El Nino: Outlook 2018

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El Nino Outlook – September 2018
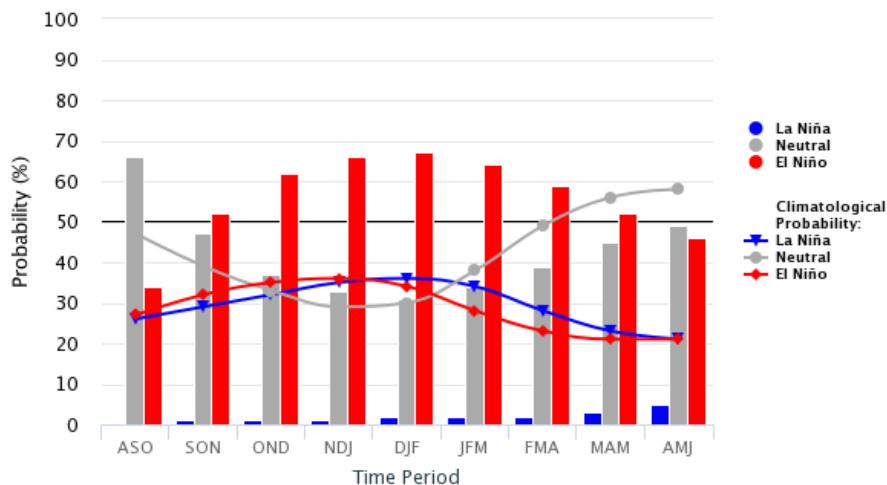
CPC/IRI ENSO Forecast from September. Red bars denote probability of an El Nino developing in the near future

Possible evolution of an El Nino indicator (Pacific sea surface temperature anomaly) generated by a diverse number and types of forecast models.
Red line shows the average of dynamical forecasts, green line shows the average of the statistical models
The maximum level of this indicator for the last El Nino of 2015-16 is shown as purple line (near the top of the plot)

Will an El Nino take place?

Current forecasts of Eastern Pacific sea surface temperatures (SST) and expert judgement point to a significant likelihood of an El Nino materializing: currently this stands at 50-55% chance of it happening in the northern hemisphere Autumn and 65-70% chance of it developing in the coming Winter.

How long is it likely to last?

Judging from the forecasts for how SST are likely to evolve, this El Nino, should it materialize, is likely to be relatively short and over by mid 2019.

How intense is it likely to be?

Based on the same evidence, and other features of the Pacific ocean circulation, it is likely to remain a weak to moderate El Nino.
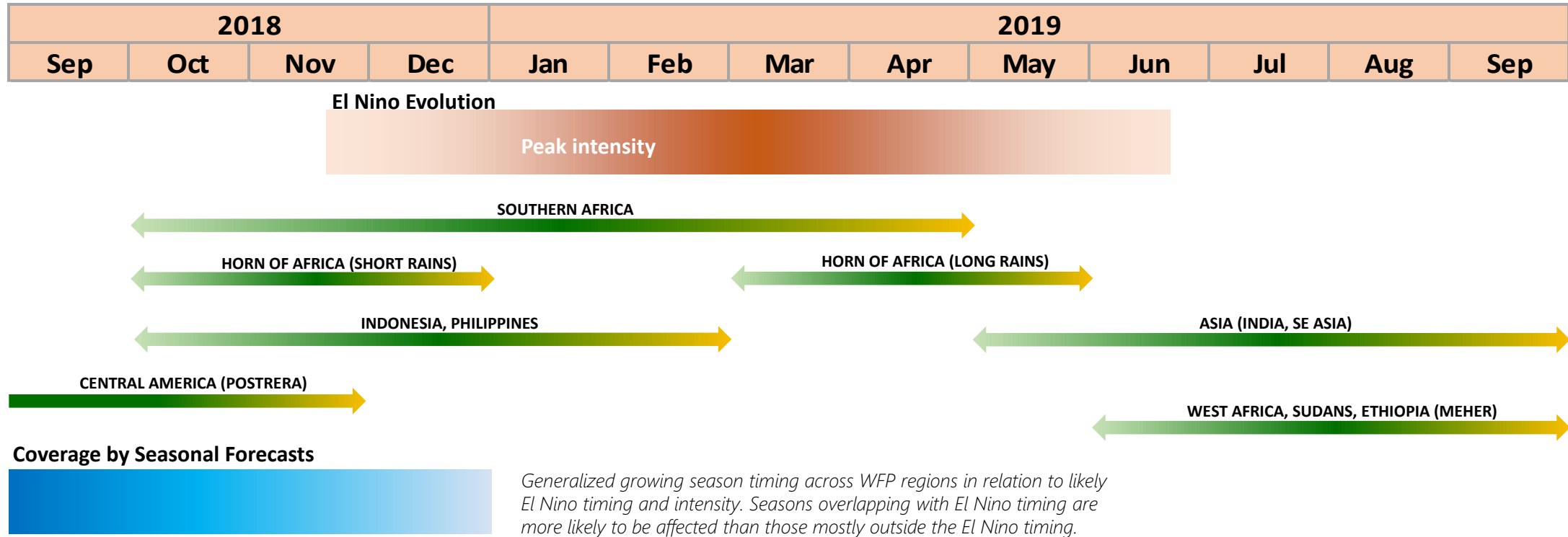
How would it compare to the 2015-2016 event?

Currently we expect it to be weaker and much shorter than the 2015-16 event. This was one of the longest and most intense on the record – it started in late 2014, got really going in early 2015 and lasted until mid 2016.

Nothing to worry about, then?

Not exactly. Although we do not expect impacts on the scale of 2015-16, the link between El Nino intensity and impacts is not very strong. Weak El Nino in the past have led to significant droughts in specific regions. And we need to account for the heightened vulnerability of some regions due to past droughts or non climatic factors such as conflict

El Nino and Growing Seasons

Generalized growing season timing across WFP regions in relation to likely El Nino timing and intensity. Seasons overlapping with El Nino timing are more likely to be affected than those mostly outside the El Nino timing.

Which regions will be impacted by a possible El Nino?

Current forecasts provide a tentative sketch of a likely El Nino timing: a start towards late 2018 and petering out by mid 2019, with a peak sometime in January-February 2019.

Growing seasons whose timing overlaps with the El Nino timing are more likely to display typical El Nino impacts.

Based on these broad timings, the growing seasons most likely to be affected are:

- Southern Africa
- East Africa (Short Rains and Long Rains to a lesser degree)
- Indonesia and Philippines (to a lesser degree)

Depending on exact timings and how the El Nino intensity develops, early stages of the season in SE Asia and possibly West Africa might be affected. Further impacts are only likely in case the situation evolves in ways not described by the current forecasts
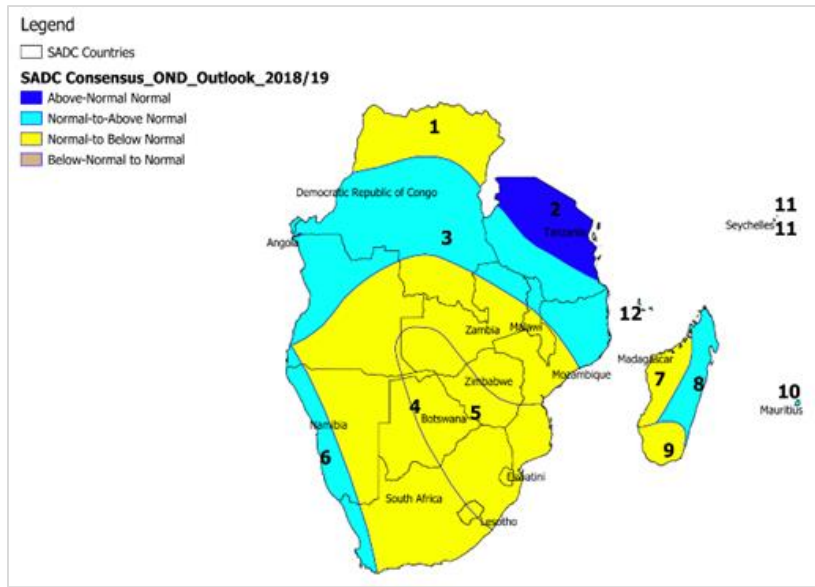
Southern Africa:

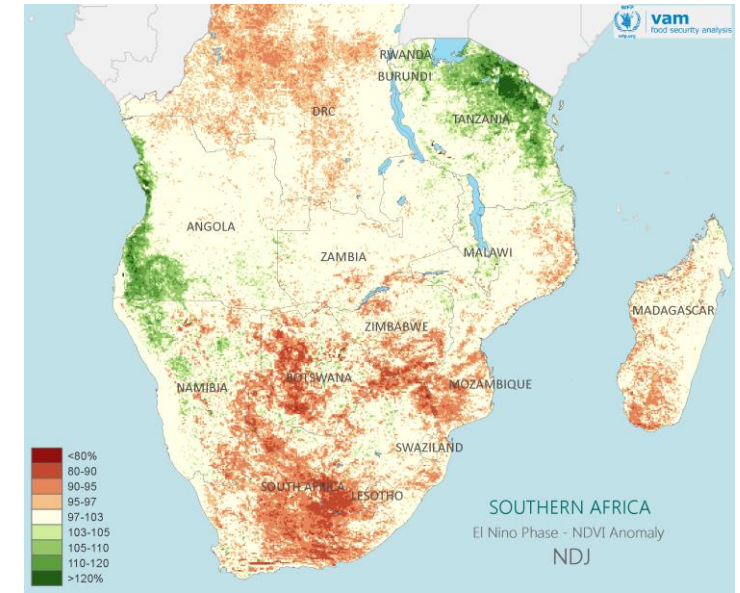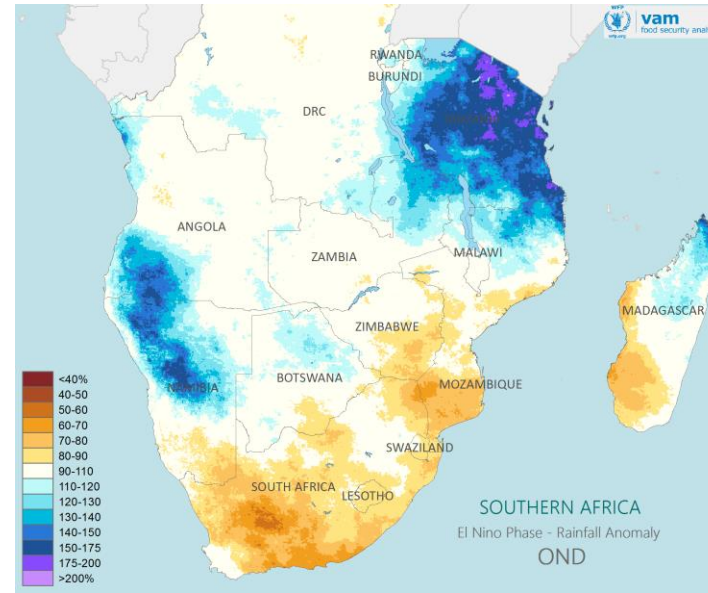*Expectations of a poor growing season*

El Nino Impacts: Southern Africa Early Season

SADC Consensus Outlook for Oct-Dec rainfall in southern Africa. Drier than average conditions are expected in yellow areas, wetter than average in areas in blue.

October-December (left) total rainfall and November-January vegetation (right) during El Nino seasons as a percent of the average in neutral seasons. Blue (rainfall) or green (vegetation) shades for El Nino above neutral, orange (rainfall) or browns (vegetation) shades for El Nino lower than neutral

El Nino impacts on seasonal rainfall can be evaluated by comparing the typical rainfall during El Nino seasons with that of neutral seasons. For Southern Africa, the comparison is made for two key periods of the season, October-December (planting and early crop development) and January-March (includes the time when maize is most sensitive to water deficits).

In El Niño seasons, during October-December, drier than average conditions tend to affect mostly the border areas of NE South Africa, southern Mozambique and SW Zimbabwe as well as southern Madagascar. Similar conditions affect western South Africa though rainfall amounts are small and the main rains arrive towards late December.

In contrast, Tanzania, N Mozambique, N Zambia and N Malawi typically enjoy wetter than average conditions during this early stage of El Nino seasons. These areas share the same impacts (enhanced rainfall) as East Africa during the short rains. Northern Namibia and SW Angola also have favourable early seasons during El Nino.

These tendencies are already picked up by the SADC consensus forecasts issued in late August.

The rainfall patterns are clearly reflected in the vegetation response one month later: areas of enhanced rainfall also show higher vegetation cover, confirming an earlier than average start of the season. Rainfall deficits lead to lower than usual vegetation cover.

El Nino Impacts: Southern Africa Mid Season
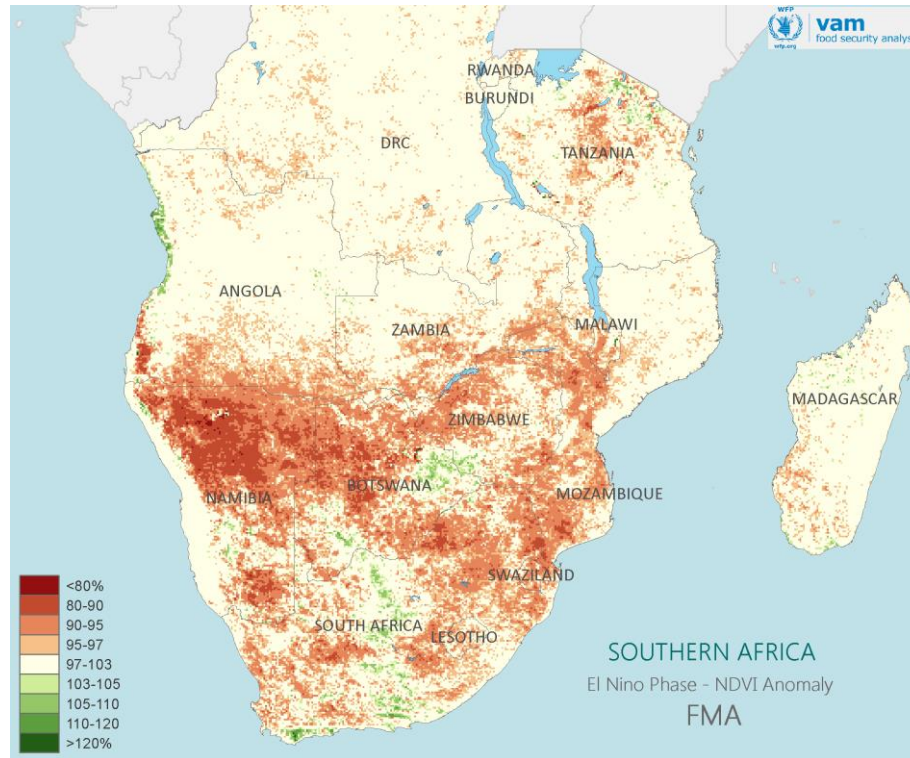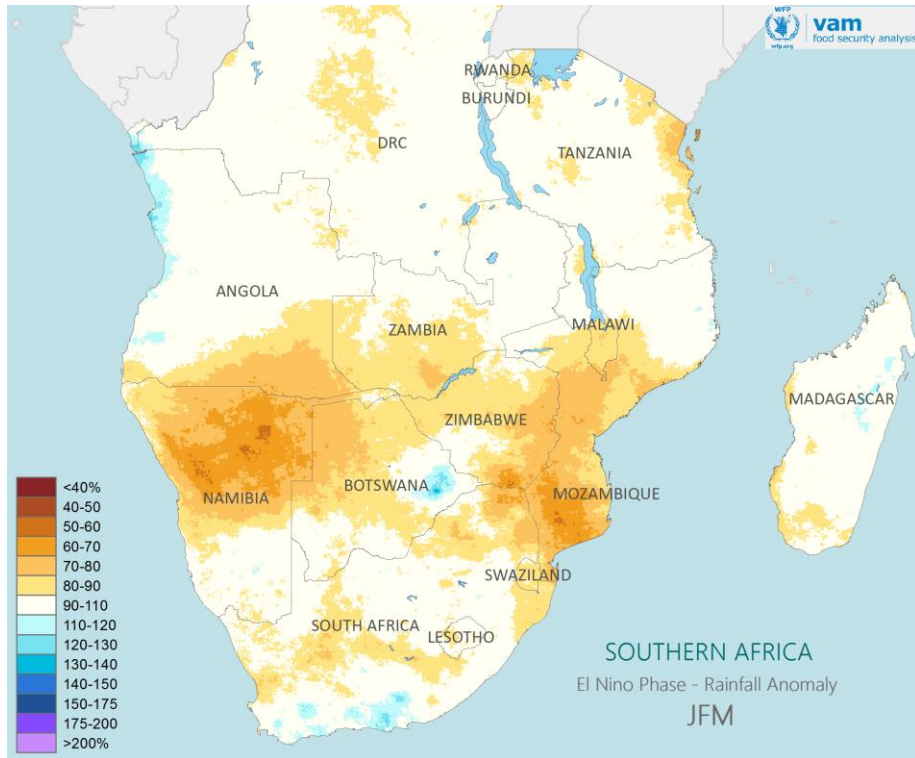
Average January-March (left) total rainfall and February-April average vegetation (right) during El Nino seasons as a percent of the average in neutral seasons.

Maps: Blue (rainfall) or green (vegetation) shades for El Nino above neutral, orange (rainfall) or browns (vegetation) shades for El Nino lower than neutral

January-March is the most sensitive period for staple crop development. Even moderate rainfall deficits if coincident with the flowering and grain filling stage of maize can have a disproportionate impact on crop production.

In El Niño seasons, this period is characterized by a tendency for extensive regional scale rainfall deficits, mostly affecting northeastern South Africa, south and central Mozambique, south and central Malawi, most of Zimbabwe, southwestern Zambia as well as northern Namibia, southern Angola and western Botswana.

NE areas of the region (e.g. Tanzania) which had benefitted from enhanced rainfall in October-December revert to average as the Eastern Africa Short Rains fade away.

The January-March rainfall deficits typical of El Nino seasons lead to evident impacts on vegetation cover. Across most of the region vegetation during February-April is well below average, particularly where rainfall deficits have been more pronounced.

These indicators clearly support the likelihood of strong significant impacts on crop production across the region, including its largest producer (South Africa) and the most vulnerable countries (Zimbabwe and Malawi).

El Nino Impacts: Crop Production and Market Prices
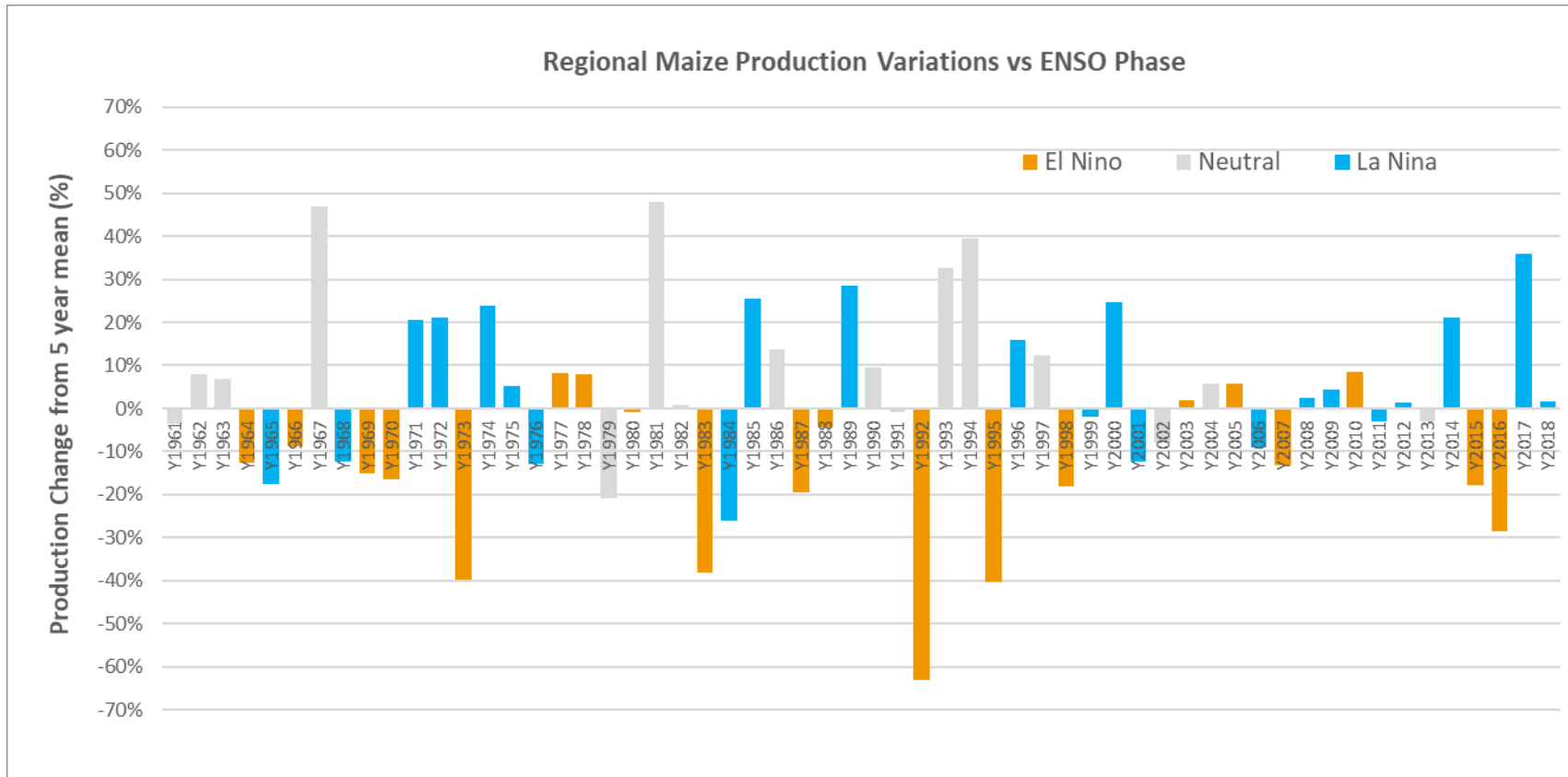

Regional Maize Production Variations vs ENSO Phase

Chart showing variations in regional maize production from a 5 year mean colour coded according to the ENSO phase of the producing season.
Regional production is based on data from South Africa, Zambia, Zimbabwe, Mozambique and Malawi.

El Nino events have a well defined impact on crop production, even at regional scale.

The plot above shows variations in regional maize production from the 5 year mean colour coded according to the ENSO phase affecting the growing season. Drops in production (negative variations in orange) are mostly associated with El Nino events. The reverse is true for increases in production (positive variations in blue) which are associated with La Nina events.

However, the magnitude of the production drops is not well related to the magnitude of the El Nino event. Out of the countries that contribute to the regional total, South Africa is the one for which production variations are more closely tied to ENSO phase.

Depending on the impact on regional production and existing stocks, staple food prices in the following lean season (from late 2019) may rise enough to become a concern for food security of poor and vulnerable populations.
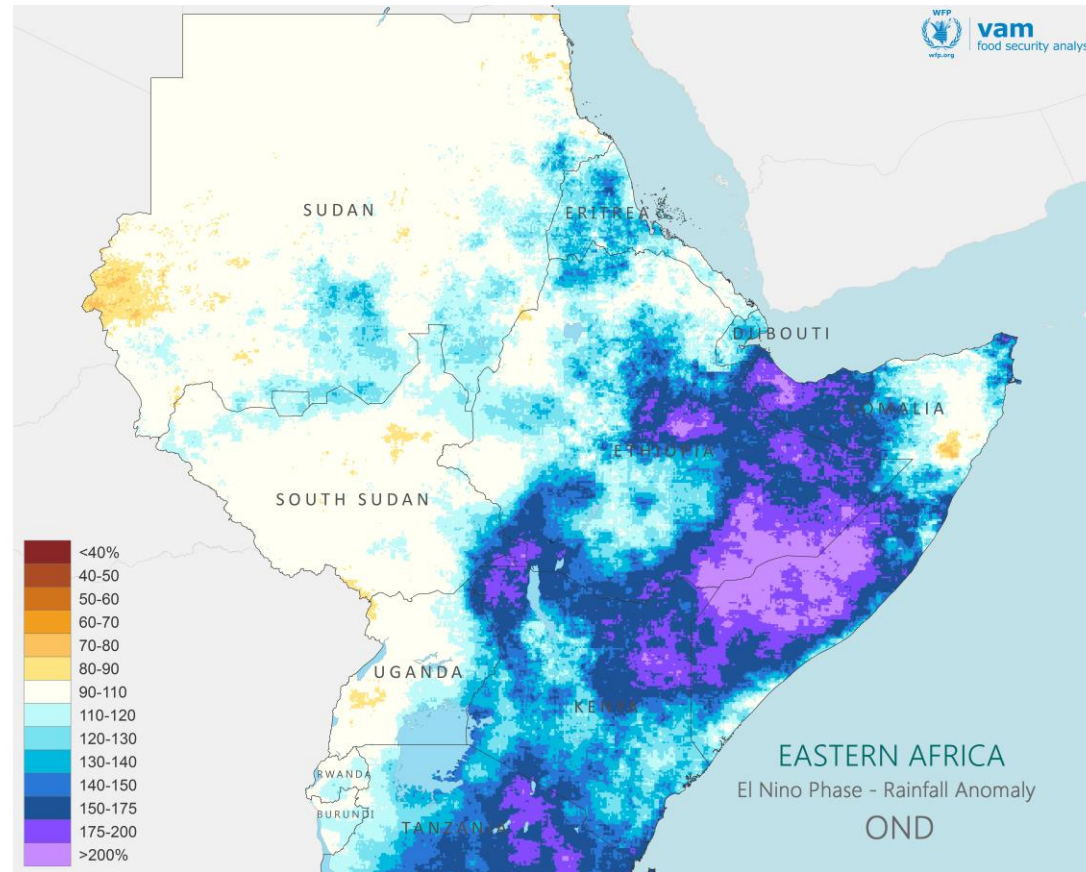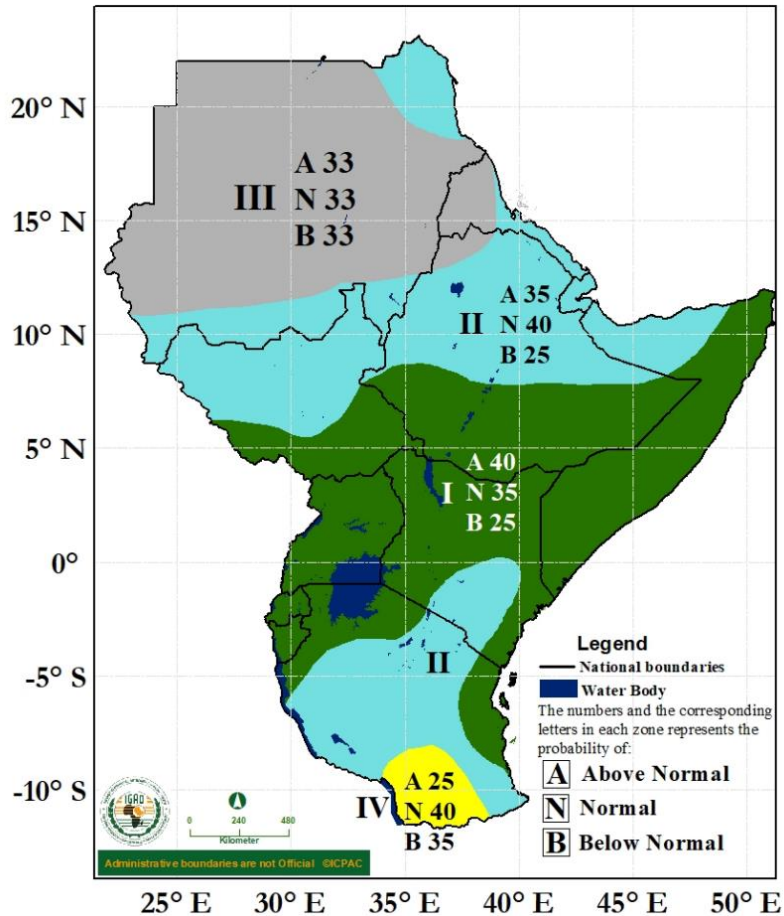
East Africa:

Good rainfall, abundant pasture but risk of flooding

El Nino Impacts: East Africa Short Rains

Left: GHACOF Seasonal forecast for Oct-Dec rainfall in East Africa.
Green and blue denote areas of on or above average rainfall.

Right: October-December total rainfall during El Nino seasons as a percent of the rainfall in neutral seasons.

Blue shades for El Nino wetter then neutral, orange shades for El Nino drier than neutral

East Africa (Kenya, Somalia and SE Ethiopia) has two rainfall seasons, Short Rains (Gu) from October to December and Long Rains (Deyr) from March to May. In other areas where rainfall is spread along the year, these remain the wettest periods of the year.

For the short Rains, El Nino typically leads to enhanced rainfall across East Africa, particularly in northern Kenya from Turkana to the Somalia borders, southeast Ethiopia, southern Somalia and Somaliland-Djibouti.

The GHACOF forecasts for Oct-Dec are in good agreement with the expected patterns, showing extensive areas of above average rainfall around the region.
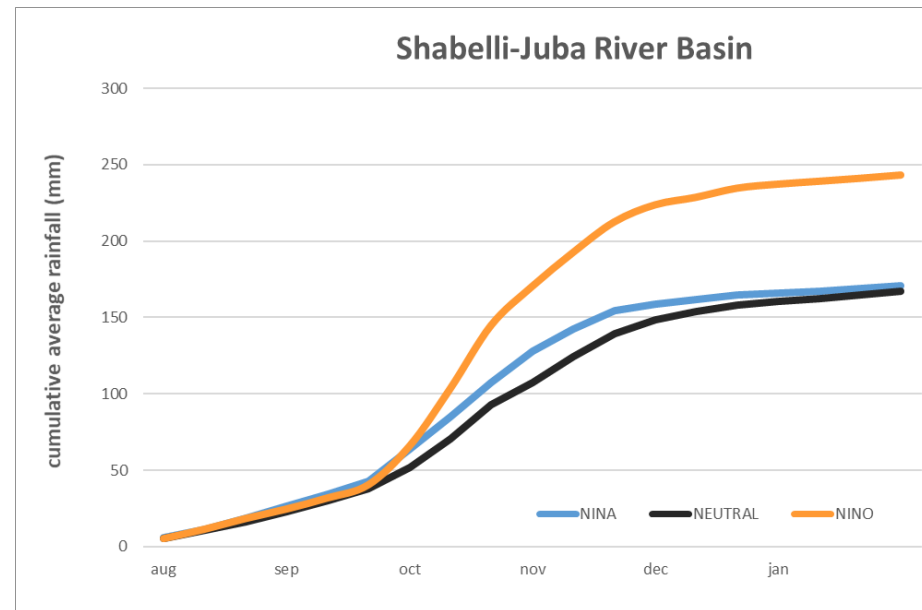
El Nino Impacts: Implications for East Africa
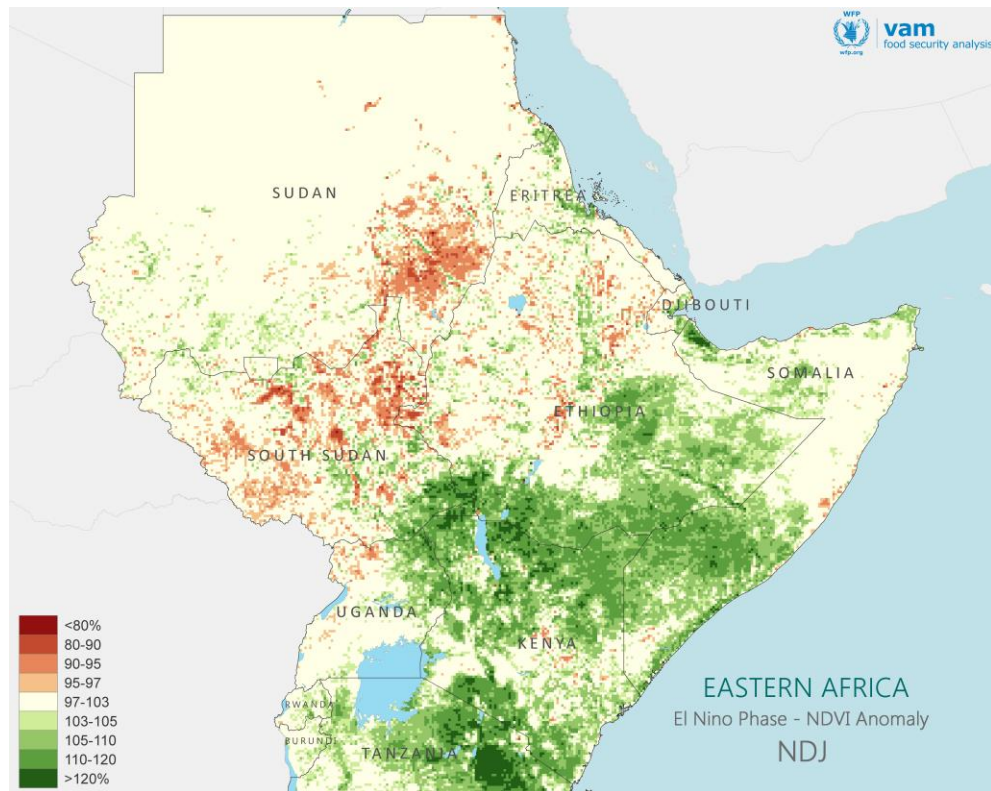
November-January vegetation during El Nino seasons as a percent of the vegetation in neutral seasons.
Green shades for El Nino greener then neutral, red shades for El Nino less vegetated than neutral

Average seasonal cumulative rainfall over the Shabelle-Juba river basins for El Nino, Neutral and La Nina seasons.

Wetter than average conditions during El Nino Short Rains results in much greener than usual conditions throughout the season and across most of the region.

This is expected to result in much improved production, particularly in marginal agricultural areas and semi-arid grasslands dominated by pastoralist livelihoods. This will build on the very favourable conditions of the previous Long Rains season (March-May 2018).

On the other hand, flood risk along the river systems of Somalia and Kenya will increase. El Nino seasons result in much enhanced rainfall in the region's river basins (see chart above). Widespread flooding has happened in the past (specially the catastrophic flooding of 1997) but it is not possible at this stage to figure out whether significant flooding will result and to what extent.
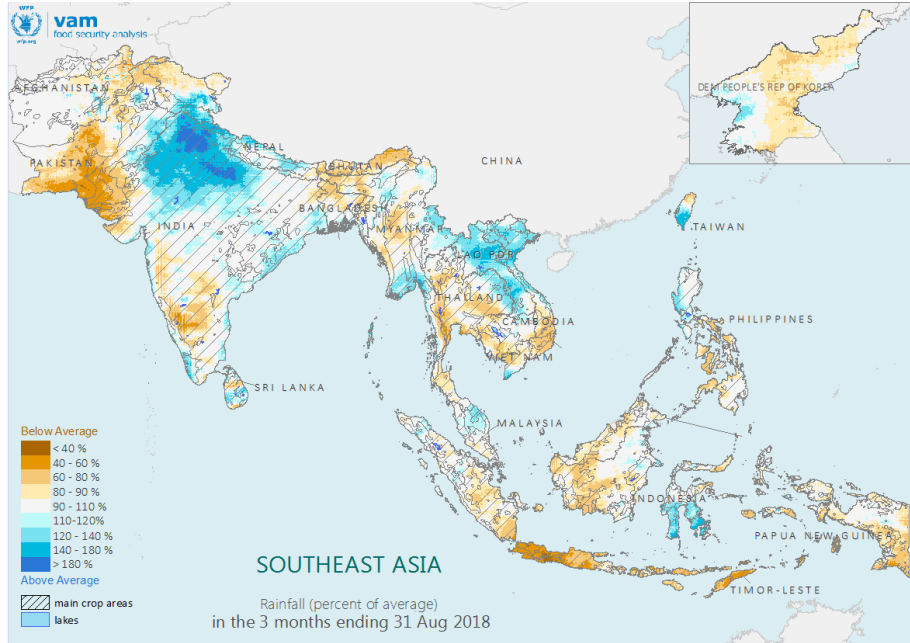
Irrigated agriculture along Somalia's Shabelle and Juba rivers may be at risk, depending on rainfall levels in SE Ethiopia.
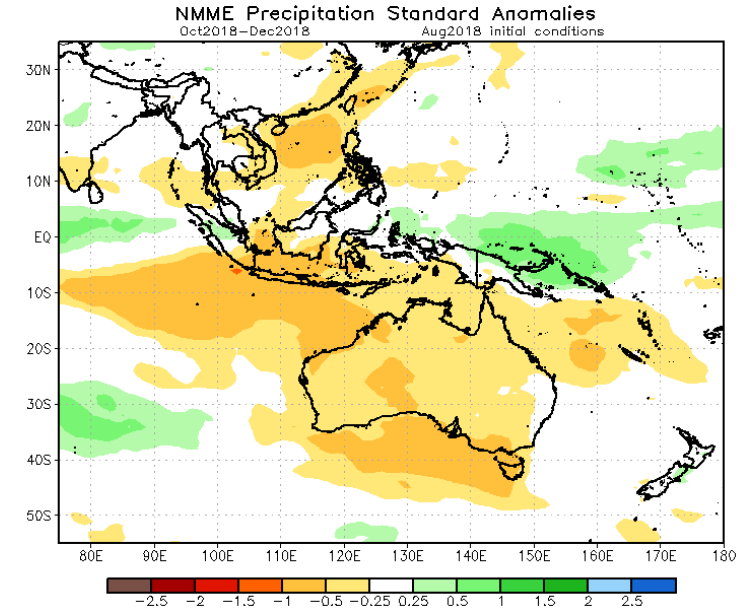
Other Regions

El Nino Impacts: SE Asia

June-August 2018 rainfall as a percent of average. Browns for drier than average conditions, blue for wetter than average.

Rainfall forecasts for Oct-Dec 2018 rainfall. Orange shades for drier than average, greens for wetter than average


Typically, El Nino leads to drier than average conditions across Indonesia, Philippines, Papua New Guinea and the Pacific Islands. Seasonal forecasts already pick up this tendency (map above right).

Currently, drier than average conditions are affecting Indonesia and parts of SE Asia. In Indonesia, these conditions should continue throughout the coming main growing season extending to mid 2019. No significant impact on aggregate national crop production is expected, but poorer vulnerable communities in eastern areas of the country dependent on rainfed farming may suffer.

Papua Guinea is expected to face drier than average conditions but is not likely to experience a repeat of the extreme conditions of 2015-16.

Elsewhere (Philippines, SE Asia), only the secondary cropping season will be affected (October-March). Given the expected short length of the El Nino no impacts are expected for the main season of 2019.
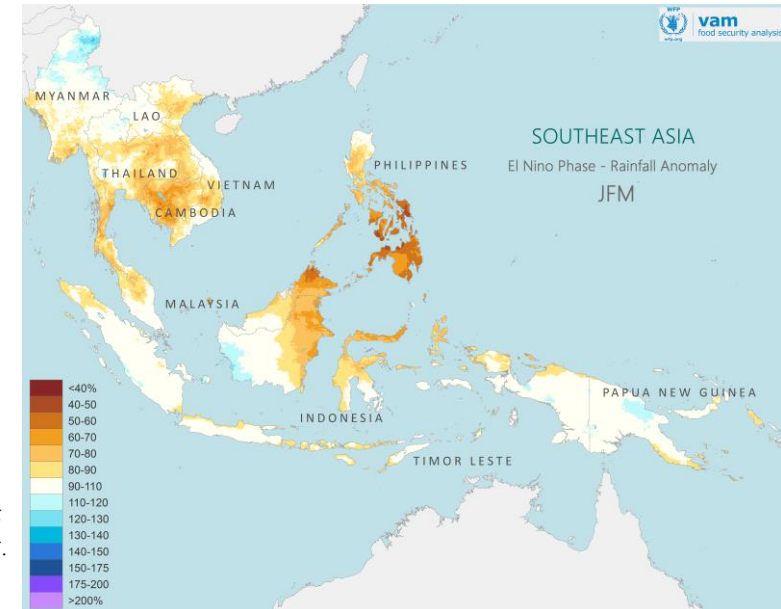
Average Jan-March rainfall in El Nino seasons as a percent of the average in neutral seasons. Blue shades for El Nino wetter than neutral, orange shades for El Nino drier than neutral
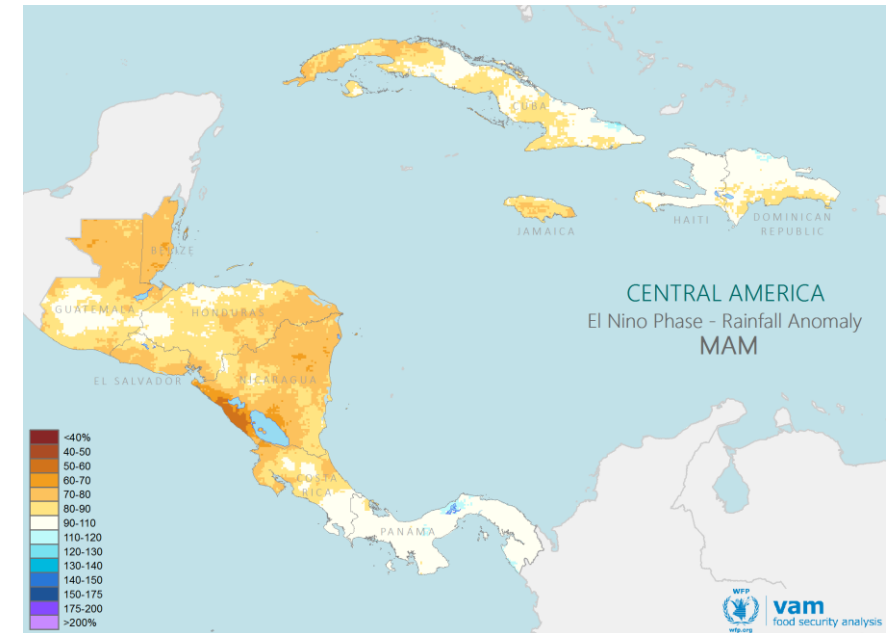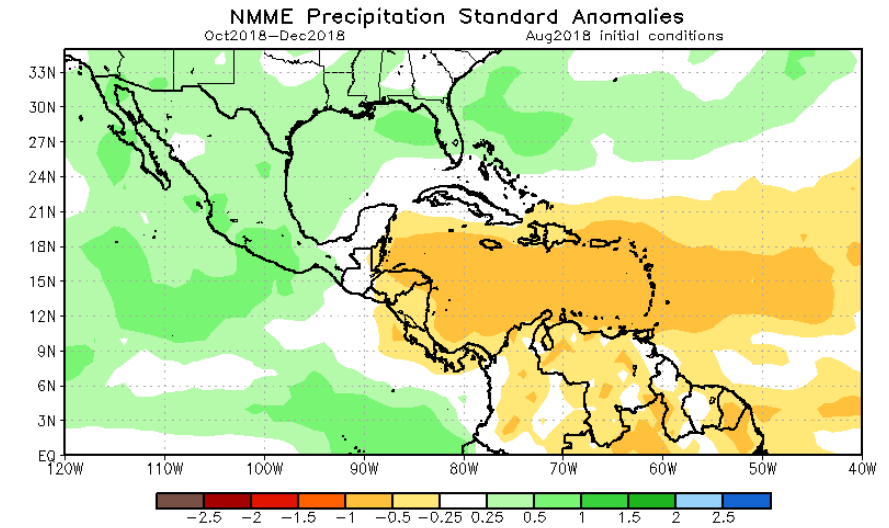
El Nino Impacts: Central America
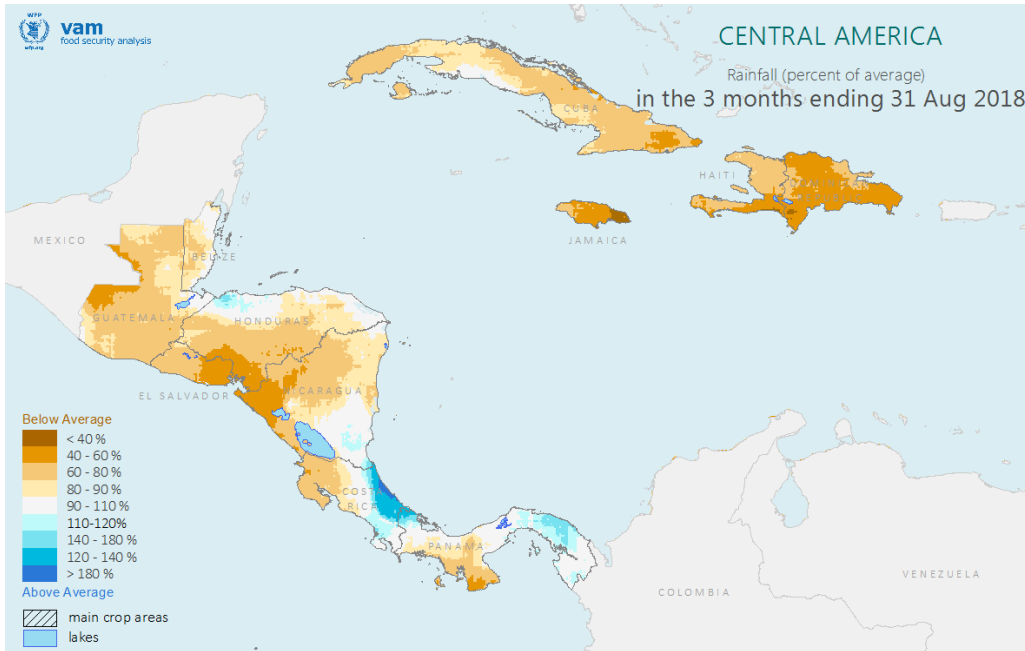
June-August 2018 rainfall as a percent of average. Browns for drier than average conditions., blue wetter than average.

Rainfall forecasts for Oct-Dec 2018 rainfall. Orange shades for drier than average conditions, greens for wetter than average

Central America and the Caribbean are already undergoing drought conditions affecting mainly the Postrera (second) season (see map above left).

An El Nino event will make it likely that such dryness will continue during the remainder of 2018, conditions which are already clearly picked up by seasonal forecasts (map above right).

Depending on the evolution of the El Nino, these drier than average conditions may continue into 2019, possibly leading to a delayed start and unfavourable early stages of the 2019 Primera season (map below right).

Average March-May rainfall during El Nino seasons as a percent of the average in neutral seasons.
Blue shades for El Nino wetter than neutral, orange shades for El Nino drier than neutral

DATA SOURCES:

Rainfall: CHIRPS, Climate Hazards Group, UCSB
Vegetation: MODIS NDVI, EOSDIS-NASA
Land Cover: ESA CCI

PROCESSING:

VAM software components, ArcGIS

FOR FURTHER INFORMATION:

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