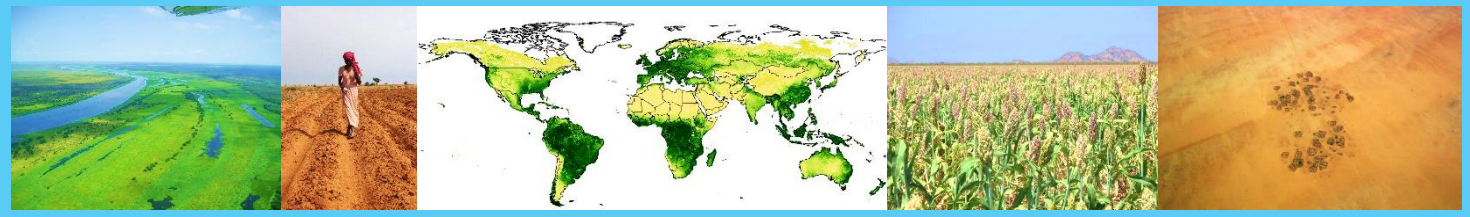


Southern Africa Growing Season 2015-2016:

Facing El Nino in Difficult Circumstances

WFP
wfp.org

vam
food security analysis

HIGHLIGHTS

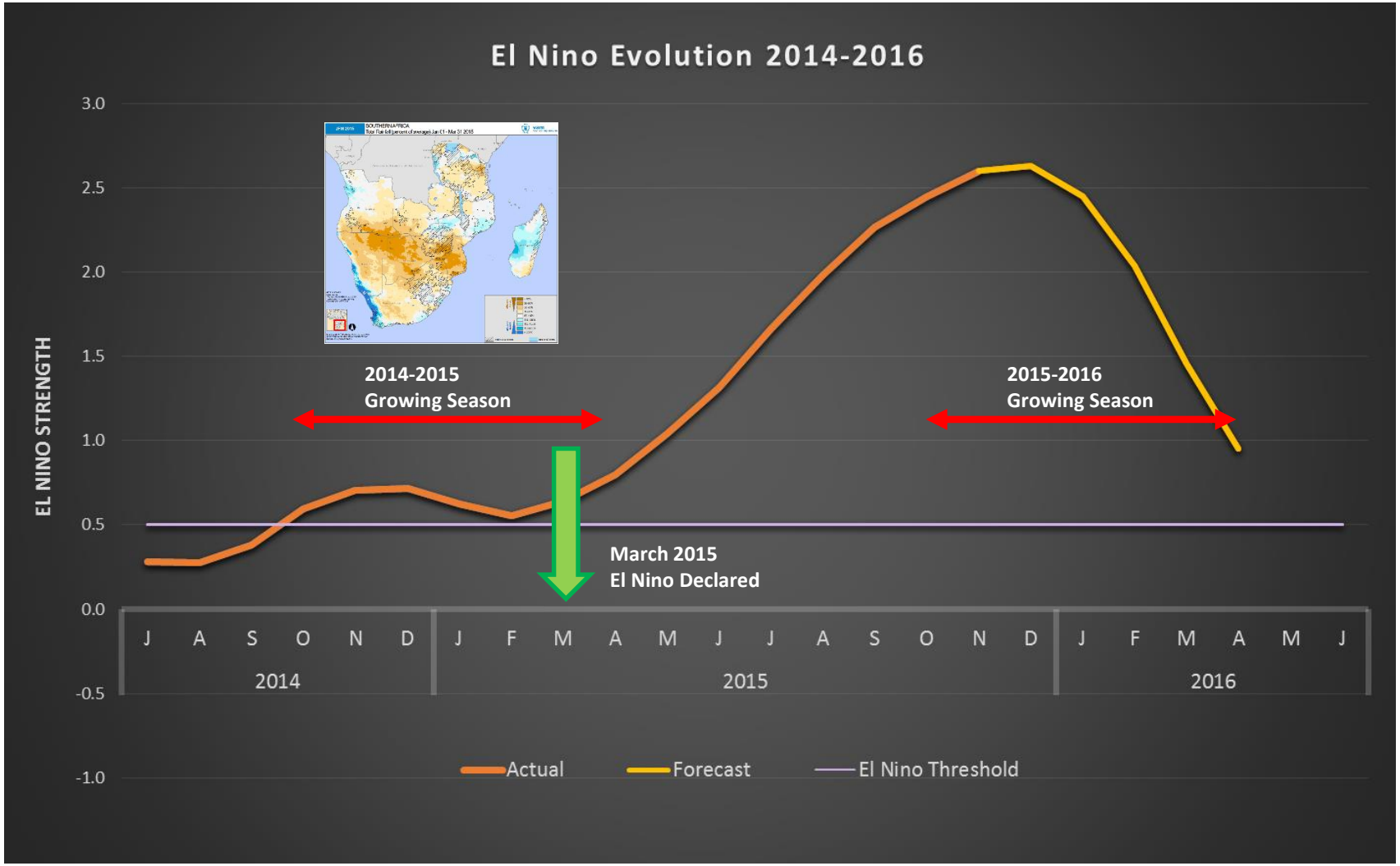
- The current **growing season** (October 2015 – April 2016) in Southern Africa will develop during the peak stage of one of the **strongest El Nino events** in the available record. Unlike previous events, the official onset of this El Nino in March 2015 was preceded by borderline conditions during the previous growing season.
- Although not a fully fledged El Nino, these **borderline conditions** led to extensive rainfall deficits, resulting in widespread drops in crop production. Now the Southern African region has to **face a record level El Nino** in fairly **unfavourable circumstances** of low regional stocks and high market prices.
- Historical records underline the **clear link** between **El Nino events and drops in national maize yield**. This link is strongest for the main maize producer (South Africa) and one of the most food insecure countries (Zimbabwe). Long term satellite data identifies the regions of NE **South Africa**, southern **Mozambique** and south and western **Zimbabwe** as those most **strongly affected** by El Nino events.
- According to expectations, the **early stages** of the season were characterized by **markedly drier** than average conditions that led to widespread **delays in the start of the season**, particularly in eastern South Africa in particular. Vegetation cover is particularly affected given the cumulative effects of the previous season's poor rainfall.
- **Seasonal forecasts** for the current season are **pessimistic**, providing indications of widespread lower than average rainfall for the duration of the season and most of the region.

What to Expect: Historical Evidence and Context

WFP
wfp.org

vam
food security analysis

El Nino Timings and Southern Africa Growing Seasons



El Nino evolution 2014-2015-2016

The current El Nino event was officially declared in March 2015 and will reach its peak intensity in December 2015, before waning after the first quarter of 2016. It will be one of the three strongest El Nino events on record and may well become the strongest ever recorded.

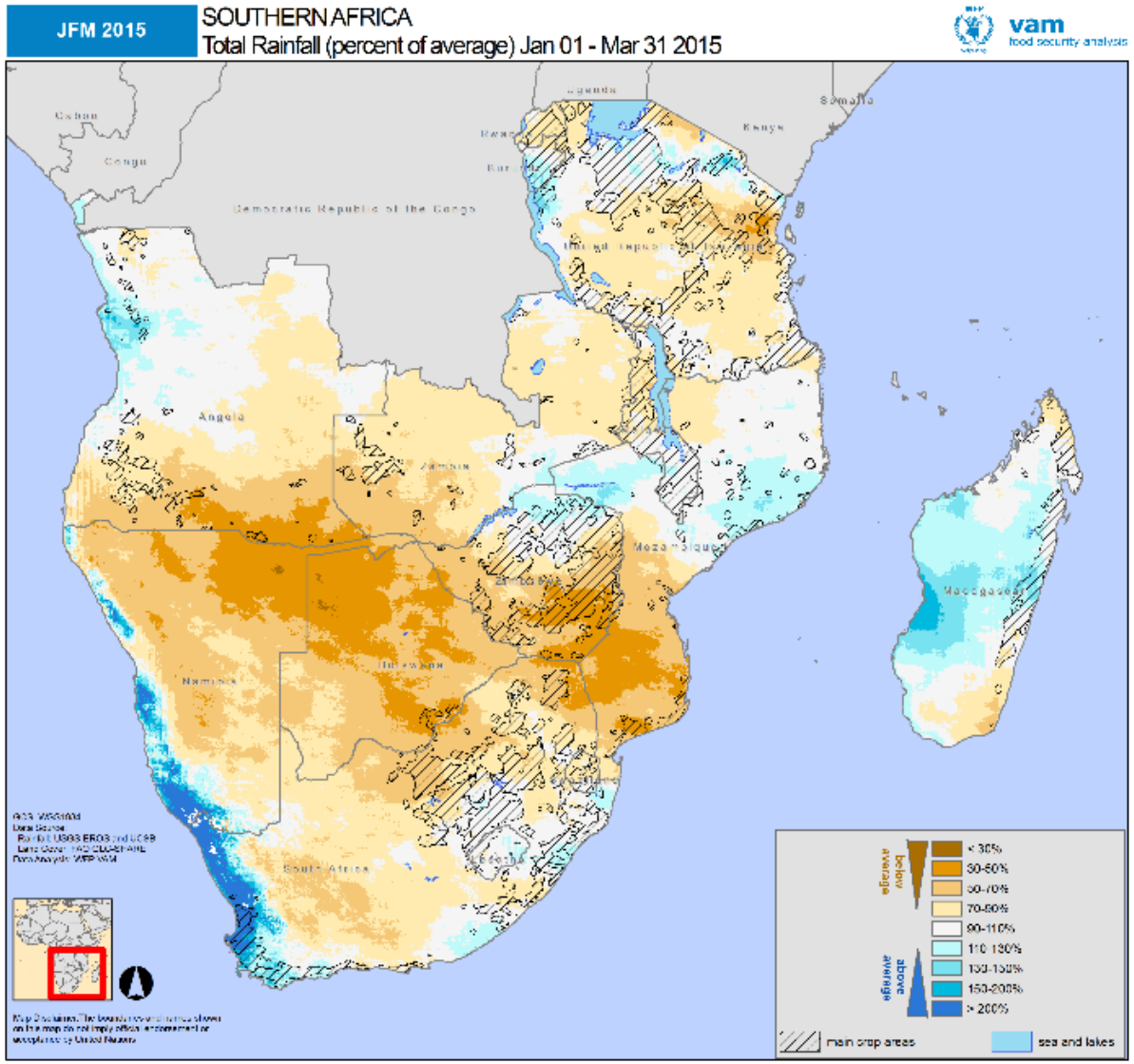
The growing season of 2015-2016 now underway is developing during the peak stage of this (near) record El Nino event.

Furthermore, although its official start was in March 2015, borderline El Nino conditions had in fact prevailed since mid 2014. The El Nino threshold was even briefly exceeded during October-January 2014, though not all criteria were in place to trigger an El Nino declaration.

These borderline conditions largely coincided with key stages of the previous growing season and led to regional level crop losses.

This is a key contextual element for the evaluation of possible impacts of El Nino on the current growing season (see next).

Perspectives for the 2015-2016 Season: Previous Season and Regional Stocks



January to March 2015 cumulative rainfall as a proportion of a 20 year average (1994-2013).

Poor crop performance during the previous growing season

The previous growing season of October 2014 to April 2015 was characterized by extensive rainfall deficits during its key stages – these led to a delayed start of the season and dry spells during the flowering and grain filling stages of the staple maize crop (see map on the left). Significant though localized flooding in Malawi and northern Mozambique further compounded the problems.

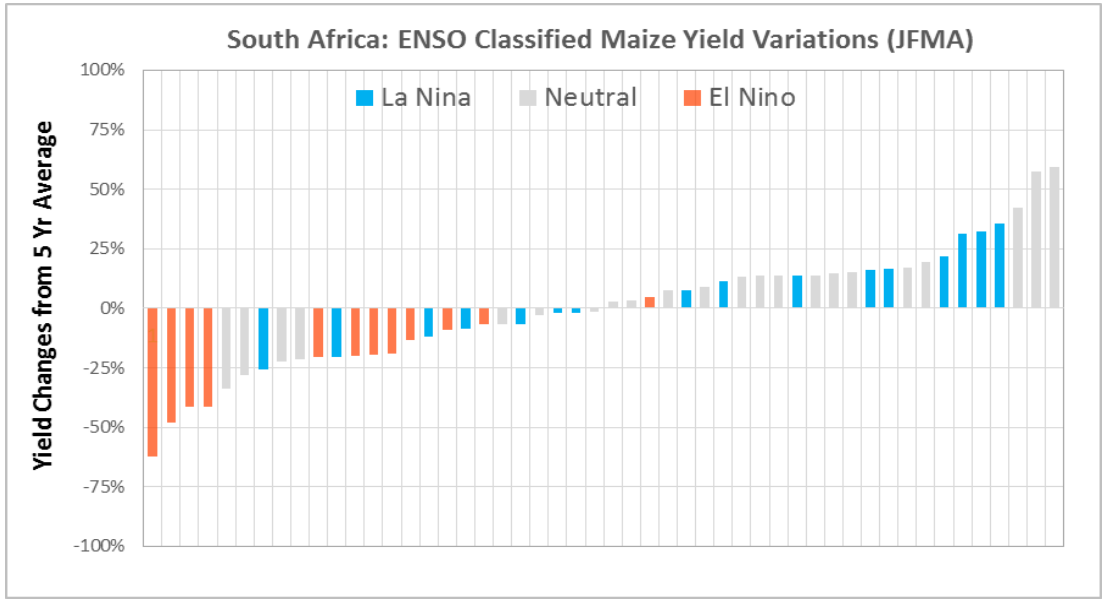
This resulted in crop production deficits across the region which were particularly acute in South Africa, Zimbabwe and Malawi. Much of the possible impacts were attenuated by the extensive stocks that resulted from the bumper crop production of the 2013-2014 season.

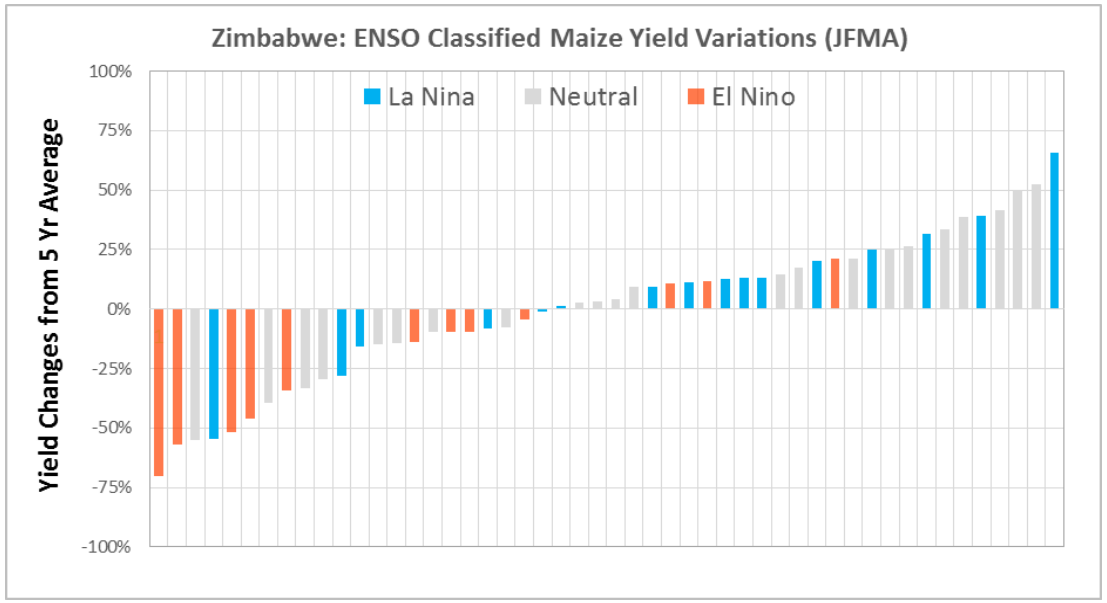
These stocks are now much decreased (from 4400 to an estimated 1750 mi tons, SADC) at the beginning of what may be another poor cropping season.

2014-15 all cereal production vs 5 year average. The two countries of most concern are highlighted: sharp falls on important production volumes (and requirements). SADC figures

Country	2014/15	5yr Avg	Ratio
Angola	1749	1110	58%
Botswana	15	62	-75%
Lesotho	81	92	-12%
Malawi	2945	3883	**-24%**
Mozambique	2255	2338	-4%
Namibia	51	126	-60%
RSA	13149	14420	-9%
Swaziland	82	78	5%
Tanzania	7382	6973	6%
Zambia	2846	2943	-3%
Zimbabwe	800	1373	**-42%**

Perspectives for the 2015-2016 Season: Evidence from Agricultural Statistics





Ranked national maize yield variations from the 5 year average, coded according to ENSO phase
South Africa (above), Zimbabwe (below). Note how largest drops are systematically associated with El Nino

El Nino is associated with maize yield decreases

Historical crop statistics (1961 to 2013, from FAO-STAT) clearly reflect the impact of El Nino events on regional maize production.

National maize yield data for the countries of the region, when expressed as variations from its five year average, show a clear relationship with El Nino and La Nina events (see plots to the left).

Negative variations in maize yield (values below 0%, left side of the plots) are mostly associated with El Nino events (orange) rather than La Nina or Neutral seasons (in blue and grey respectively). The reverse is true for increases in maize yield, which are predominant in Neutral or La Nina seasons.

The strength of the association is variable, but is strongest for the largest producer (South Africa) and the most food insecure country (Zimbabwe) in the region. For Malawi, the association is weaker as the country sits geographically between two opposing El Nino spheres of influence – wetter than average conditions that predominate in Tanzania (associated with East Africa rainfall) and drier than average conditions that usually dominate elsewhere in Southern Africa.

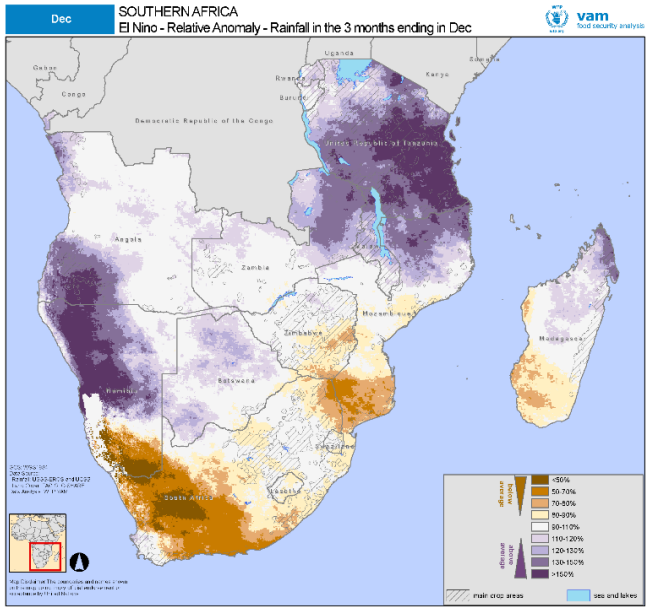
Approximate ranks of maize yield El Nino vulnerability

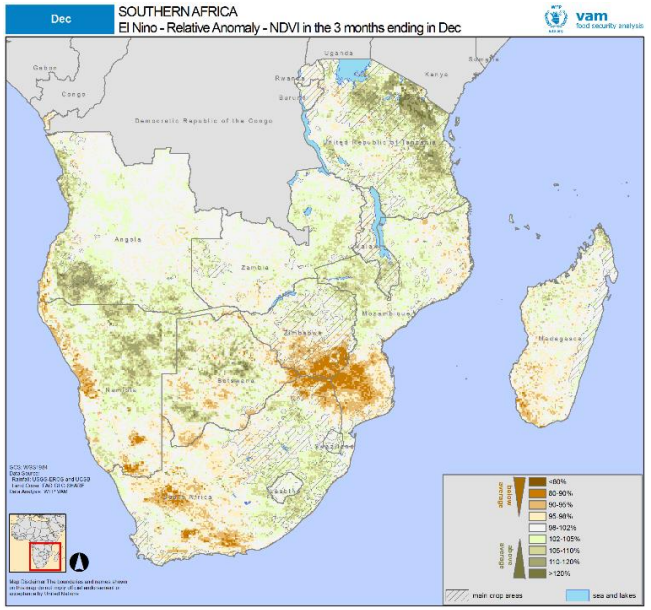
South Africa
Zimbabwe
Mozambique
Zambia
Swaziland
Malawi

Southern Africa: Facing El Nino in Difficult Circumstances

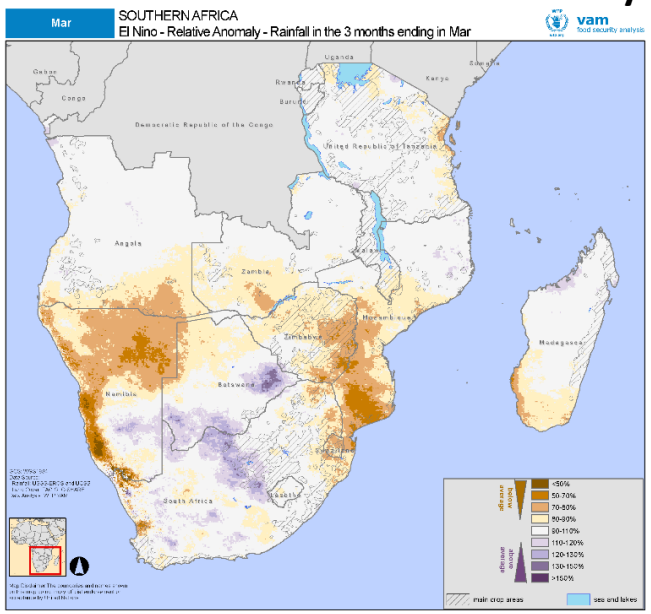
Perspectives for the 2015-2016 Season: Historical El Nino Rainfall and Vegetation Patterns

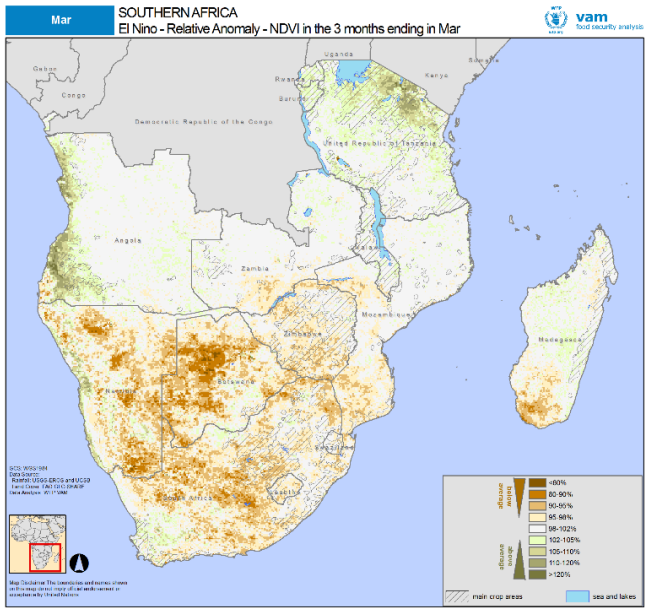
October-December





January - March





Clear signs in historical patterns

Analysis of historical patterns of rainfall and vegetation shed some light on what might be expected from an El Nino season.

The maps to the left represent the comparison between the rainfall and the vegetation cover in El Nino seasons against that in neutral seasons; specifically between total rainfall and average vegetation during two key periods of the season, October-December (planting and early crop development) and January-March (including the time when maize is most sensitive to water deficits).

In El Nino seasons, during October-December, drier than average conditions affect mostly the border areas of NE South Africa, Mozambique and Zimbabwe as well as southern Madagascar. Similar conditions affect SW South Africa though rainfall amounts are small. Vegetation shows similar patterns. These are typical of the late arrival of the rains and consequent severe delays in the start of the season.

Midway through El Nino affected seasons, drier than average conditions are widespread, extending from Namibia across Zambia, Zimbabwe and into Mozambique and NE South Africa and Swaziland. Extensive vegetation deficits are also evident. These patterns typically result from significant dry spells during this period, which can have severe impacts on maize crop production.

Maps represent the average 3 month rainfall and vegetation in El Nino seasons compared to Neutral Seasons.
Above: October-December, Below: January to March.

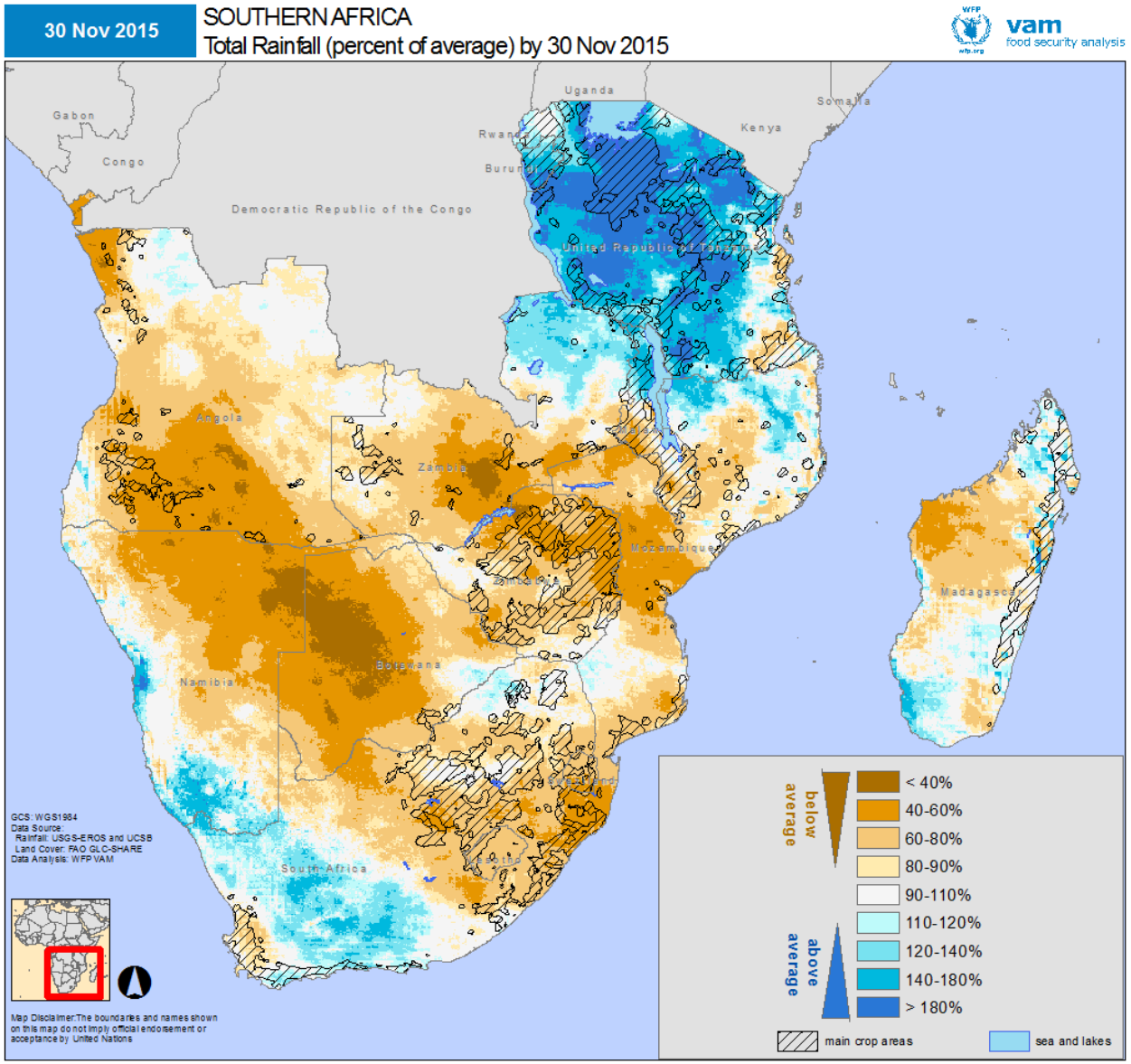
Based on 34 years of data (1981 to 2013) for rainfall and 12 years (2002-2013) for vegetation

Current Status and Near Future Perspectives

WFP
wfp.org

vam
food security analysis

Current Rainfall Patterns



Seasonal cumulative rainfall until late November 2015, as a percentage of the 20-year average.
Hashed pattern indicates main agricultural areas.
Brown shades indicate below-average rainfall; blue shades indicate above-average seasonal rainfall.

Widespread dryness at the start of the season

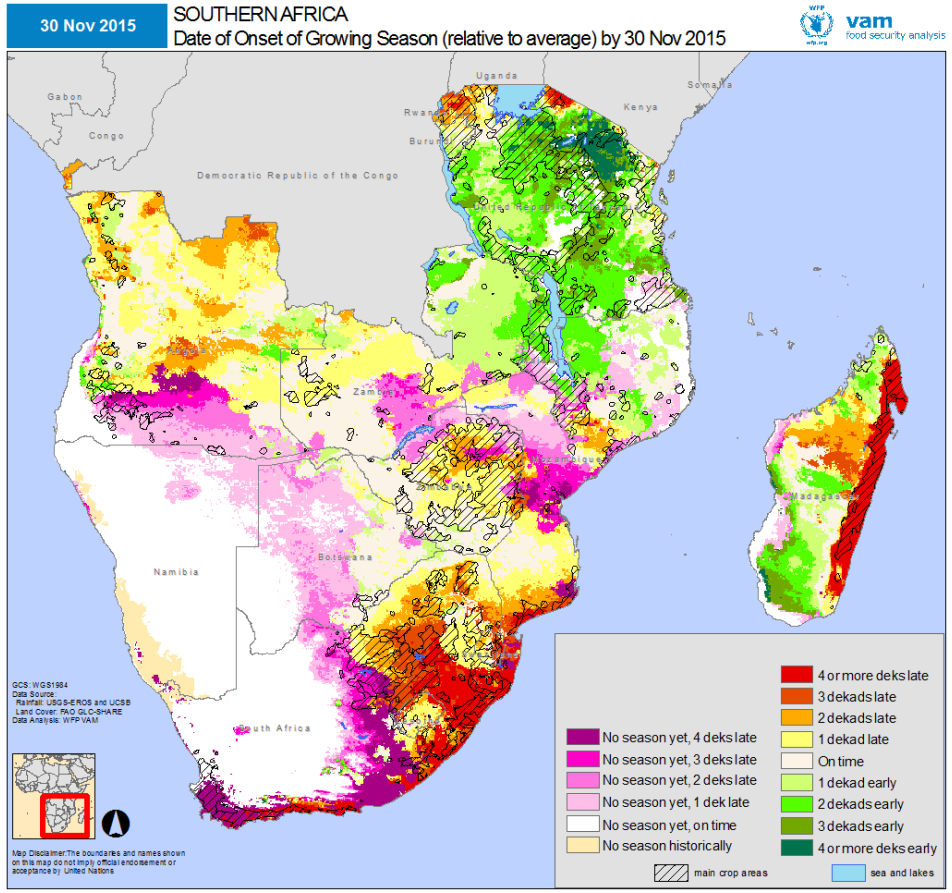
The early stages of the rainfall season have already been characterized by severe rainfall deficits, with wide areas across the countries receiving less than 50% of the usual rainfall.

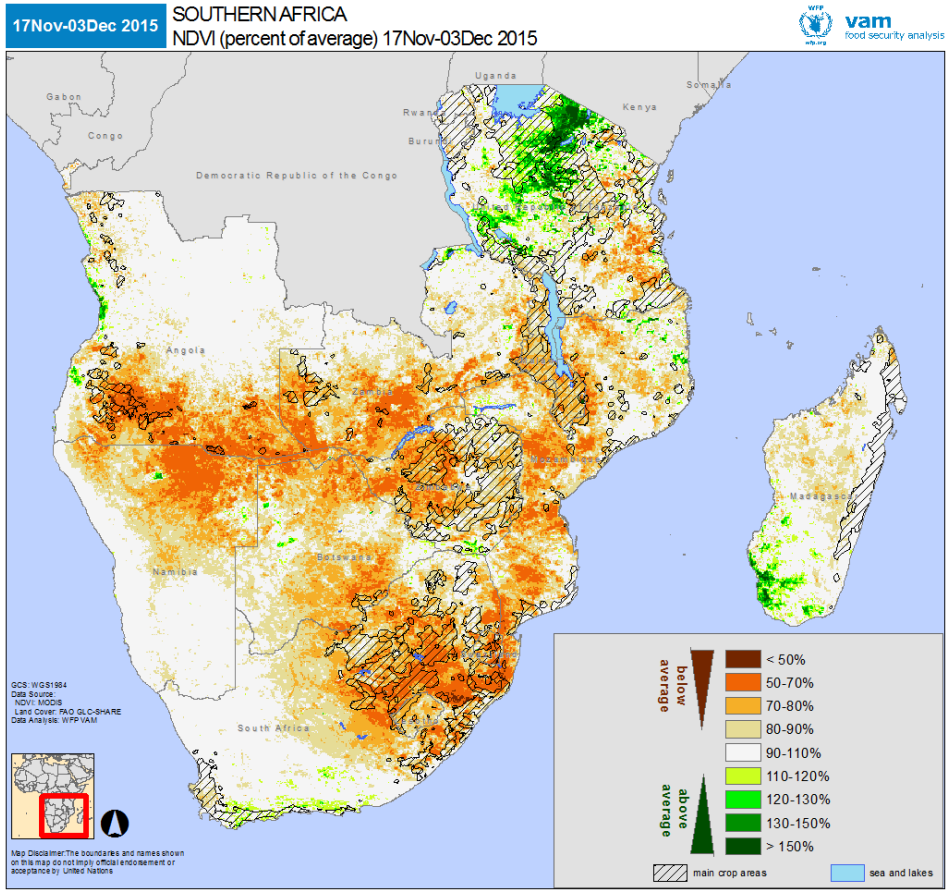
Every El Nino is particular and different from another – however, broad features are in agreement with the expectations from historical data, in particular the wetter than average conditions in Tanzania, northern Zambia and northern Mozambique. On the other hand, over SW South Africa and SW Angola the current situation is the reverse of what would be expected. Southern Madagascar has so far had good conditions,

The regions so far affected by the most severe rainfall deficits include the areas extending from south central Zambia, northern and NE Zimbabwe and central Mozambique. The major agricultural areas of South Africa (eastern and NE), southern Mozambique and Swaziland have been characterized by much drier than average conditions though recent rainfall has allowed some recovery.

These early rainfall deficits result in delays to the start of the growing season. There is plenty of time for a full recovery, but the later the start of the season, the better conditions need to be at a later stage (above average rainfall and longer than usual season).

Current Vegetation and Growing Season Patterns





Left: Date of onset of the growing season by 20 November 2015 compared with average. Oranges and pinks for delayed onsets, greens for earlier then average onsets. Hashed pattern indicates main agricultural areas.

Right: NDVI in mid November 2015, as a percentage of a 12-year average. Orange shades indicate below-average vegetation; green shades indicate above-average vegetation.

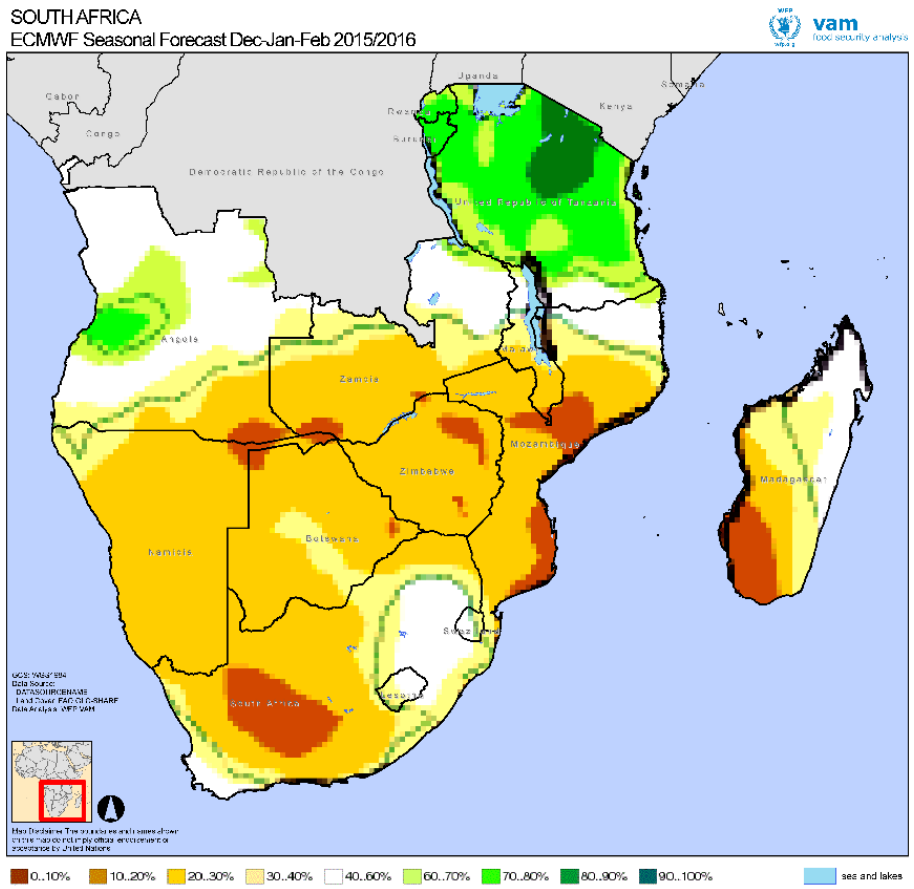
Major delays to the start of the season

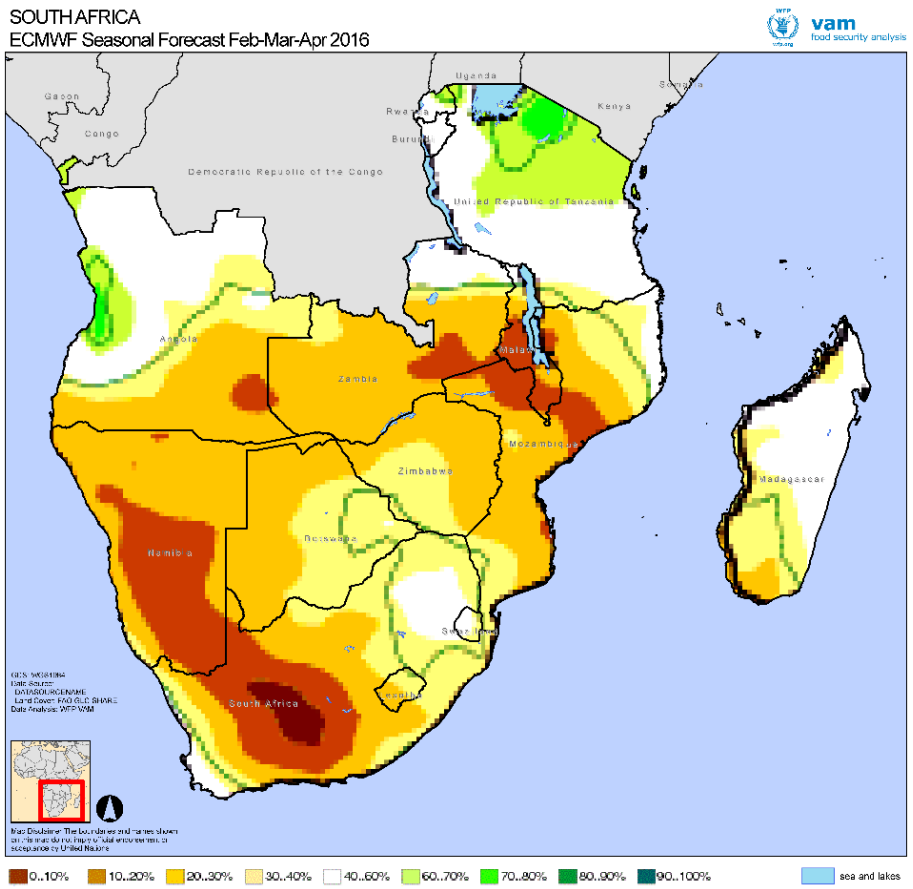
The poor rainfall recorded so far has led to delays in the start of the growing season and as a consequence, below average vegetation cover.

This is evident in the maps above, showing extensive areas with delays in the onset of the season of up to 5-6 weeks. So far, the most extreme delays have been in eastern South Africa, with shorter delays extending across Mozambique into Zimbabwe and Zambia. Angola also had generalized, though more modest delays across the country. On the other hand, across Tanzania and northern Zambia, the wetter than average conditions typical of El Nino seasons allowed an earlier than usual start to the season. Southern Madagascar is also enjoying a good start of the season, unusual under El Nino.

Growth and development of vegetation were also delayed, resulting in strong vegetation cover deficits clearly detected in satellite data. Though there is still time for a full recovery, the urgency of good consistent rainfall that can create suitable moisture conditions for crop development is increasing.

Outlook for the Growing Season 2015-2016





ECMWF forecast :
Left: December-February 2016 rainfall
Right: February-April 2016
Green shades = wetter than average conditions more likely.
Orange shades = drier than average conditions more likely

Forecasts point to continuing dryness

Current seasonal rainfall forecasts cover most of the Southern Africa rainfall season. The forecast for the next three months indicate a continuation of drier than average conditions across most of the region, except central and northern Angola, NE Zambia and Tanzania. Here expectations are for wetter than average conditions. Although the key maize growing areas of eastern South Africa may see improvements in rainfall up to average levels, perspectives for the rest of the region are pessimistic, considering as well the current delays in the onset of suitable moisture conditions for planting and early crop development.

For the latter stages of the season (February to April), the general tendency is maintained with some likely worsening of conditions in the southwest areas of the region and over northern Mozambique and Malawi. These are longer range forecasts and apply to a decreasing El Nino phase, and hence may be less reliable.

Data Sources:

Rainfall: CHIRPS, Climate Hazards Group, UCSB

Vegetation: MODIS NDVI, EOSDIS-NASA

Land Cover: FAO GLC-Share

Processing:

VAM software components, ArcGIS

For more information, please contact:

Rogerio Bonifacio

rogerio.bonifacio@wfp.org

+39 06 6513 3917

WFP

wfp.org

vam

food security analysis