

East Africa Flood Scenarios 2020



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food security analysis

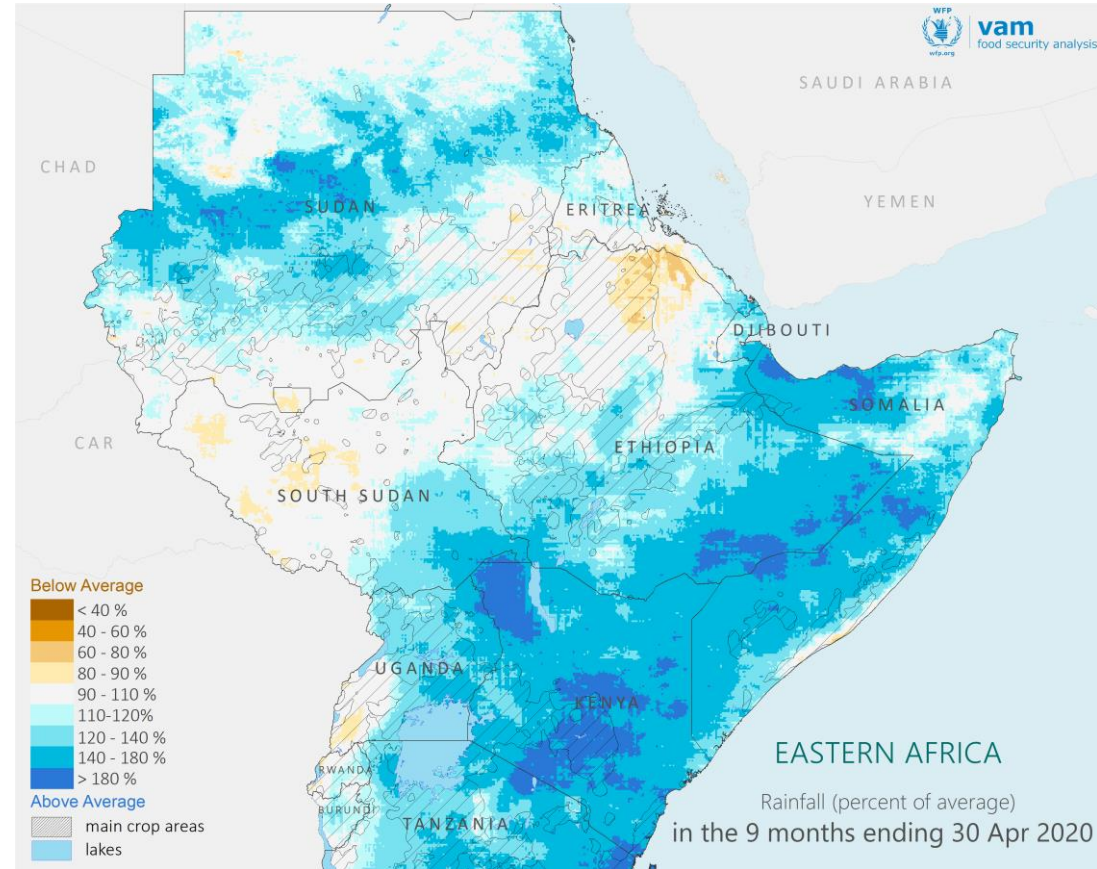
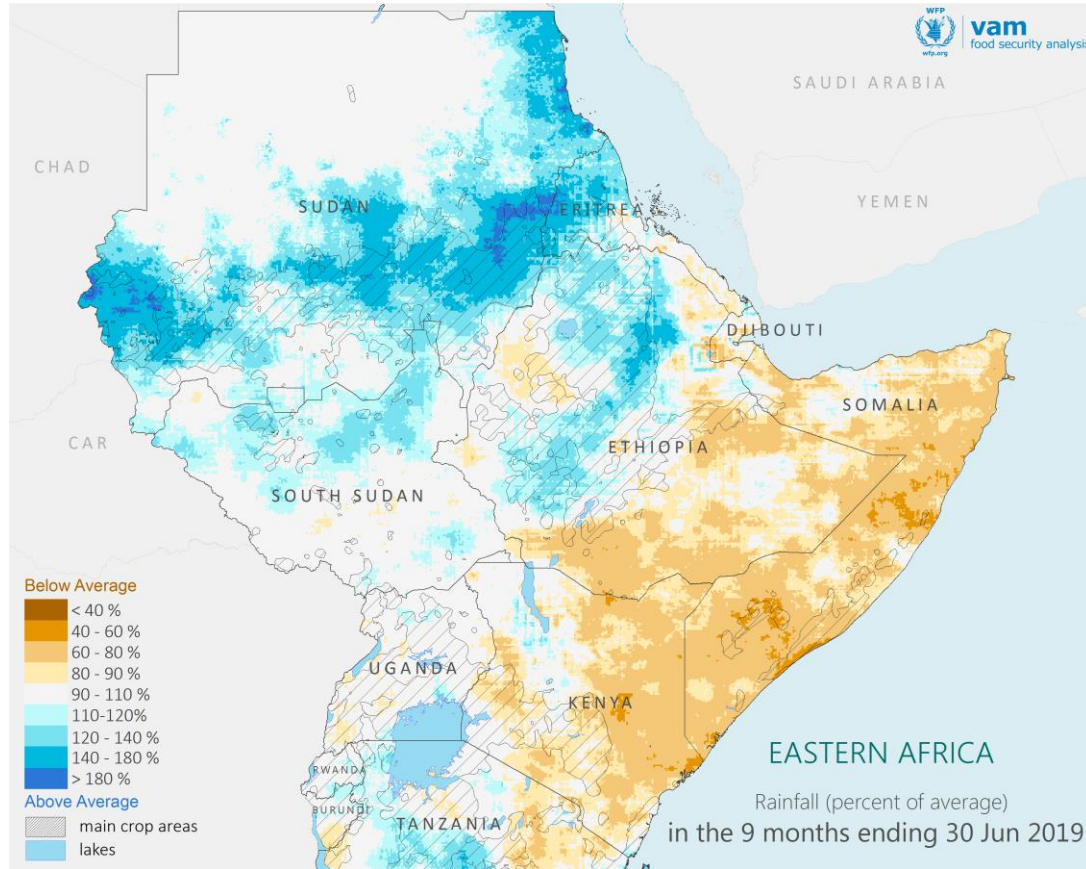
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SUMMARY

- After a drier than average period across East Africa until mid 2019, conditions turned sharply to much wetter than average weather. Across vast areas of the region, the last nine months have been the wettest ever in the near 40 year data record. The most affected areas include the South Sudan – Ethiopia borders, Lake Victoria and western-central Kenya and SE Ethiopia and northern Somalia.
- Sustained, extreme rains have resulted in floods and landslides across Kenya and Uganda since mid 2019 to now and additional flooding in SE Ethiopia and Somalia both during the Short Rains of late 2019 and the current Long Rains season. In South Sudan, huge increases in wetland extent led to localised famine events while flooding of dry season pastures led to massive inter-communal fighting that is still on-going. In Uganda, Lake Victoria hit record height levels leading to floods and destruction of livelihood infra-structures.
- Latest seasonal forecasts from a wide variety of sources unanimously indicate a continuation of much wetter than average conditions until September 2020, in particular for a region extending from NW Kenya to western Ethiopia and eastern South Sudan.
- Expected consequences include: a continuation of flooding and landslides in western Kenya and Karamoja; additional flooding in eastern South Sudan, possibly leading to acute food insecurity and further inter-communal fighting later in the year; heavy rains along the Blue Nile catchment and increased White Nile flows may lead to flooding along both rivers within Sudan.

Context: Regional Rainfall 2019-2020

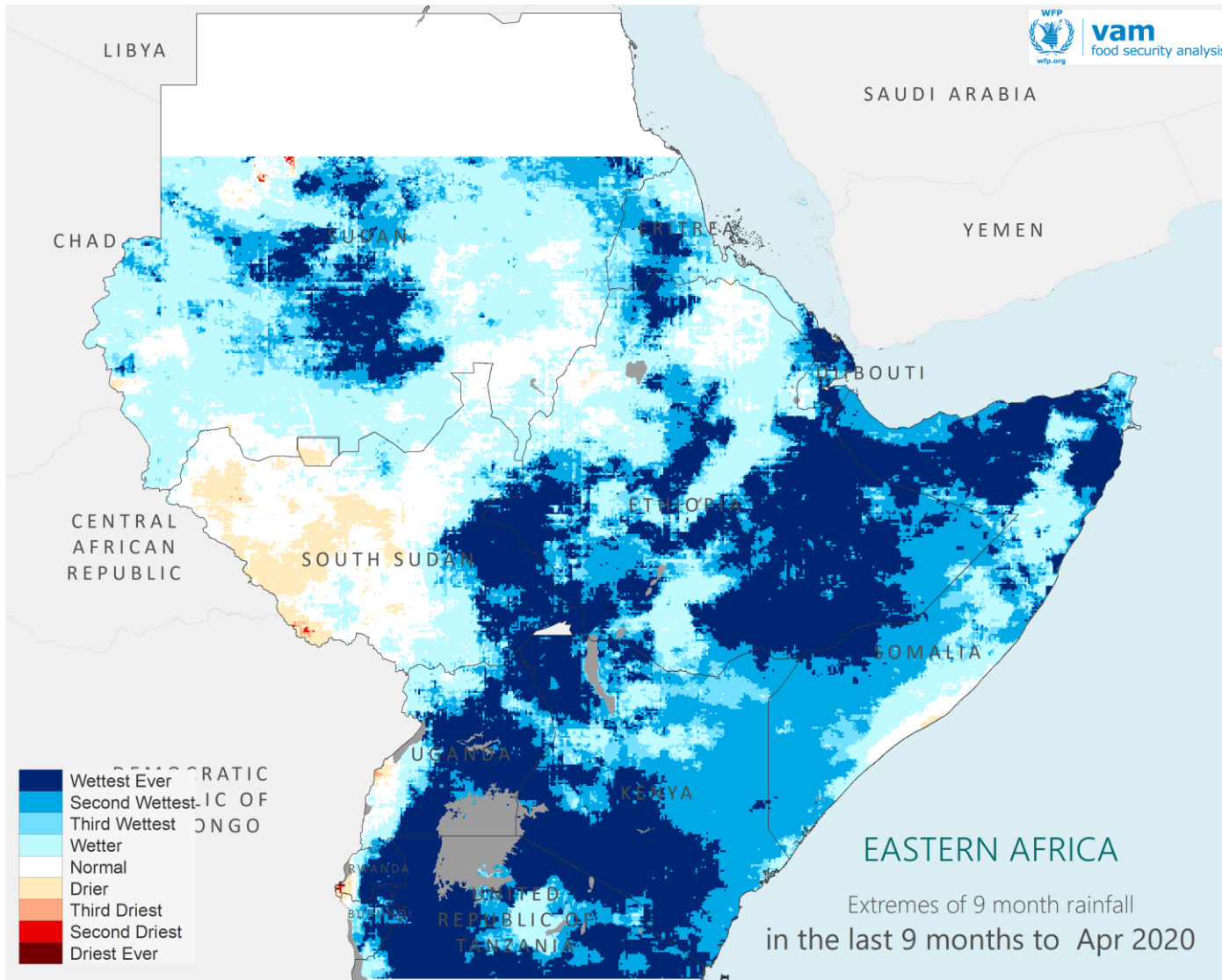


Rainfall in the 9 months ending in June 2019 (left) and 9 months ending in April 2020 (right) as a percent of the long term average. Blues for wetter than average, browns for drier than average.

Floods follow Drought across East Africa

A long drier than average period affected East Africa during the Short Rains of late 2018 and the Long Rains of 2019 (March to May). From mid-2019 however, conditions changed sharply bringing much wetter than average weather across the region. These conditions have remained in place since then, with the sustained heavy rains leading to flooding events across the region during the Short Rains of late 2019 and the Long Rains of March to May of 2020.

Context: Rainfall Extremes 2019-2020



Widespread Extreme Rainfall 2019-2020

The East Africa region is undergoing an extremely wetter than average period across most of the region. To map the intensity and spatial extent of possible extremes, recent rainfall data was expressed as ranks within the nearly 40 year CHIRPS rainfall archive.

The results for a 9 month rainfall total ending in April 2020 are shown in the map. This 9 month period includes the current Long Rains, the previous Short rains (late 2019) and the late stages of the main season in the Sudans and Ethiopia.

Areas in darkest blue show where this 9 month rainfall was the highest ever since 1981. Areas with second and third highest rainfall are also shown as lighter blues. The huge extent of the wettest-ever areas is unprecedented.

Several areas of extreme rainfall with different timings are: around Lake Victoria and western-central Kenya which is still on-going; the border between South Sudan and Ethiopia which eased off in late 2019; SE Ethiopia and northern Somalia, during the recent season (March-April).

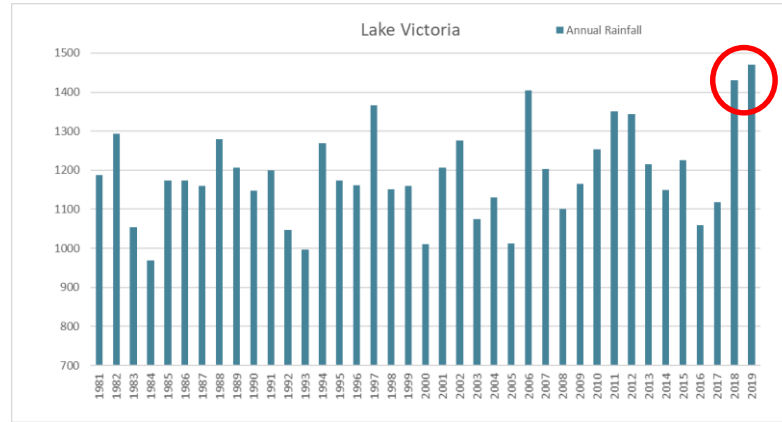
These resulted in floods and landslides across Kenya and Uganda during this whole period, in eastern South Sudan and in Somalia along rivers swollen by heavy rains in SE Ethiopia. Displacement in Kenya and heavy armed conflict in Jonglei, South Sudan were the most evident consequences.

Rainfall amounts from August 2019 to April 2020 expressed as ranks in the historical record since 1981. Wet extremes in shades of blue, Dry extremes in shades of red.

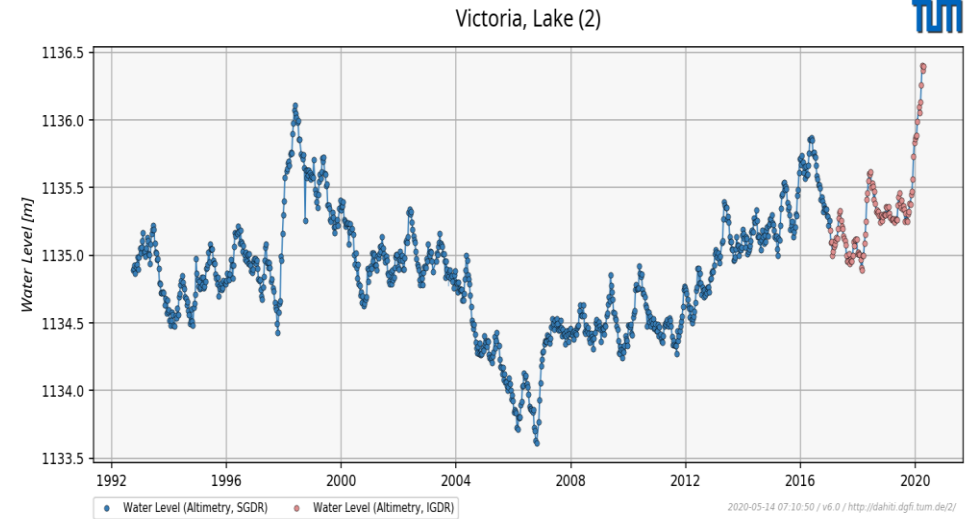
Context: River Basins

Lake Victoria Rainfall

The 39 year record for Lake Victoria catchment rainfall was broken twice in succession in 2018 and 2019. Most of the rainfall behind the 2019 record fell in the second half of the year. Rainfall in 2020 is already above the long term average by 16%.



Annual rainfall over the Lake Victoria catchment from 1981 to 2019

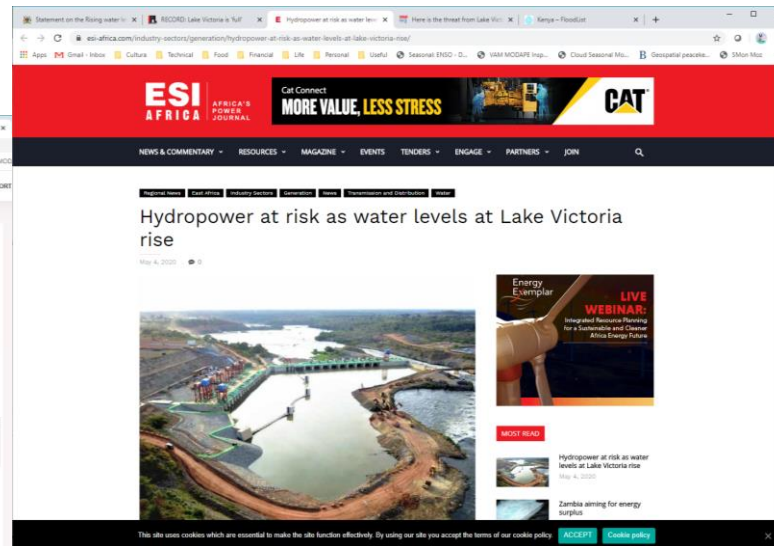


Altitude of Lake Victoria surface since 1992 to present day from altimetry measurements

Lake Levels

The sustained high rainfall in the Lake Victoria catchment for the past two years is likely the main driver behind the recent and sharp rise in the levels of the Lake since late 2019 – these are heading to 3m above the minimum of 2007 and well above the peak reached during the strong El Nino of 1997. This has led to flooding in coastal lake areas, damage to infra-structure and potentially may damage energy supply.

Besides these immediate effects, high lake levels will lead to slow changes in the extent of the huge wetland systems of South Sudan, influencing the local dynamics of natural and livelihood resources in complex ways.



Context: River Basins

Floods, Famine and Conflict in South Sudan 2019

Heavy rains affected South Sudan and neighbouring regions in 2019, in particular within the Pibor-Akobo-Sobat catchment, which drains into the states of Jonglei and Upper Nile. Record rains within the catchment led to extensive flooding in Jonglei state that were the driver for localised famine conditions in late 2019.

By early 2020, wetlands within Jonglei had reached an unprecedented extent, destroying dry season pastures and leading to large scale communal fighting which at some stage involved close to 8,000 combatants. Retaliation attacks have continued until very recently.

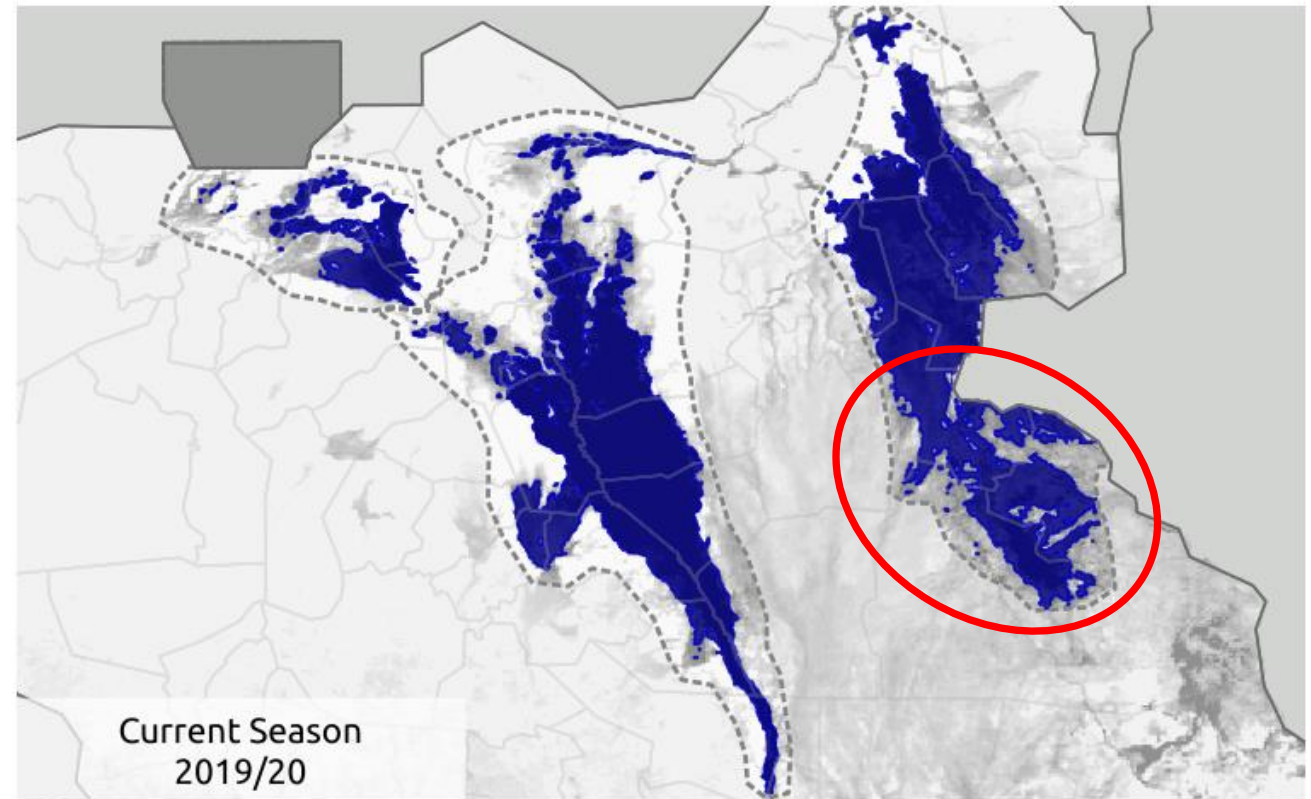
Record Rains Elsewhere

Other catchments of the wider Nile River basin have also been registering record rainfalls.

Rainfall in 2019 was a record for the basin of Lake Albert - Lake Kyoga, in the vicinity of Lake Victoria.

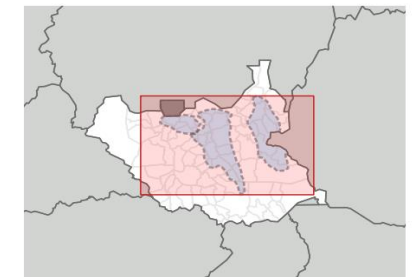
The huge Blue Nile catchment (mostly in Ethiopia) also registered record rainfall in 2019 with 2017 a close second.

Record Wetland Extent in South Sudan: late 2019 – early 2020



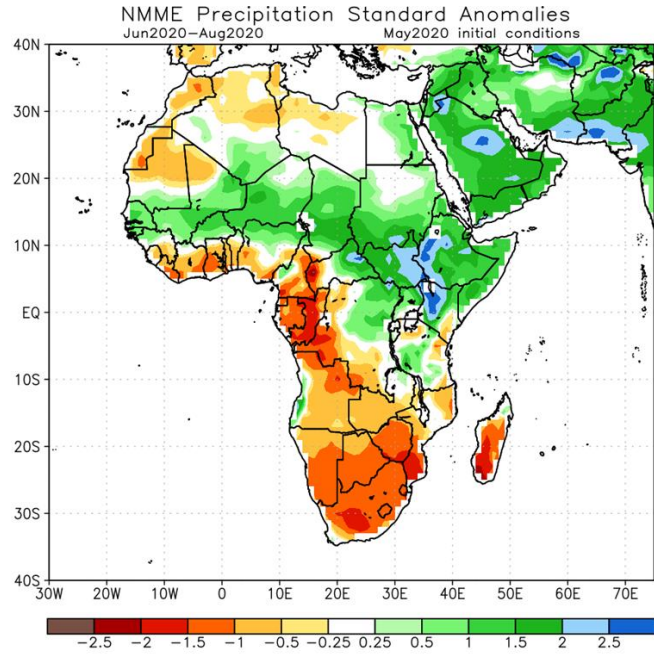
Wetland extent in South Sudan in late 2019-early 2020 following record rains in the Pibor-Akobo-Sobat river basin.

Note the huge extent of “new” wetland within Jonglei State, within the red circle. Flooding of dry season pastures led to intense large scale inter-communal fighting.

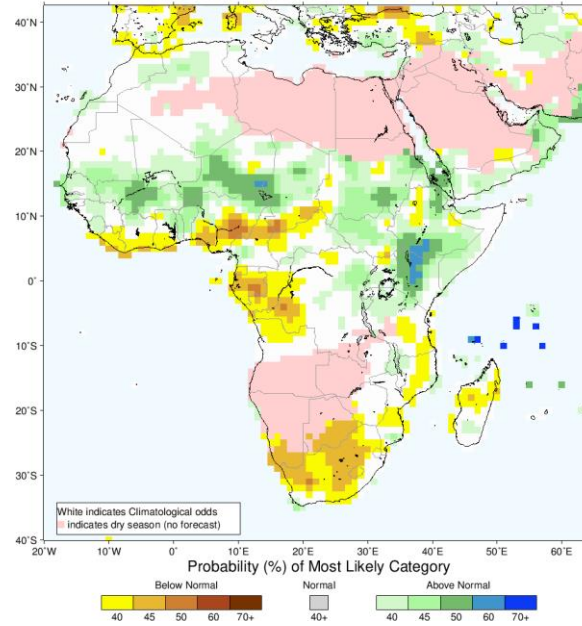


■ Wetland Extent

Outlook: Seasonal Forecasts



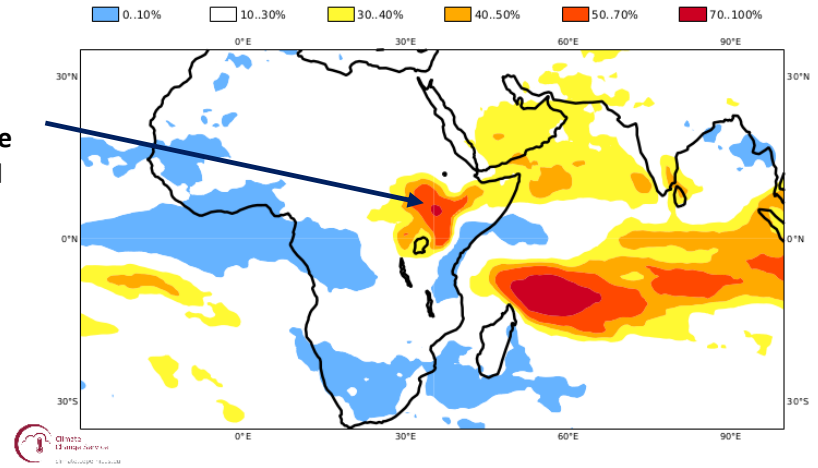
IRI Multi-Model Probability Forecast for Precipitation for June-July-August 2020, Issued May 2020



C3S multi-system seasonal forecast
Prob(highest 20% of climatology) - precipitation
Nominal forecast start: 01/05/20
Unweighted mean

ECMWF/Met Office/Météo-France/CMCC/DWD/NCEP
JJA 2020

Area of Likely Extreme Rainfall



Six-forecast consensus published by ECMWF. In red areas where June-August rainfall is expected to fall in the top 20% of the historical record.

Seasonal rainfall forecasts for June-August 2020: Left, from NCEP-CPC, Middle, from IRI. Greens and blues for wetter than average, reds and browns for drier than average

Forecasts Indicate Further Flooding is Likely

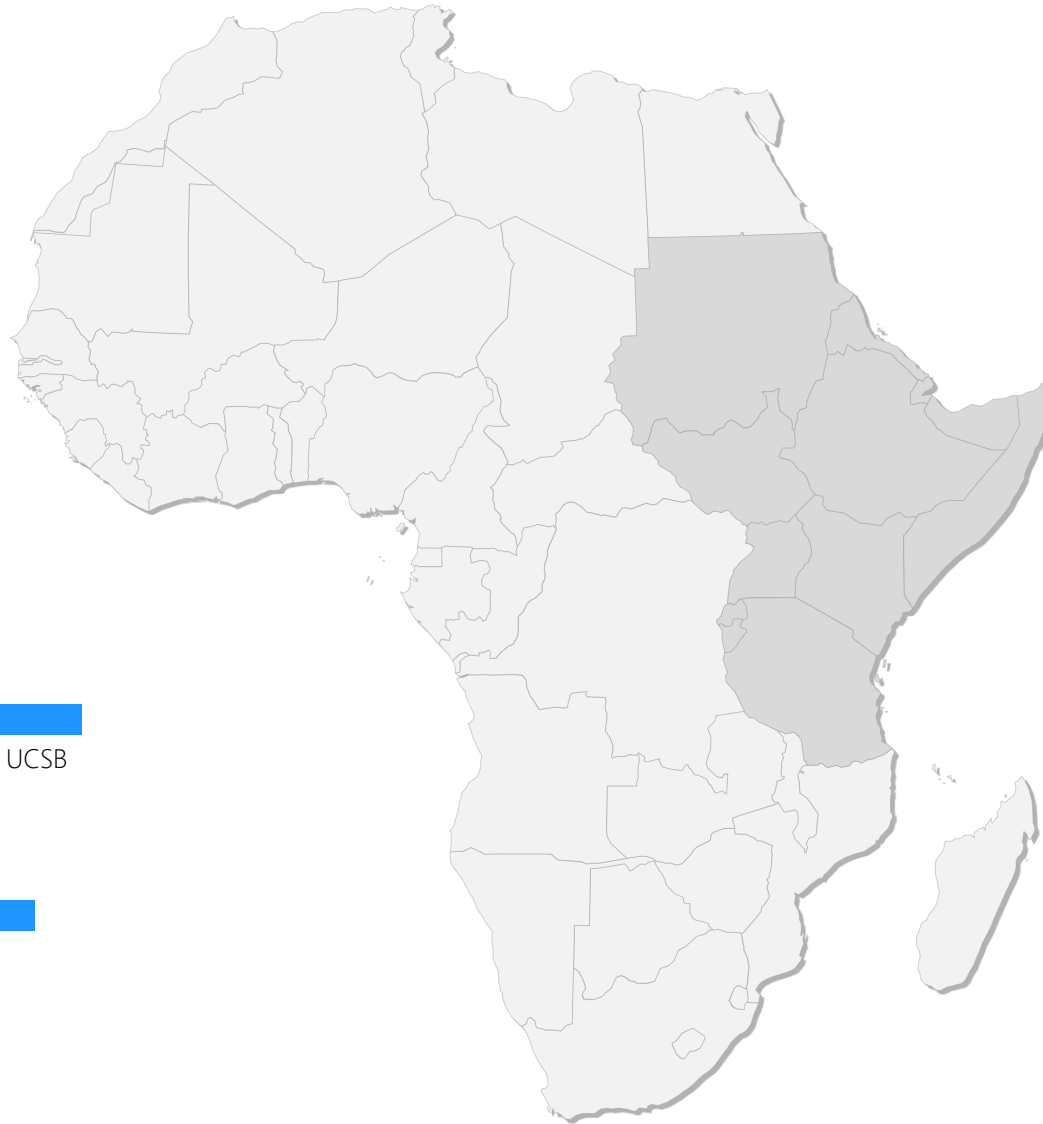
Seasonal forecasts from a wide variety of sources unanimously indicate much wetter than average conditions for the period from June to September 2020, in most of the same areas that have been already affected by rainfall extremes since August 2019. Some forecasts indicate a high probability of the rainfall in this period to fall in top 20% of the historical record.

The area forecast to be most affected by these wetter and likely extreme conditions extends from NW Kenya – eastern Uganda into western Ethiopia and along eastern South Sudan.

Most of these regions are already suffering from the effects of extreme rains – given the unanimity in the seasonal forecasts, there is high confidence that further impacts are to be expected.

Besides a continuation of flooding and landslides in western Kenya and Karamoja, there is a significant likelihood of additional flooding in eastern South Sudan – this may lead to a repeat of localized famine events and renewed heavy inter-communal fighting as a result of flooding of pasture resources.

Heavy rains along the Blue Nile catchment and additional waters flowing into the White Nile are likely to lead to flooding along both rivers and at their confluence within Sudan.



DATA SOURCES:

Rainfall: CHIRPS, Climate Hazards Group, UCSB
Vegetation: MODIS NDVI, EOSDIS-NASA
Land Cover: FAO GLC-Share

PROCESSING:

VAM software components, ArcGIS

FOR FURTHER INFORMATION:

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