainfall of last April in this region.

In terms of variations from average (fig 4), good late April rainfall led to above average vegetation development across Bahr-el-Ghazal. A similar pattern is also seen extending across Lakes state towards the southern half of Jonglei / Eastern Equatoria and parts of Central Equatoria. Some of the patterns (in Jonglei and in areas of southern Upper Nile) are in areas prone to flooding and result from water flows arising from heavy rainfall in Ethiopia near bordering areas with Sudan.

So, this pattern in general is still the result of favourable rainfall in April, but the recent drier than average conditions are likely to lead to a convergence to the average by the end of May.

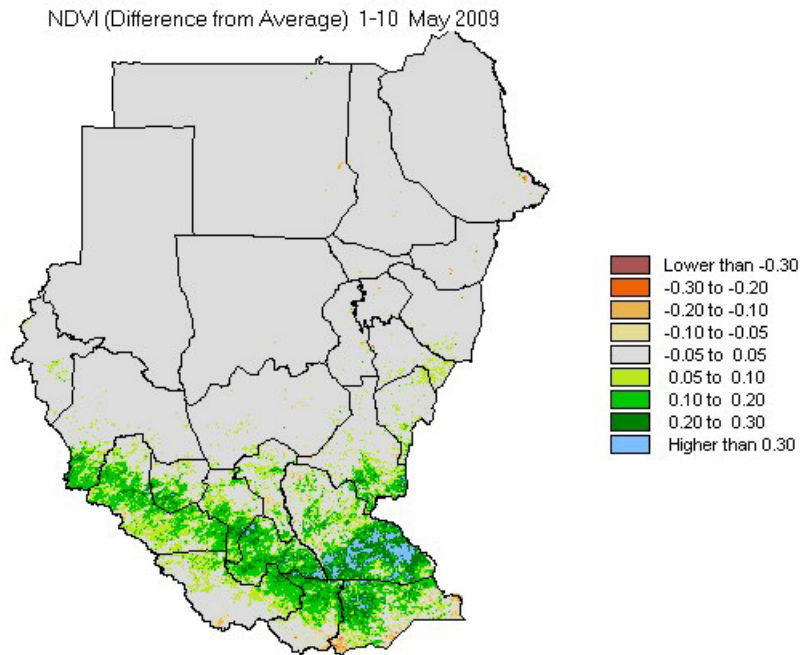


Fig 4 – NDVI difference from average in early May 2009. Yellows and reds represent below average vegetation development, greens and blues represent above average vegetation development. Note prominent good conditions in southern Jonglei through Lakes and Bahr-el-Ghazal due to favourable April rainfall

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 Apr-Jun season there is an approximately 75% probability of maintaining neutral conditions, and that is predicted to be the most likely situation through the end of 2009 and into early 2010. The likelihood of returning to La Niña conditions is now very low while the chances of El Niño conditions are about normal.

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

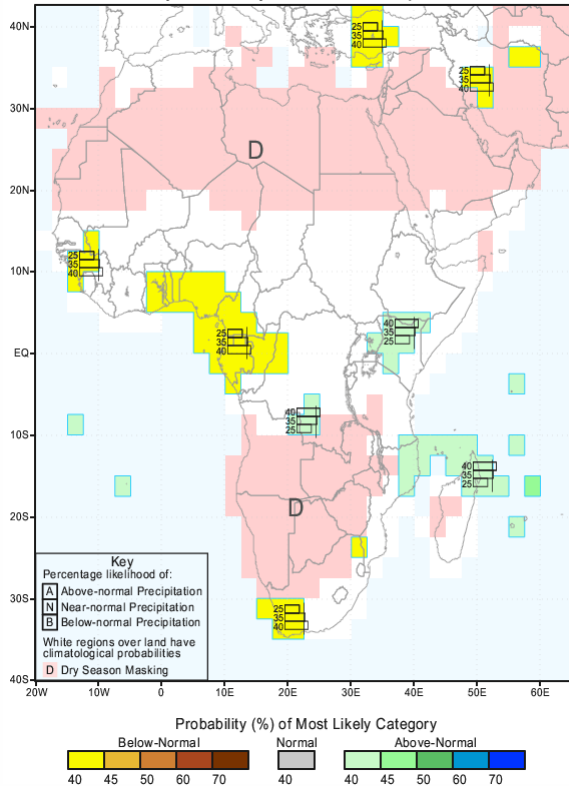
The SMA forecast for March-May rainfall presented in the last issue indicated higher likelihood of above average rainfall for Southern Sudan (as did forecasts from other institutions). Given the generalized dryness across Sudan in the month of May until now, this scenario is now unlikely to be achieved, and on average / below average conditions are the most likely outcome for this period.

May-July 2009 Rainfall Forecasts

Current forecasts (issued in April) from three main international centres (Fig 5), all point to near normal precipitation amounts for the 3 month rainfall amounts in May-June-July 2009. These forecasts provide no indication of the rainfall distribution within this period, but if current conditions (ITF retreat and very low rainfall) continue, May will be characterized by lower than average rainfall.

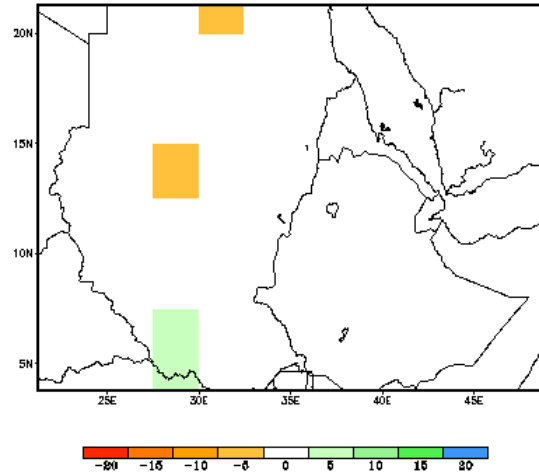
Additionally, the Sudan Meteorological Authority (SMA) has developed new forecasts of the rainfall amount for the month ahead. The forecasts for June rainfall indicate moderately below average rainfall, a scenario consistent with the fact that it may take some time for the rainbearing airmasses to make up for their southwards displacement during the month of May.

IRI Multi-Model Probability Forecast for Precipitation for May-June-July 2009, Issued April 2009



a

CCA Depart. Clim. Prob. Forecast X 100 May-Jul 2009 N. Horn of Africa Rainfall, One Month Lead

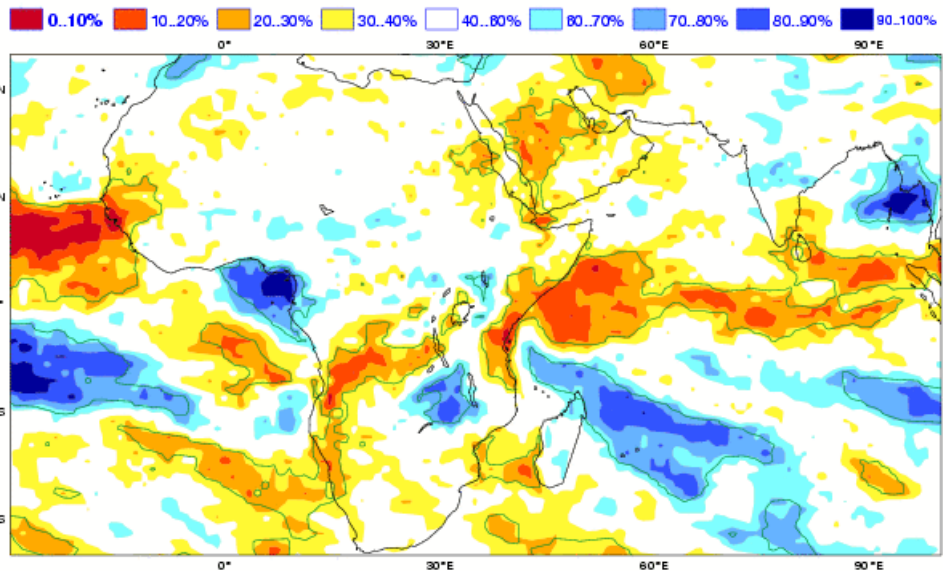


b

ECMWF Seasonal Forecast Prob (precipitation > median) Forecast start reference is 01/04/09 Ensemble size = 41, climate size = 275

System 3 MJJ 2009

Solid contour at 1% significance level



Forecast issue date: 15/04/2009

ECMWF

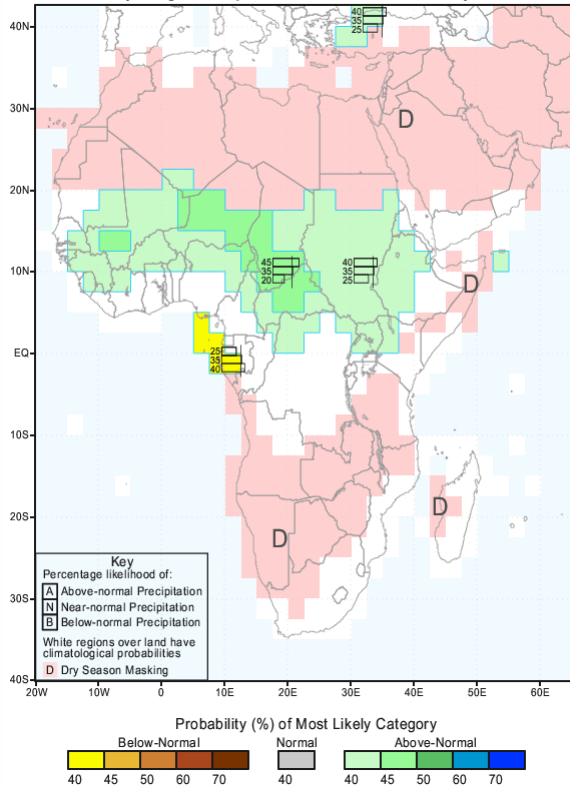
c

Fig 5a – Probabilistic forecast for May-June-July (MJJ) 2009 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).

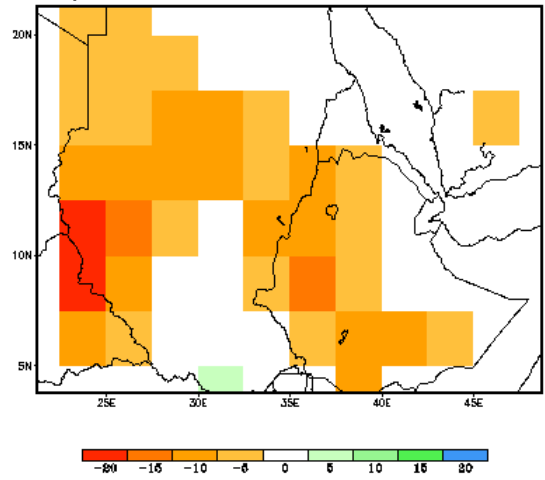
Fig 5b – Forecast for May-June-July (MJJ) 2009 rainfall for NE Africa. Colours indicate departure from climatology (usual scenario), oranges and yellows for below average conditions, blues and green for above average (source CPC).

Fig 5c – Forecast for May-June-July (MJJ) 2009 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 Multi-Model Probability Forecast for Precipitation for July-August-September 2009, Issued May 2009



CCA Depart. Clim. Prob. Forecast X 100 Jul-Sep 2009 N. Horn of Africa Rainfall, 4 Months Lead



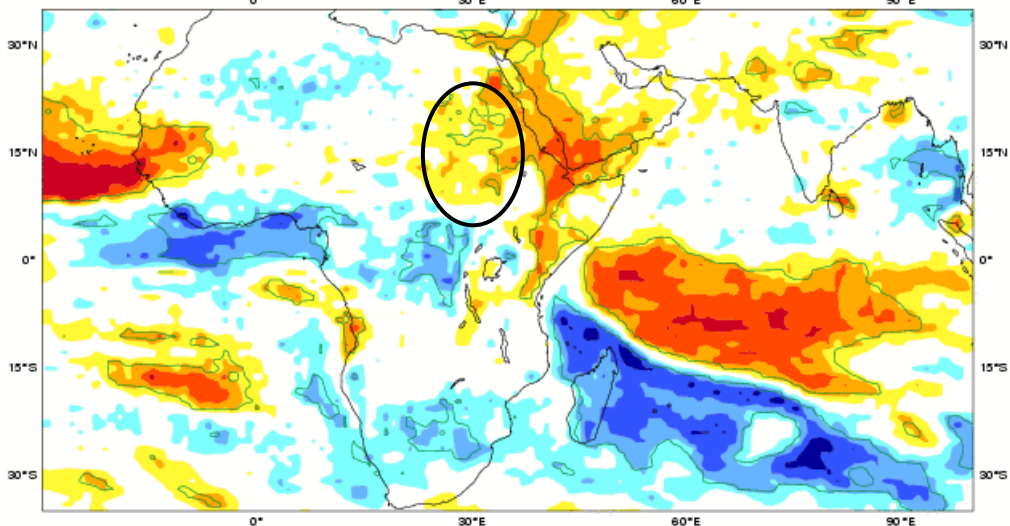
ECMWF Seasonal Forecast Prob (precipitation > median)

Forecast start reference is 01/05/09
Ensemble size = 41, climate size = 275

System 3 JAS 2009

Solid contour at 1% significance level

0..10% 10..20% 20..30% 30..40% 40..60% 60..70% 70..80% 80..90% 90..100%



Forecast issue date: 15/05/2009

ECMWF

Fig 6a – Probabilistic forecast for July-August-September (JAS) 2009 rainfall for Africa. Boxes indicate likelihood of above (top), on (middle) and below (bottom) average conditions. Green to blue indicates areas of increasingly more likely above average conditions (source: IRI).

Fig 6b – Forecast for July-August-September 2009 rainfall for NE Africa. Colors 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 July-August-September 2009 rainfall for Africa. Sudan region is circled in red. 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)

July-August-September 2009 Rainfall Forecasts

This period is the crucial one for most crops in Sudan, in particular for the northern regions. There are forecasts available prepared in May for this period from the sources above. However, forecasts made at such long ranges have low skill and users may find conflicting information between forecasts from different sources; this is the case for this season.

The forecasts from IRI (Fig 6a) indicate above average rainfall across most of Sudan. This current forecast is slightly less optimistic (chances of above average rainfall are slightly lower) than previous ones made earlier.

ECMWF forecasts (Fig 6b) for this period are now indicating below average rainfall as the most likely scenario. It is worth noticing that earlier forecasts were predicting above average conditions and this change comes as we get closer to the target period (and in principle accuracy increases).

Forecasts from CPC provide a strong signal of below normal conditions across most of Sudan (in particular in western and northern Sudan as well as eastern border regions). Normal conditions are forecast for South and south-central Sudan. An updated CPC forecast will only be available next month.

There is no sure way to decide which forecast is better. The fact that forecasts have changed towards a less favourable scenario as the season comes nearer and the current developments provides a basis to expect below average rainfall during the key July-September period.

A firmer verdict can be reached next month when all three forecasts will have been updated and additional information may come out of SMA and IGAD.

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.